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From Qatar to the World: Ooredoo's Blueprint for Digital Leadership

Ahmad Abdulaziz Al-Neama,
Group Regional CEO of Ooredoo

The 'Four As': The Telecom Industry's Formula for Success

Industrial IoT: Accelerating Industry 4.0 Transformations

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Ahmad Abdulaziz Al-Neama, Group Regional CEO of Ooredoo

From Qatar to the World: Ooredoo's Blueprint for Digital Leadership

With technology advancing at lightning speed, the telecom industry is driving remarkable change, reshaping how we connect, work, and live.

Telecommunications and technology are no longer separate worlds; they've merged to create an era where digital solutions and artificial intelligence (AI) are redefining what's possible. For companies to stay competitive, embracing advanced technologies has become essential. It's not just about keeping up; it's about finding smarter ways to operate, keep customers happy, and unlock new opportunities for growth.

At the heart of this shift is AI, a true game-changer for telcos. It is becoming a cornerstone of innovation, and companies across all sectors will eventually need to embed it into their business models to remain relevant and harness its transformative potential. From analyzing vast amounts of data and predicting issues before they arise to optimizing networks and automating customer service, AI is making things faster, smarter, and more personalized. But achieving this isn't something telecom companies can do alone; it takes partnerships with technology leaders to fully tap into AI's potential and scale its benefits.

One person who's seen this transformation up close is Ahmad Abdulaziz Al-Neama Group Regional CEO of Ooredoo. With years of experience under his belt, Ahmad has been guiding Ooredoo's regional operations during this exciting time. His leadership has been key to driving the integration of AI and digital technologies in the markets he oversees, helping Ooredoo strengthen its position as an industry leader while navigating challenges along the way.

This cover story will take you behind the scenes of this transformation, offering an inside look at Ahmad Al-Neama's journey and his role at Ooredoo. We'll explore Ooredoo's groundbreaking partnership with NVIDIA, the transformative impact of AI on Indosat Ooredoo Hutchison in Indonesia, and how the company is tackling complex regulatory landscapes to drive growth and innovation.

Alongside these stories, you'll see how Ooredoo is helping shape the future of telecommunications—one connection, one innovation, and one bold move at a time.

Profile

Ahmad Al-Neama's journey with Ooredoo is a story of dedication, growth, and represents a person with a knack for navigating challenges with a forward-thinking approach. Born and raised in Doha, Qatar, Ahmad pursued a degree in Electrical and Electronics Engineering from the University of Colorado, Denver—a decision that set him up for a career in the dynamic world of telecommunications.

Ahmad joined Ooredoo Qatar in 2004, stepping into a technical role that allowed him to immerse himself in the core operations of the industry. Early on, his problem-solving skills and natural leadership began to shine. Whether it was tackling engineering projects or streamlining operations, he quickly made a name for himself as someone who could turn challenges into opportunities. His early career saw him take on pivotal roles, including Director of Demand and Project Management and Senior Director of Radio Networks, where he played an instrumental role in shaping the technical backbone of Ooredoo Qatar.

As Ahmad's responsibilities grew, so did his impact. From Chief Sales & Services Officer at Ooredoo Qatar to Group Chief Technology Officer at Ooredoo Group, he built a reputation for blending strategic vision with hands-on execution. In these roles, he worked to enhance operational efficiency and strengthen Ooredoo's market presence, ensuring the company remained ahead in an ever-evolving industry.

In May 2019, Ahmad took on a new challenge: leading Indosat Ooredoo, one of Indonesia's largest telecom companies, as President Director and CEO. His tenure in Indonesia was marked by his bold decisions and the impactful results the company delivered. From launching 5G services in multiple cities to steering the company through the complexities of the COVID-19 pandemic, Ahmad consistently delivered. One standout moment was orchestrating the USD 750 million sale of over 4,200 telecom towers—one of the largest deals of its kind in Asia. This strategic move not only strengthened Indosat Ooredoo's financial position but also paved the way for its growth. Another highlight was the successful merger of Indosat Ooredoo with Hutchison 3 Indonesia, creating a more competitive and future-ready entity.

Today, as Group Regional CEO, Ahmad oversees Ooredoo's operations in

> Ooredoo is helping shape the future of telecommunications—one connection, one innovation, and one bold move at a time

Algeria, Tunisia, Palestine, the Maldives, and Indonesia, demonstrating a diverse portfolio of markets with unique challenges and opportunities. He remains focused on fostering collaboration and identifying partnerships that unlock growth while ensuring cost efficiency.

In an exclusive interview with Telecom Review, we sat down with Ahmad to explore Ooredoo's ambitious strides in digital infrastructure and its groundbreaking partnership with NVIDIA, which is set to bring the power of AI to its markets. He also shared his perspective on Indosat Ooredoo Hutchison's remarkable success—one of Ooredoo's flagship success stories. We also discussed how the company is tackling complex regulatory challenges in a fast-changing landscape.

Digital infrastructure has become a cornerstone of modern economies. How is Ooredoo positioning itself as a leader in this space?

Ahmad: Digital infrastructure is the heartbeat of modern innovation and economic growth. It's what powers everything from AI and 5G to cloud computing and digital payments, making it essential for businesses, governments, and communities to thrive in today's world.

At Ooredoo, we've embraced this reality by reimagining how we operate. A few years ago, we started transforming Ooredoo into a telecom and infrastructure holding company with five key focus areas: telco operations, towers, data centers, subsea cables, and fintech. This isn't just a new structure; it's a way to ensure we're ready to support the next wave of digital transformation.

Take our data centers, for example. These are built to handle advanced AI workloads and cloud services, enabling businesses to innovate faster and smarter. Or our investment in subsea cables, like the 2Africa project, which is in its final stages of landing. This will provide the region with stronger global connectivity, a critical piece of the puzzle for economic growth.

By breaking away from the traditional telecom model and moving toward a more focused, layered approach, we've created a system that's not only more agile but also more aligned with the needs of the digital economy. This means we can strategically invest where it matters most and help our partner—whether they're startups, enterprises, or governments—tap into new opportunities and deliver real impact.

Ultimately, our goal is simple: to build the foundation that supports innovation and drives economic progress, creating a future where everyone can benefit from the power of technology.

AI is clearly a major focus for Ooredoo, especially with your partnership with NVIDIA. How do you see this collaboration shaping Ooredoo's role in the AI ecosystem, and what opportunities does it open up for the markets you serve?

Ahmad: AI is a transformative technology that's reshaping industries, and at Ooredoo, we see it as a critical part of our future. Our partnership with NVIDIA represents a major milestone

in this journey. NVIDIA's expertise in AI hardware and software, combined with our advanced digital infrastructure, positions us to play a leading role in the AI ecosystem across our markets.

One of the first steps we're taking is adapting and retrofitting our data centers to deploy NVIDIA's latest-generation GPUs. These are specifically designed for high-performance computing and AI workloads and having them integrated into our operations will open up enormous possibilities—not just for us, but for the businesses, governments, and communities we serve.

In practical terms, this collaboration enables us to bring AI-driven solutions to life. For example, we're looking at opportunities in sectors like healthcare, oil and gas, financial services, and transportation. AI can help these industries unlock new efficiencies, gain deeper insights, and deliver more personalized services.

But beyond specific use cases, this partnership also strengthens our position as an enabler of innovation. By offering AI-ready infrastructure, we're helping our markets across the MENA region prepare for the future—whether that's by supporting startups, experimenting with AI applications, enabling enterprises to scale their AI strategies, or empowering governments to use AI for public services.

What excites me most is that we're just getting started. AI is still in its early stages, and through this partnership, Ooredoo is laying the groundwork to ensure we can grow alongside the evolving needs of our customers and the wider digital economy to become the MENA region's leading digital infrastructure group.

Indosat Ooredoo Hutchison is one of Ooredoo's key markets, and it's been making significant strides in AI and digital transformation. Can you share more about IOH's journey, particularly how the partnership with NVIDIA is playing a role, and what this means for their customers and Indonesia's broader digital ecosystem?
Ahmad: Indosat Ooredoo Hutchison

(IOH) has had an incredible year in 2024, taking steps that really showcase its leadership in digital infrastructure and AI. Indonesia is such a dynamic market, and IOH is driving the country's digital-first future with some truly innovative initiatives.

And here's the exciting part: the lessons we've learned from IOH's success are already shaping our approach in other markets. The collaboration with NVIDIA has demonstrated the potential of AI when combined with world-class infrastructure. And we're now bringing that model to the broader region, scaling what's worked so well in Indonesia to accelerate digital transformation and deliver real value for businesses and communities across our footprint.

One of the standout achievements this year has been IOH's work on data centers. In partnership with BDx Indonesia and Lintasarta, they made a game-changing move with a deal worth IDR 2,625 billion (around USD 165 million), acquiring carrier-neutral colocation and edge sites across Indonesia. These ten strategic sites are

> Ultimately, our goal is simple: to build the foundation that supports innovation and drives economic progress, creating a future where everyone can benefit from the power of technology

now connected to major domestic and international subsea cables, significantly boosting the country's digital infrastructure. It's all about creating the kind of connectivity that businesses and communities can rely on as they grow and innovate.

Then there's the work IOH has been doing with NVIDIA, which is nothing short of groundbreaking. Together, they're building AI-ready infrastructure, including state-of-the-art data centers equipped with NVIDIA's cutting-edge AI platforms. This partnership is all about making AI accessible across industries, giving local businesses and government agencies the tools they need to transform the way they operate.

> Regulation is absolutely essential when it comes to harnessing the full potential of AI and digital infrastructure, which will lead us to a thriving digital economy

One initiative I'm particularly excited about is Sahabat-AI, a project designed to bring Indonesian large language models (LLMs) to life. These LLMs are tailored specifically to Indonesia's cultural and linguistic needs, and they're already enabling industries and public services to innovate in ways that truly resonate with the local community.

IOH's subsidiary, Lintasarta, also launched GPU Merdeka, a sovereign AI cloud service powered by NVIDIA. This is a big deal because it gives businesses in Indonesia the ability to access high-performance AI tools and integrate them seamlessly into their operations.

But it's not just about the technology; IOH has also focused on driving collaboration and sparking ideas. For example, they hosted a Banking AI Day to explore how AI can reshape financial services, and they have partnered with companies like Accenture and Google Cloud to deliver enterprise-grade AI solutions that enhance customer experiences.

What I find most inspiring about IOH's journey is how it's creating ripple effects across Indonesia's digital ecosystem. It's about building infrastructure, empowering entire industries, fostering innovation, and driving economic growth.

The recent Digital Ecosystem Conference held by Ooredoo Group highlighted the critical role of policy and regulation in shaping the future of the digital economy. Given the rapid advancements in AI and digital infrastructure, how do you see regulations evolving to balance innovation with oversight? And what specific steps should be taken to regulate AI use cases effectively while fostering growth in markets like Indonesia?

Ahmad: Regulation is absolutely essential when it comes to harnessing the full potential of AI and digital infrastructure, which will lead us to a thriving digital economy. This was one of the central themes at the Digital Ecosystem Conference and what we've seen during the event is that we are already working with some of the best frameworks globally. Qatar, for instance, has built a regulatory ecosystem that sets a high benchmark for balancing innovation with oversight.

One thing that really stood out during the event was the consensus that regulations need to evolve as fast as technology itself, if not faster. Otherwise, we risk stalling innovation before it even gets off the ground. So, there is definitely room to strengthen and adapt these frameworks to meet emerging challenges.

For AI, it's not about regulating the technology itself, which has existed in

various forms for decades; instead, the focus should be on its applications. See, what's really changing now are the use cases. These are the areas where AI is applied, like predictive analytics in healthcare, fraud detection in banking, or personalized learning in education. And each use case comes with its own unique risks and opportunities, which means regulation must be tailored to address specific contexts, while ensuring consistency across markets.

Consider Indonesia, for example. It's a fast-growing digital economy where initiatives like GPU Merdeka and Sahabat-AI depend on regulatory clarity. Every step forward is tied to ensuring we have the right frameworks in place. At IOH, as we roll out sovereign AI infrastructure and initiatives like Sahabat-AI, we're working closely with local stakeholders to ensure that these innovations align with national priorities, whether it be data sovereignty, consumer protection, or cybersecurity. This approach allows innovation to boom without compromising safety or trust.

Another key takeaway from the conference was the need for collaboration between governments, industry players, and regulators. By collaboration, I mean going beyond just creating rules and setting regulations to actually having open dialogue and constructive conversations that end up benefitting all stakeholders. In our markets, we've seen firsthand how discussions around cross-border data protection, the 5G rollout, and AI ethics can pave the way for balanced frameworks that both enable growth and safeguard public interest.

Regulation is not a barrier, and it shouldn't be; it's a blueprint that gives everyone clarity, consistency, and confidence. But for that to happen, we need a shift in mindset. Regulators and industry players must work together on co-creating policies that are forward-thinking, adaptable, and, most importantly, aligned with the pace of innovation.

At Ooredoo, we see ourselves as enablers. We are not just technology providers, but also a partner working closely with governments, regulators, and policymakers to co-create policies that are forward-thinking, practical, and implementable. By initiating and contributing to conversations like those we recently had at the Digital Ecosystem Conference, we're helping to shape a regulatory environment that ensures technologies like AI can truly prosper while addressing the unique needs and challenges of each market.

And to bring it back to Indonesia, I think it's a perfect case study. The success of initiatives like GPU Merdeka or Sahabat-AI depends on a regulatory ecosystem that understands the transformative potential of these technologies. It's about setting the right foundations now, so we're not just building for today, but for the future.

Conclusion

As Ahmad reflects on the strides Ooredoo has made and the opportunities ahead, one question remains: How does Ooredoo plan to stay ahead of the curve in a world where technology evolves faster than ever? The answer lies in the company's solid commitment to innovation, partnerships, and creating a sustainable digital ecosystem one bold step at a time. TR

> We are not just technology providers, but also a partner working closely with governments, regulators, and policymakers to co-create policies that are forward-thinking, practical, and implementable

Connectivity in Space: LEO Satellites Help Bridge the Digital Divide

The communications industry is working towards ubiquitous connectivity, and recent advances in satellite technology are making it easier to bridge the gap.

Satellite technology has played a vital role in global communications for decades. Starting with TV broadcasts and basic phone calls and evolving to broadband internet and mobile backhaul, geostationary Earth orbit (GEO) satellites and medium Earth orbit satellites (MEO) have been filling the connectivity gaps in hard-to-reach areas not connected by traditional telecom networks. However, due to the distance these satellites cover from Earth, latency has become an issue, preventing their widespread use in real-time communications.

Low Earth orbit (LEO) satellites are much closer to Earth—ranging from 300m to 1,500km—resulting in much lower latency than GEO satellites. LEO satellites can also be linked together to increase capacity. The downside of LEO technology has been the cost, limiting their use in commercial networks. With recent technological advances like software-defined control and AI, as well as lower cost launches, LEO satellites offer an exciting and affordable option to bridging the digital divide, filling

mobile coverage gaps and equipping diverse industries with high-quality and mission-critical communications anywhere in the world. This is specifically pertinent when considering the increasing impacts of natural disasters, such as flooding caused by hurricanes, which can leave people isolated and unable to communicate. Using satellite communication to reach these areas could allow for aid to reach them more quickly.

However, the demands of highly dynamic LEO satellite networks place requirements on network and service operations that go above and beyond what any modern telco or satellite provider has been equipped to handle. In addition, given the on-demand nature of LEO satellite connections due to their low latency and finite capacity, operators need an efficient and scalable way to transact with customers and partners. Key issues include:

- **Highly Dynamic Operations:** Building a real-time view of the service topology is extremely complicated given the many moving parts in a satellite network.
- **Multi-Domain Services:** New operational systems are needed to model, manage and orchestrate services across space and Earth.
- **Complex Diverse Global Customer Base:** Different business models and better engagement models will be needed to address the specific needs of customers in different countries and adhere to the specific requirements of those countries including language, currency, taxation schemes and data privacy.

Another emerging technological innovation telcos need to consider is the ability to connect satellites directly to regular mobile, as well as IoT, devices using direct-to-device (D2D) technology. In place of dedicated satellite phones, ordinary smartphones can seamlessly switch from 4G/5G mobile networks to satellite to maintain connectivity and fill coverage gaps. In the IoT market, this presents opportunities to keep remote sensors and tracking devices connected at all times for use in agriculture, transportation and environmental monitoring, among others, enabling operators to offer ubiquitous connectivity to consumers and a variety of industries.

Telcos and Satellite Operators Embrace the New Era of Communications

In order to take advantage of the communication potential introduced by LEO satellites, both telcos and satellite operators need to adapt to these new requirements. By ensuring their systems are able to handle the interconnection between satellites and telco networks, both parties can play a significant role in closing the connectivity gap.

Telcos can extend their coverage by placing 5G RAN in areas that are difficult to serve and using satellite for backhaul, employing a multi-orbit strategy. Fixed satellite access can address the consumer and business market in areas that are not economical for 5G, D2D or fiber.

To serve these telco markets, satellite communication providers need a new way to manage, optimize and monetize their business as they prepare to offer new types of services, expand into new markets and differentiate themselves in what is becoming a highly competitive market. Satellite operators require:

- The ability to deliver and guarantee the highest service quality at any time, helping them address mission-critical services in highly demanding verticals and the governmental market.
- Ways to engage with their customers and partners in a more digital and API-centric way, making it easier for customers to purchase or modify services and get the support they need.
- A method to easily create any type of service offer and support any customer type in any country in the world. Satellite operators need to be able to quickly adapt to changes in the market and take advantage of new innovations.

To meet these requirements, Netcracker has developed the industry's first blueprint for multi-orbit satellite IT, incorporating new innovations to help satellite providers always guarantee the highest service quality.

The Netcracker Digital Satellite Solution encompasses significant innovations in real-time operations and sophisticated BSS applications and is deeply embedded with AI to help satellite operators extract the maximum value from their significant investments. With our solution, operators can deliver and guarantee the best service quality at any time, provide premium digital engagement for their customers, and expand their business with any type of customer and service offering, in any country.

Utilizing its Digital Satellite Solution, Netcracker is helping satellite operators to expand their communication offerings through deeper integration with telco domains, maximizing their value in this growing market and delivering differentiating communication experiences. TR

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

“The Netcracker Digital Satellite Solution encompasses significant innovations in real-time operations and sophisticated BSS applications and is deeply embedded with AI”

Adrian Pickering, Senior Regional Director MENA, Red Hat

How Red Hat's Open-Source Solutions are Shaping MENA's Digital Future

In an exclusive interview with Telecom Review, Adrian Pickering, Senior Regional Director MENA, Red Hat, shared details about the company's journey towards technological advancement in the region, their customer demands this year, and how open-source technology is essential in building secure and scalable IT infrastructures.

Why is Red Hat considered a key partner in the MENA region's journey towards technological advancement?

The adoption of open-source technologies has really started to accelerate over the last four-to-five years. The customers are very willing to adopt open-source technologies given the advantages it brings in terms of rapid innovation and cost-effectiveness.

From a Red Hat perspective, our open-source solutions encompass a broad range of industries. We work with customers in banking and financial services, telecommunications, aviation, and oil & gas, among others.

How did Red Hat respond to evident customer demands in the region this year?

We have seen that most of our customers are moving towards a cloudified environment. Hence, most organizations are looking at how they can embrace cloud, particularly the hybrid cloud approach, and that is exactly what Red Hat does.

Our solutions are designed to allow enterprises or public sector organizations to utilize and gain all the benefits from distributing their technologies and application requirements across a hybrid-cloud environment.

How does Red Hat utilize open-source technology to build secure and scalable IT infrastructures?

Open-source technologies develop and innovate at a very rapid pace. Because of that, one of the key concerns when we bring open-source technologies to the marketplace is whether they are completely secure.

Through our process of screening, testing, and certifying before deploying the software to the customer, we're absolutely confident that any sorts of risks they may face out there are mitigated.

We can demonstrate what we do to our customers and our partners, giving them the assurance that if they are doing business with Red Hat, and implementing our technologies, the platform is very secure.

What can customers expect from Red Hat MENA in 2025?

Firstly, we will continue to focus on our operating system and its adoption within more data centers. We are also increasingly gravitating towards devices located at the edge of the networks.

Secondly, you will see Red Hat continuing to focus on our Red Hat OpenShift Container platform, and, in particular, this relates to looking for customers who want to migrate their virtualization infrastructure, which is happening quite extensively across the Gulf region.

Lastly, we will continue leveraging artificial intelligence (AI) as Red Hat recently announced RHEL AI (Red Hat Enterprise Linux AI)—the AI version of our operating system—as well as the OpenShift AI. TR

We can demonstrate what we do to our customers and our partners, giving them the assurance that if they are doing business with Red Hat, the platform is very secure

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Managed Connectivity: Perspectives For Potential Investors

In the rapidly evolving telecom landscape, managed connectivity has emerged as a critical enabler for businesses and commercial property owners seeking to enhance their operational efficiency and customer experience. Managed connectivity encompasses a range of technologies, including WiFi, Distributed Antenna Systems (DAS), small cells, and Private Mobile Networks (PMN), all designed to provide seamless, reliable connectivity. This article delves into the significance of managed connectivity from a potential investor's perspective, exploring its main types, demand drivers, key investment themes, and future outlook.

Types of Managed Connectivity Technologies

Managed connectivity providers typically design and install network infrastructure, as well as operate and manage the connectivity service. These technologies come in various forms, each with unique advantages and applications.

WiFi is a wireless networking technology that allows devices to connect to the internet and communicate wirelessly within a local area. It is widely used in homes, offices, and public spaces to provide internet access. In the UK and Europe, notable players in the managed WiFi market include ASK4, Glide, Wifinity, Wifirst, and Passman.

Distributed Antenna Systems (DAS) and small cells are other important technologies within managed connectivity. DAS is a network of spatially separated antenna nodes connected to a common source, enhancing wireless coverage within buildings and other structures. Small cells, on the other hand, are low-powered cellular radio access nodes that improve coverage and capacity in specific areas. Key players in this segment include Freshwave, WIG, Boldyn and Shared Access, with TowerCos such as Cellnex, TDF and Vantage Towers also developing offerings.

Private Mobile Networks (PMN) are dedicated mobile networks designed for specific organizations or industries, providing secure and reliable connectivity tailored to their needs. These networks are particularly beneficial for industries with stringent security and reliability requirements, such as healthcare, manufacturing, and logistics.

Range of Asset Ownership and Customer Segments

Managed connectivity solutions involve various levels of asset ownership and serve diverse customer segments. Asset ownership could include data centres, upstream connectivity, local access (passive and active), and the software layer. Different ownership models can

impact the flexibility and control over the connectivity solutions, influencing the overall service quality as well as revenue models. For instance, an ISP service offered by a managed connectivity provider could involve it owning both the passive and active equipment, whereas if offered as a managed service, the provider would typically just own the software layer.

Managed connectivity serves a broad range of industries, each with unique connectivity requirements and challenges. For instance, commercial real estate developers invest in advanced connectivity solutions to enhance the value of their properties and attract high-quality tenants. In the hospitality industry, reliable high-speed internet access is a critical amenity that can significantly impact guest satisfaction. Similarly, healthcare providers rely on powerful connectivity solutions to support telemedicine, electronic health records, and other digital health initiatives.

Demand Drivers

Several factors are driving the demand for managed connectivity solutions. One of the primary drivers is growing data demand. For instance, mobile traffic growth has exceeded 25% per annum globally, driven by smartphone proliferation, increased usage of streaming services and social media, and the introduction of unlimited data plans by major carriers. To keep up with the pace in data consumption, significant infrastructure investment is needed to ensure adequate network capacity.

Another key driver is the decline in Capex spending by Mobile Network Operators (MNOs). Mobile ARPUs have declined in many markets, leading MNOs to reduce their cost base to maintain margins through restructuring and carving out infrastructure assets. Moreover, operators invested heavily in 5G from 2017-2022 but faced high competition and flat revenue growth, leading to expected decreases in network Capex in 2023 and beyond. This has led to a shift from MNO-funded to venue-funded models.

The post-pandemic shift towards hybrid working patterns has also boosted demand for high-quality connectivity solutions. Enterprises are taking up less space, with a clear flight to quality as they choose Grade A spaces to attract employees back to offices. Commercial building developers are investing in technology to improve the quality of space, with in-building connectivity seen as a vital amenity.

Building materials also play a significant role in driving demand for managed connectivity solutions. As 5G technology promotes the use of higher frequency bands, it is more susceptible to interference from metal, insulation, and tinted glass used in buildings. With 5G subscriptions accelerating, indoor cellular coverage issues are expected to increase, creating strong demand for in-building capacity solutions such as DAS and WiFi.

Investment Rationale for Infrastructure Funds, Private Equity Funds and Strategics

Infrastructure funds are increasingly interested in managed connectivity for several reasons. One of the primary reasons is asset ownership. Owning active and/or passive infrastructure provides long-term value and control over critical assets, ensuring stable and predictable cash flows. High capex requirements and the need to build strong relationships create barriers to entry, making it difficult for new players to compete.

Managed connectivity solutions also offer stability and predictability of cash flow through multi-year contracts (up to 5-10 years) and low churn rates. Additionally, managed connectivity providers are typically well-diversified in terms of sectors, serving a broad range of customer types, including B2C, government, hospitality, healthcare, enterprises and offices. This diversification provides insulation from economic cycles, with contracted revenue often protected against inflation. Recent deals, such as the acquisition of ASK4 by GI Partners, highlight the growing interest and investment in this sector by infrastructure funds.

Private equity funds are also increasingly drawn to managed connectivity investments. The managed services component of connectivity solutions offers recurring revenue as well as growth potential in adjacent segments and markets. For example, the acquisition of Wifirst by CAPZA demonstrates the attractiveness of managed connectivity solutions to private equity investors. These funds see opportunities for growth through strategic acquisitions and expansion into new markets, leveraging the recurring revenue streams and scalability of managed connectivity solutions.

Strategic investors are interested in managed connectivity assets for consolidation and synergy opportunities. The managed connectivity market could potentially be ripe for consolidation, with larger players acquiring smaller companies to expand their service offerings and market reach. For instance, opportunities exist for DAS providers to accelerate their positioning in the Managed WiFi segment (and vice versa) through acquisition, driven by synergies in account management, infrastructure, and technical capabilities. Bundling services as a unified communications offering can also reduce churn and enhance customer loyalty.

Potential Investment Risks

While managed connectivity offers numerous benefits, it also presents certain risks. Segment concentration can lead to seasonality and utilisation risks for some players. High competition in certain segments of the managed connectivity market can impact margins and growth potential. To mitigate these risks, conducting thorough commercial due diligence is essential to identify and address potential challenges.

As the demand for reliable and scalable connectivity solutions continues to grow, managed connectivity will play an increasingly vital role in driving digital transformation and unlocking new growth potential in the telecoms industry. By understanding the market drivers and strategic importance of managed connectivity, investors can effectively navigate the evolving landscape and capitalize on emerging opportunities. TR

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The 'Four As': The Telecom Industry's Formula for Success

Within the telecom and ICT sectors, four concepts are being focused on when it comes to advancing service delivery, livelihoods and interconnectedness within societies. When availability, accessibility, affordability, and adaptability are all present within an operating environment, the benefits can be realized for its greater purpose.

Across the world, and impressively across the Middle East and GCC countries, the success formula within the telecom industry is rigorously promoted, driven by significant investments, smarter processes, and an efficient workforce.

Key Principles Driving Growth, Efficiency, and Customer Satisfaction

For those living in urban areas, the availability of accessible, affordable, and flexible connectivity networks is abundant, whether it be a public Wi-Fi network in malls or personal data packages from a reputable telecom operator. In contrast, rural areas remain to be an area requiring improvement when it comes to the digital divide.

The ITU emphasizes that advancing universal connectivity requires a focus on creating ICT infrastructure, services, and applications that are accessible, affordable, high-quality, interoperable, and secure.

Availability: Ensuring that telecom networks and services are consistently available to customers is critical. High availability means the network boasts minimal downtime, reliable service delivery, and robust infrastructure to handle demand.

From smartphones to smart home devices, spectrum powers seamless connectivity, enabling the Internet of Things (IoT) and supporting the interconnected web of modern gadgets. As a key innovation driver, the availability and effective management of spectrum fuels advancements like high-speed 5G networks.

In the Middle East, network performance and availability are generally strong, though they face real challenges in densely populated gatherings. Major events like Dubai's Expo, Qatar's FIFA World Cup, and Saudi Arabia's Hajj intensify demands on networks, requiring 100% availability to maintain connectivity for large crowds.

According to the latest Ericsson Mobility Report, the MENA region is on track for the fastest growth in 5G adoption globally, with an expected annual increase of 51%. This rapid uptake is driven by broader network coverage and the growing availability of affordable 5G-enabled smartphones.

In Jordan, Umniah's new data center will leverage advanced Tier III technologies and security systems to provide high availability and ultra-fast speeds. Meanwhile, in Saudi Arabia, center3's data centers and connectivity infrastructure are strengthening the local digital ecosystem and supporting regional content delivery networks (CDNs).

From an international perspective, Tarana's next-generation fixed wireless access (ngFWA) technology recently launched in the United Kingdom, with further deployments expected across the EU by the end of 2024.

Accessibility: Providing easy access to telecom services for all customers, regardless of location, device, or network involves expanding coverage, improving network reach in underserved or rural areas, and offering user-friendly interfaces and customer support. Accessibility also includes ensuring services are inclusive for users with disabilities as well as the elderly.

In the ICT and telecom sectors, digital accessibility plays a fundamental role in achieving successful digital transformation. By developing strategies and programs that ensure ubiquitous accessibility to digital services, inclusivity across society can be achieved, regardless of individuals' abilities or locations.

To drive a knowledge-based digital society and economy, the UAE's Telecommunications and Digital Government Regulatory Authority (TDRA) emphasizes the importance of following the principles outlined in the National Digital Accessibility Policy. This policy ensures that digital services are easily accessible to all societal sectors, including individuals with disabilities and senior citizens.

Similarly, Oman has been recognized by UNESCWA for its outstanding commitment to digital accessibility for people with disabilities. The government's dedication to inclusivity shines through its National Digital Access Policy, which enables electronic access for all members of society.

On the telco side, Vodafone is committed to adapting to the changing needs and lifestyles of its customers and supporting continued growth and broader connectivity for all. This is evident in the company's commitment to expanding its core services and extending the reach of its 5G Next Level network, which aims to cover more than 90% of the population.

Moreover, to bridge the internet accessibility gap, Fixed Wireless Access (FWA) has become a popular solution, although, its implementation varies across regions due to unique geographical, economic, and technological factors. However, significant investments in 5G infrastructure by major telecom providers are already paving the way forward.

The accessibility of RedCap and passive IoT terminals is also anticipated to expedite the adoption of IoT technologies, which are revolutionizing sectors such as agriculture, retail, and logistics in the region.

On the fintech side, one of the most recent entrants is du pay, the innovative digital financial solution that is poised to play a pivotal role in enhancing financial inclusion, accessibility and security.

Affordability: Offering telecom services at a price point that is accessible to a wide range of customers is crucial in today's digital-driven era. Affordability is now key for customer retention and market penetration, especially in highly competitive markets.

According to the GSMA's State of Mobile Internet Connectivity 2024 report, 43% of the global population is still unconnected to mobile internet. In low- and middle-income countries (LMICs), key barriers to internet adoption include device affordability and digital literacy, with entry-level, internet-enabled devices costing roughly 18% of an average monthly income.

In the smartphone industry, MediaTek continues to prioritize enhanced user experiences, especially by providing affordable 5G solutions. The company attributes broad 5G adoption to accessibility and affordability and is investing in entry-level 5G technology to lower costs and retain its position as the world's leading 5G CPE supplier.

In 2023, mobile and fixed broadband costs fell across regions and income groups, yet affordability remains a major barrier to connectivity. In low-income countries, entry-level mobile broadband costs 8.6% of the average income—22 times more than the 0.4% recorded in high-income nations.

An Ookla report from Q2 2024 highlighted that, while factors such as geography, competition, and government policies influence fiber deployment in the Middle East, affordability remains a significant barrier to widespread gigabit adoption. Despite robust gigabit-ready infrastructure in some Middle Eastern countries, high costs and income disparity limit the uptake of high-speed broadband.

While 1 Gbps fiber plans are available for as little as USD 30 per month in places like Hong Kong and Singapore, similar plans cost more in the GCC: USD 100 in Qatar, USD 150 in the UAE, USD 250 in Saudi Arabia, and USD 345 in Bahrain. Bridging this affordability gap is crucial to accelerating high-speed broadband adoption across the region.

Apart from wireless networks, by leveraging open-source software and hardware, ground station networks can offer cost-effective solutions for satellite communication. This affordability makes satellite data more accessible to a broader range of users, including those with limited financial resources.

Adaptability: To quickly adapt to changing market conditions, customer demands, technological advancements, and regulatory environments, the 'telco-to-techco' transformation among telco players has been adopted. This involves embracing innovation, upgrading network infrastructure, and maintaining a tech-centric, agile approach when launching new services and features.

Traditionally, service delivery models involved long-term, costly projects, but the focus has now shifted to flexibility and adaptability to keep pace with fast-changing markets. Agile and iterative development models enable this shift, especially as businesses increasingly embrace digital services over physical products.

As the demand for high-speed data and connected devices rises, MIMO has become essential across various applications, from cellular networks and broadband systems to IoT, defense, navigation, and radar. Its adaptability highlights its importance in our interconnected world.

Accordingly, scalability is a critical yet challenging factor for SMB growth, requiring solutions that can evolve with changing business needs. Addressing this, etisalat by e& leverages technology, analytics, and innovation to provide sustainable, customer-focused experiences powered by data-driven insights.

According to the du CEO, operational efficiency is a top priority for them as they strive to optimize processes and resources. By embracing structural efficiencies, the digital telco remains agile and cost-effective, enabling them to adapt quickly to the challenges of a constantly evolving digital landscape.

To ensure adaptability, the readiness of government entities and institutions to embrace the digital realm is also important. This involves initiatives such as digital literacy programs, upskilling efforts, and a supportive ecosystem for innovation.

Given the accelerated GenAI adoption, small language models (SLMs) have become an alternative since the model can be tailored to specific industries, yielding more relevant and accurate outcomes. The model can also be updated and implemented expeditiously, enabling rapid adaptation to new data and trends.

In 2024, the evolution of the hybrid cloud within the telecom industry has been recognized for its adaptability to varying workload demands, improved security measures, and integration with emerging technologies like AI and edge computing.

In this context, CIEM practices are crucial for organizations, including telecom companies, as they navigate the complexities of increased digitalization and multi-cloud adoption. These practices provide the security, efficiency, compliance, and adaptability needed to support their digital transformation initiatives.

Together, these "Four A's"—Availability, Accessibility, Affordability, and Adaptability—represent a crucial formula for achieving success in the dynamic and competitive ICT and telecom landscape. TR

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Emerging Technologies Impacting Telecom: RIS and HAPS

As technology evolves, the potential for transformative connectivity is reaching new heights—both figuratively and literally. Emerging innovations like reconfigurable intelligent surfaces (RIS) and high-altitude platform stations (HAPS) are paving the way for smarter, more inclusive networks.

RIS technology enables ordinary surfaces to become active participants in wireless communication, optimizing signal paths and enhancing energy efficiency across smart environments. Meanwhile, HAPS leverages aircraft, blimps, and balloons to deliver mobile network access to underserved areas, bridging connectivity gaps for billions globally.

Together, these technologies offer groundbreaking solutions that could redefine connectivity and accelerate the journey toward a truly interconnected world.

RIS: A Sustainable Technology Solution

RIS, also known as intelligent reflecting surfaces (IRS) or software-defined surfaces (SDS), are emerging as transformative tools in the telecommunications landscape. By transforming the physical environment into an adaptable wireless network layer, RIS promises to significantly enhance signal efficiency, coverage, and control over wireless communications. With applications already integrated with 5G and research underway for 6G integration, RIS could soon redefine connectivity standards.

What Are Reconfigurable Intelligent Surfaces?

Imagine a world where walls, ceilings, and other surfaces are no longer static but instead intelligently shape and optimize wireless signals around us. This is the potential of RIS technology. Built from a matrix of micro-antennas or passive reflecting units, these surfaces manipulate electromagnetic waves, essentially transforming the physical environment into an active part of the wireless infrastructure.

Acting as "smart" mirrors, RIS can direct radio waves intentionally, creating more reliable and robust wireless connectivity without the need for additional power-hungry base stations. Among the key benefits are:

Enhanced Signal Strength and Coverage: By manipulating the behavior of radio waves, RIS technology improves the received signal strength, mitigates interference, and increases the effective channel ranks. This results in a better signal-to-noise ratio (SNR) and a reduced bit error rate (BER), ensuring stronger, clearer connections for end-users. Boasting the ability to redirect waves with precision, RIS can improve signal quality in challenging environments, such as urban areas, where interference is common.

Reduced Power Consumption: One of the most appealing aspects of RIS is its low power requirement. Unlike active signal-boosting methods, RIS works passively by reflecting and redirecting signals, which allows network operators to maintain lower power levels at transmitting stations, reducing overall energy consumption. This makes RIS a sustainable choice for expanding network coverage, especially as the world transitions to more eco-friendly technology solutions.

Cost-Effective Coverage Expansion: Traditional methods for expanding network coverage—like building additional base stations—are expensive and resource-intensive. RIS offers an alternative by acting as a low-cost, efficient method to boost signal reach without the need for massive infrastructure investments. This flexibility makes RIS an attractive option for extending network coverage, particularly in areas where installing new base stations may not be feasible or financially viable.

Current RIS Developments

RIS technology is showing promise in 5G mmWave deployment, where it can enhance signal efficiency and coverage, particularly in dense urban environments. In 2023, a study by Rohde & Schwarz and Greenerwave successfully demonstrated that metamaterial-based RIS modules could improve wireless communication performance, providing a crucial foundation for 6G technology.

As per the European Telecommunications Standards Institute (ETSI), RIS modules can operate across a broad spectrum—from sub-6 GHz to THz frequencies. With the integration of artificial intelligence (AI) and machine learning (ML), these systems are becoming more adaptable and efficient, and are able to self-optimize based on network conditions.

ZTE is leading the way in RIS innovation with its second-generation RIS product, RIS 2.0, which was released last year. This product, launched at MWC Shanghai, incorporates over 17,000 surface elements and offers improvements in cost, power consumption, and reliability. The enhanced panel allows for precise beamforming with real-time device tracking, enabling network operators to deliver high-quality connectivity across diverse frequency bands.

Recent research by institutions like Tohoku University and the University of Nottingham has led to new methods of quantifying RIS performance analytically. Meanwhile, a team at the Beijing Institute of Technology developed a deep learning-based processing method that enhances RIS capabilities in massive MIMO terahertz communication. These advances underscore the potential of RIS technology in future wireless systems, where the ability to adapt to changing conditions will be critical.

The Dark Side of RIS Technology

While RIS holds vast potential, it also presents certain risks. By actively manipulating radio signals, RIS can unintentionally interfere with nearby frequency bands, potentially disrupting other wireless services. Furthermore, because RIS components control wireless channels, they can be vulnerable to malicious tampering. In the wrong hands, a hacked RIS could be used to degrade communications rather than enhance them, posing significant security risks.

Similarly, in a research paper, Yajun Zhao, Chief Engineer, ZTE Corporation, explored the potential risks of deploying RIS in relation to network coexistence challenges. While RIS offers promising control over electromagnetic environments, it may introduce new and severe interference issues that could degrade overall network performance if unaddressed. To tackle these risks,

the study proposes a detailed RIS coexistence model and examines two novel RIS design mechanisms: a multilayer structure with an out-of-band filter and a RIS blocking mechanism. These innovations aim to mitigate interference, yet Zhao's research underscores that RIS deployment risks persist, posing challenges to seamless RIS integration in intelligent network environments.

To further address these concerns, industry experts stress the importance of stringent regulation, standardization, and security protocols. Ensuring that RIS hardware and software are designed with robust security features will be essential as the technology progresses toward mainstream adoption.

HAPS: Bridging the Connectivity Gap

HAPS are unmanned aerial systems operating in the stratosphere, typically around 20 kilometers above the Earth's surface. Studies on HAPS were conducted by the ITU as early as the mid-1990s; however, recent technological advancements have spurred renewed interest in, and feasibility for, these systems.

Improved solar panel efficiency, higher-density batteries, lightweight materials, autonomous avionics, and advanced antennas make HAPS a promising solution for bridging the connectivity gap between terrestrial and satellite systems.

Key Use Cases and Benefits of HAPS

HAPS offer unique advantages that make them suitable for a variety of applications. By occupying an elevated position between terrestrial networks and satellites, they can provide connectivity across expansive areas, including remote islands, isolated rural regions, and under-served urban zones. This capability is particularly valuable for improving internet access, supporting disaster recovery, and aiding in environmental monitoring.

For instance, AALTO HAPS's Zephyr has demonstrated the ability to provide direct-to-device 5G coverage, functioning like a "tower in the sky" that replaces hundreds of traditional ground-based towers, offering low-latency connections in areas where traditional infrastructure is not feasible.

The sustainable nature of HAPS, combined with its ability to support broadband services and IoT applications, aligns with the United Nations (UN) Sustainable Development Goal (SDG) 9, which promotes industry, innovation, and infrastructure. By facilitating better access to communication technologies, HAPS contribute to several other SDGs, enhancing digital inclusion in areas that were previously hard to reach.

Market Potential and Industry Investment

According to NSR's High Altitude Platform report, the market opportunity for HAPS could reach nearly USD 4 billion, covering manufacturing for communication and remote sensing applications. Service-based revenues are expected to add another USD 1.1 billion.

Regions such as Latin America and the Middle East and Africa (MEA) are seeing rapid growth in HAPS in-service units, with projected annual growth rates of 28.9% and 29.5%, respectively. This growth reflects HAPS's role as a viable alternative to traditional terrestrial and satellite systems in areas with sparse infrastructure.

Recent developments in the region demonstrate the growing interest and investment in HAPS deployments. These include the first HAPS flights in the UAE and strategic partnerships to progress the development of private networks, IoT applications, disaster management solutions, environmental monitoring and Earth observation, among other use cases.

Moreover, industry alliances are advancing the deployment of HAPS for 5G networks. UK-based Stratospheric Platforms Limited (SPL), in partnership with Deutsche Telekom, tested 5G coverage from the stratosphere over a 450-kilometer area in Saudi Arabia. The success of such trials reveals the potential of HAPS to complement terrestrial infrastructure and deliver high-speed, low-latency mobile internet to a wider audience.

The Road Ahead: Flexible and Scalable HAPS Networks

The HAPS Reference Architecture Series, released in 2024, envisions an integrated network of land, sky, and space assets to achieve seamless connectivity. This model offers flexibility, scalability, and cost-effectiveness, as HAPS networks can be deployed quickly and adjusted as needs evolve. Unlike satellites, HAPS networks provide direct-to-handset performance, achieving latency and speed comparable to traditional terrestrial networks. The architecture can support various setups, from standalone HAPS networks providing connectivity directly to end-users, to wholesale arrangements with terrestrial mobile network operators, allowing adaptable and scalable solutions.

As new development programs and international partnerships emerge, HAPS are likely to become even more sophisticated, with extended operational ranges, higher payload capacities, and greater autonomy. This progress will expand the role of HAPS in both civilian and military contexts, from remote sensing and environmental monitoring to secure communications and disaster response. TR

> Emerging innovations like reconfigurable intelligent surfaces (RIS) and high-altitude platform stations (HAPS) are paving the way for smarter, more inclusive networks

The Power of Responsible AI Practices in Telecom

The telecom industry is pioneering a unified approach to responsible AI use, setting a precedent as the first sector to embrace this commitment. With AI now embedded in nearly every tech and telecom operation, its responsible application is imperative.

In September 2024, the GSMA introduced the first industry-wide Responsible AI (RAI) Maturity Roadmap. Despite its nascent introduction, 19 mobile network operators (MNOs) worldwide have pledged to use this roadmap to monitor, uphold, and enhance their responsible AI practices.

ITU members have also established new priorities for standards and capacity development, particularly focusing on implementing responsible, safe, and inclusive AI, to support sustainable digital transformation.

Notably, Microsoft and Abu Dhabi-based AI tech giant, G42, have established two new centers in Abu Dhabi, which focus on responsible AI development within the telecom sector and other industries across the Middle East and the Global South. A unique feature of this partnership is its "red teaming" process—designed to rigorously test and secure AI models against potential misuse or threats, ensuring systems are resilient and trustworthy. These centers work closely with Abu Dhabi's AI and Advanced Technology Council (AIATC), which supports local and global cooperation in AI policy and research, with a focus on AI safety and ethical practices.

Why Telcos Need AI Innovation

AI offers telcos an opportunity to transform into AI-native organizations, integrating AI across all business areas to boost growth and innovation. Many have already started leveraging generative AI (GenAI), achieving substantial cost savings in marketing, sales, and customer service. In Q3 2024, Telecom Review held a successful webinar titled "Riding the Wave of Generative AI," where experts explored trends, advancements, best practices, challenges, telecom use cases, and predicted the future of GenAI and its integration.

For instance, Nokia's Cybersecurity Dome serves as a comprehensive solution for threat identification, detection, and validation. By leveraging AI, Nokia has eliminated the need for a dedicated expert monitoring team to manage security operations. Moreover, Umniah highlights that GenAI is playing a pivotal role in personalizing services, fostering closer customer connections, understanding their needs, and tailoring offerings accordingly. Notably, chatbots now play an integral role in these operations.

Similarly, Azerconnect Group reported a 10% reduction in calls forwarded to customer services within six months of implementing GenAI, reflecting enhanced efficiency in customer interactions. When telcos decide to adopt GenAI, B-Yond emphasizes that they need a well-coordinated team of domain experts, data scientists, and developers who not only have a deep knowledge of telecom operations but also work cohesively towards shared goals.

Achieving an AI-native transformation requires a strong focus on responsible AI (RAI). This encompasses deploying AI ethically, safely, transparently, and in compliance with regulations. In the highly regulated telecom industry, RAI frameworks are vital for building consumer trust, protecting sensitive data, and mitigating security risks through accountability and transparency.

Another telco-driven solution is MYCOM OSI's GenAie, which is designed to elevate business and operational decision-making by transforming complex data into actionable insights. GenAie supports CSPs in their strategic initiatives and long-term planning by delivering comprehensive analyses that integrate and correlate network data across various dimensions.

With all these in mind, adopting a 'responsible AI' approach is not only about ethical compliance; it's also a critical business imperative.

Benefits of a 'Responsible AI' Strategy

Implementing effective Responsible AI (RAI) practices can be a powerful way to enhance brand reputation, driving customer acquisition and retention, and ultimately boosting revenue growth. RAI also minimizes both commercial and reputational risks across an organization's entire AI ecosystem, ensuring each tool and application operates with maximum accuracy and reliability.

RAI practices ensure that a customer service chatbot avoids biased, inaccurate, or sensitive language and aligns with the company's branding. By embedding RAI into its operations, companies can build trust and loyalty, safeguarding their brand while maximizing the impact of AI on business performance.

Visionary telcos view strong RAI governance as a 'compass' that guides them toward innovation and allows them to explore the full landscape of AI with confidence and control.

An effective Responsible AI (RAI) framework should provide telcos with a clear, structured pathway for advancing their RAI maturity over time. Each level of the framework should outline specific metrics that telcos must achieve to progress, ensuring a continuous and measurable commitment to responsible AI practices.

Salam's perspective aligned with this during the Q3 webinar, indicating the importance of having a well-defined strategy and objectives for AI implementation. This means not only identifying why AI is being adopted and where it will be applied but also establishing dedicated departments to manage and analyze the vast volumes of data AI will generate. These departments should be equipped with the right tools and expertise to maximize AI's value effectively.

In the future, telecom companies that adopt structured Responsible AI (RAI) practices will establish themselves as ethical and innovative leaders while also unlocking substantial financial benefits. Having said that, a McKinsey analysis suggests that

telcos implementing advanced RAI strategies could realize up to USD 250 billion in additional value globally by 2040 through effective use cases.

To help CSPs overcome challenges and unlock the true power of GenAI, Netcracker launched its GenAI Telco Solution, which comprises a GenAI Telco Platform consisting of knowledge management to build, test, and optimize telco-focused scenarios and includes a GenAI Trust Gateway, providing CSPs with the highest levels of security and accuracy.

By prioritizing Responsible AI (RAI), telecom operators can unlock AI's full potential for business growth while strengthening customer trust—a foundation for driving innovation and generating new revenue streams. Emphasizing RAI also positions telecom companies as attractive employers, helping them attract and retain top talent and foster a culture of continuous improvement.

Outlook

To fully harness the competitive advantage and business value of GenAI, enterprises must prioritize building trust in these models and solutions. Achieving this requires embedding transparency, accountability, and ethics into the core. Establishing clear lines of responsibility, creating auditable systems for traceability, and implementing mechanisms to detect and address errors, biases, and misconduct are essential steps.

In the telecom industry, which intersects with AI, connectivity, security, and sustainability, a balanced regulatory framework is crucial to support innovation while safeguarding critical infrastructure.

As the telecommunications sector navigates this digital era, individuals, communities, businesses, and policymakers all play a vital role in shaping the future of AI. By focusing on customer experience and adhering to responsible AI practices, the industry can drive progress and ensure that AI technologies make a positive impact on society. TR

Industrial IoT: Accelerating Industry 4.0 Transformations

By 2028, the global Industrial Internet of Things (IIoT) market is projected to grow to a staggering USD 516.6 billion, according to a report by Research and Markets. This exponential growth underscores the transformative power of IIoT in driving digital transformation and reshaping the industrial industry.

The advent of IIoT heralds new opportunities for industries, particularly in manufacturing enterprises. As businesses become more dependent on modern technology to streamline business operations, IIoT applications have emerged as significant assets, improving efficiency and enhancing worker safety.

This emerging technology is poised to fundamentally change how the industrial landscape operates and advances on the ever-competitive global stage.

The IIoT Ecosystem

Industry 4.0 has delivered significant advancements to the world, enhancing the human-machine interaction and revolutionizing maneuvers that accelerate manufacturing operations.

Through implementing innovative computing solutions and utilizing a network of sensing devices, the IIoT ecosystem is set to revolutionize industrial manufacturing and optimize inventory and supply chain processes.

By embracing innovative technologies and solutions, such as the implementation of IIoT, organizations can maintain their competitiveness in the global market, yielding remarkable benefits and significantly improving efficacy.

Integrating industrial automation will enhance quality, reduce costs, and improve safety, rendering it critical for organizations.

Furthermore, this emerging technology will advance the completion of crucial operational tasks such as scheduling, quality management, and factory assembling, while enabling seamless connectivity between IIoT devices through the same architecture and protocols.

By leveraging big data technology and machine learning (ML), real time data collection, exchange, and analysis will be facilitated, transforming the business models of small and medium enterprises (SMEs).

This real-time data, generated by IIoT applications, is set to revolutionize predictive maintenance, enhancing operational efficiency and identifying potential issues beforehand to avoid delays or inconveniences.

In addition, the IIoT's advanced asset management system provides real-time tracking of product location, status, and condition, enabling suppliers and manufacturers to respond promptly to potential risks or damages.

By analyzing IIoT implementations, organizations will have seamless control of their operations, improving the safety of workers, maintaining product quality, and enhancing their overall operational efficiencies. Embracing this modern technology will ultimately position enterprises and organizations at the forefront of industrial innovation.

Navigating the Risks and Challenges of IIoT

While the advantages of IIoT are undeniably evident, organizations must address critical risks and challenges to ensure a successful and safe implementation.

In the IIoT ecosystem, security remains the biggest concern, with formidable data security, confidentiality, and data integrity challenges ever present, and evolving. The complexity of integrating IIoT technology into existing devices adds to these risks and concerns, consequently demanding careful planning and execution.

Data chaos presents a significant challenge, as the increasing number of connected devices leads to high data traffic and wasted channel bandwidth, which ultimately impacts data accuracy.

Monitoring the condition of IIoT devices remains crucial in preventing IIoT applications from going rogue, making device management essential.

IIoT applications—used to connect machines and devices in various industries, including manufacturing, utilities, and oil and gas—can potentially experience system failures and downtimes, which may result in high-risk or life-threatening situations. Workers' safety should always be a priority, thus, innovators and developers should critically address this issue.

Moreover, the unprecedented advancements in technology, particularly automation, have raised concerns among industrial workers. Meant to simplify processes, the emergence of IIoT applications and devices has raised questions regarding whether its implementation would cost them their jobs.

Despite the growing adoption of global digital transformation, some enterprises remain resistant to change. For businesses to stay relevant in the wake of emerging Industry 4.0 transformations, organizations must consider adopting modern technology and leveraging innovative solutions to deliver improved products and services to customers.

Additionally, enterprises must ensure their network equipment can support the bandwidth required to endure outdoor factory conditions. Running edge applications for real-time processes and responses should be enabled to proactively monitor IIoT devices.

Remote access and troubleshooting capabilities should be secure, enabling organizations to deploy and configure connectivity to edge devices and equipment efficiently.

By proactively addressing these risks and challenges, organizations can utilize the full potential of IIoT, delivering a more robust and secure human-machine interaction in the industrial landscape.

Advancements in IIoT

In 2014, global technology giants including AT&T, Cisco, General Electric, IBM, and Intel, formed the Industrial Internet Consortium (IIC). The initiative, rebranded as the Industry IoT Consortium in 2020, aims to accelerate

IIoT adoption, whilst simultaneously prioritizing security.

The IIC's initiative resulted in the launch of global IIoT industry standards. The organization emphasized the critical role that standards play in the IIoT ecosystem, including the non-engineering of custom interfaces, the collaborative effort of information technology (IT) and operational technology (OT) to achieve enterprise digital transformation, and the implementation of standards to avoid vendor lock-in.

The IIC also ensures that regulatory agencies can respond promptly to safety and security needs and focuses on upskilling employees.

Technology solutions provider, Cisco, boasts a wide range of innovative solutions that support the IIoT network. Taking industrial operations to the next level, Cisco delivers automated, intelligent, and secure solutions. These smart manufacturing innovations aid in the acceleration of industrial operations.

Recently, Andium, an IIoT leader in remote field monitoring, pledged USD 21.7 million in funding to help reduce greenhouse gas (GHG) emissions through its IIoT technology.

In the Middle East and Africa (MEA) region, the IIoT market is projected to achieve a revenue of USD 26,096.82 million by 2029, according to a report conducted by Data Bridge Market Research.

This growth is driven by the growing adoption of artificial intelligence (AI) and ML-driven technologies in the IIoT market.

The increasing demand for automation and robotics in the manufacturing industry further accelerates this growth, with sensors accounting for the most in-demand option in terms of industrial components. The implementation of sensors is poised to support the control and management of operations, automating critical industrial processes.

Furthermore, McKinsey & Company released a report outlining the key growth drivers in IIoT. These include sensor and data storage costs, device ubiquity, and connectivity. Globally, the global management consulting company emphasized the substantial growth of the IIoT market and predicts that the market will generate USD 500 billion in revenue by 2025.

Final Thoughts

The fourth Industrial Revolution has catapulted industries into an era of modern transformation, driven by the integration of intelligence, cloud computing, and ML.

Embracing this technological evolution is no longer optional; it is a necessity to remain digitally relevant and competitive in the ever-evolving world of technology. By harnessing the transformative power of IIoT, industries can drive innovation and accelerate production and business operations.

As global digital transformation in Industry 4.0 continues, industries must remain vigilant and promptly address the risks and challenges posed by IIoT implementation. It is crucial to prioritize human safety and data security to achieve a balance between protection and innovation. TR

As global digital transformation in Industry 4.0 continues, industries must remain vigilant and promptly address the risks and challenges posed by IIoT implementation

TDRA Announces Allocation of 600 MHz and 6 GHz Bands for IMT

In a move that reflects the UAE's leadership in the adoption of advanced technologies, especially in the telecommunications sector, the Telecommunications and Digital Government Regulatory Authority (TDRA) announced the launch of the fourth updated version of the National Frequency Plan, including the allocation of the 600 MHz and 6 GHz frequency bands for International Mobile Telecommunications (IMT) systems.

As a result, the UAE has become one of the first countries in the world to take the initiative to allocate such bands to operators. This plan comes in the context of the practical implementation of the outcomes of the 2023 World Radiocommunication Conference (WRC-23), held in Dubai, UAE, which garnered the participation of all countries across the world.

The physical operation of these new frequency bands is expected to begin between the years 2025 and 2026. This represents a significant advancement in securing smart city infrastructure, which relies on technologies like the Internet of Things (IoT), artificial intelligence (AI), and other Fourth Industrial Revolution (4IR) innovations. These technologies require high-frequency (HF) bands and ultra-fast data transfer speeds for efficient operation.

This new development will also pave the way for the development of 6G services, which are expected to emerge in 2030. In parallel, the UAE remains dedicated to advancing 5G technologies within the 6 GHz band, achieving a data transfer speed of up to 10 Gbps.

In the Spirit of Entrepreneurship

His Excellency Talal Belhoul Al Falasi, Chairman of TDRA's Board of Directors, commended this progress, stating, "The adoption of the 600 MHz and 6 GHz frequency bands for IMT services is a feat that coincides with our joy of Union Day 53. It is in line with the pillars of our national vision, 'We the UAE 2031,' which provides for moving from one milestone to another and comes as an actual translation of the spirit of leadership and excellence.

"Our national march aims to create a brighter future according to a roadmap laid out by our wise leadership and implemented by compatriots with their creative minds and determination to enhance the leadership of our beloved nation in communications—the key engine for development in various sectors. The importance of this step lies in the meanings of proactivity and forward thinking that lay the foundation for the coming years of modernization and evolution in light of the dramatic acceleration that characterizes our times."

GCC Countries to Achieve Highest 5G Penetration by 2030

By 2030, the overall mobile subscriptions in Gulf Cooperation Council (GCC) countries are expected to significantly reach 95 million, growing by 3% annually, according to the latest Ericsson Mobility Report.

Communication service providers (CSPs) are set to focus on 5G Standalone (5G SA) and 5G-Advanced (5G-A) for new capabilities and offerings, prioritizing value delivery over data volume.

Moreover, the report also highlighted that 5G is expected to account for a quarter of all mobile subscriptions by the end of 2024.

Commenting on the report, Nicolas Blixell, Vice President and Head of GCC at Ericsson Middle East and Africa, stated, "The November 2024 Ericsson Mobility Report highlights the pivotal role of 5G Standalone and 5G-Advanced in the future of mobile networks, particularly in regions like the GCC, where high mobile penetration and rapid urbanization are driving demand for advanced connectivity."

Despite a decline in mobile network traffic growth, estimated at 21% year-over-year (YoY) for 2024, it is still projected to experience a three-fold increase by 2030.

Driving Connectivity in the GCC

Global 5G mobile data traffic is anticipated to grow by 80% by the end of 2030, indicating a significant increase from the 34% predicted by the end of 2024.

The GCC countries are expected to achieve 47% 5G penetration by 2024, ultimately reaching 93% by 2030, driven by tourism, technology, and renewable energy sectors. Western Europe and North America follow closely at 92% and 91% respectively.

"These technologies are set to enable capabilities such as programmable networks and AI connectivity-driven use cases, creating new opportunities for growth and innovation. As service providers in the GCC and beyond adopt these advancements, they will unlock the full potential of 5G, driving digital transformation and enhancing the way industries and consumers engage with technology," Blixell added.

Es'hailSat Strengthens MENA Content with New Islamic and Cultural Channels

Es'hailSat, the Qatar Satellite Company, has expanded its channel offerings by incorporating two Yafa Medya TV channels, Tayba and Al Tanasuh TV, into its video distribution lineup at the 26°E orbital position, facilitated by the Es'hail-2 satellite.

The Es'hailSat satellite footprint strategically encompasses the Middle East and North Africa (MENA) region, optimizing signal coverage and enabling significant viewership potential for both channels throughout this expansive area. This enhancement underscores Es'hailSat's commitment to delivering a diverse range of content to satisfy regional demand.

Tayba and Al Tanasuh TV Channels
Tayba TV is a television channel that offers a mix of religious, cultural, and general programming. Tayba TV often features Islamic teachings, cultural discussions, and educational programs, reflecting its commitment to promoting value-based content. The channel primarily broadcasts in Arabic and aims to provide family-friendly content.

On the other hand, Al Tanasuh TV is an Islamic television channel that focuses on promoting Islamic teachings and values, contributing to societal reform. Its programs include religious lectures, educational content, and discussions hosted by Islamic scholars, aiming to foster awareness and provide guidance to the Muslim community.
"Es'hailSat is delighted to welcome Yafa Medya TV's channels Tayba and Al Tanasuh TV, and bring on board prominent television channels to our satellite hotspot," said Mr. Ali Ahmed Al-Kuwari, President and CEO, Es'hailSat. "We believe that the diverse range of programming and depth of the channel bouquet offered by us at Es'hailSat aligns perfectly with Yafa Medya's vision to provide quality cultural and Islamic content catering to audiences across the region."

You can tune in to the Tayba and Al Tanasuh TV channels on Es'hail-2 with the following details:

Orbital Position: 26°E
Transponder Number: F06
Downlink Frequency: 11,310 MHz
Polarization: Linear (Vertical)
MODCOD: DVB-S2, 8PSK (MPEG-2)
FEC: 2/3
Symbol Rate: 30000 sym/s.

Rising Contenders: UAE and Saudi Arabia Among Top AI-Ready Nations

As the UAE and Saudi Arabia economies strengthen their innovation capabilities, they will grow more competitive and influential in the AI space. With only five countries categorized as AI pioneers, the two GCC countries rank among the top globally for their AI readiness.

According to a recent AI maturity index, out of 73 economies assessed, only Canada, Mainland China, Singapore, the UK, and the U.S. are categorized as AI pioneers. More than 70% scored below the halfway mark in categories like ecosystem participation, skills, and R&D.

AI Readiness within the GCC
AI is revolutionizing industries and reshaping economies, positioning itself as a cornerstone of future economic development. Its rapid implementation has made it a top priority for economies worldwide.

In September 2024, the International Telecommunication Union (ITU) launched a Standardized Readiness Framework for artificial intelligence (AI) integrations, comprising of a comprehensive set of guidelines for assessing AI adoption while driving sustainability and economic growth. The report even highlighted the UAE's AI platform, U-Ask, which aims to transform citizen interaction in its government services.

Based on BCG's assessment of economies for their AI readiness, the UAE and Saudi Arabia are among the top 25% and 50%, respectively. Qatar stands within the top 75% while Oman and Bahrain are among the top 90%.

As 'Rising Contenders,' the UAE and Saudi Arabia boast economies with relatively high exposure to AI and sufficient levels of readiness for its adoption, considering that both countries have good telecommunications and AI infrastructure as well as ecosystem partners in place.

According to industry experts, by 2031, the UAE's private sector investment in AI is expected to reach AED 335 billion, boosting the country's economy. In fact, AI is set to shape Dubai's next 185 years of development, according to Omar Sultan Al Olama, UAE Minister of State for Artificial Intelligence, Digital Economy and Remote Work Applications. "AI is not a future vision; it is our reality now," he said.

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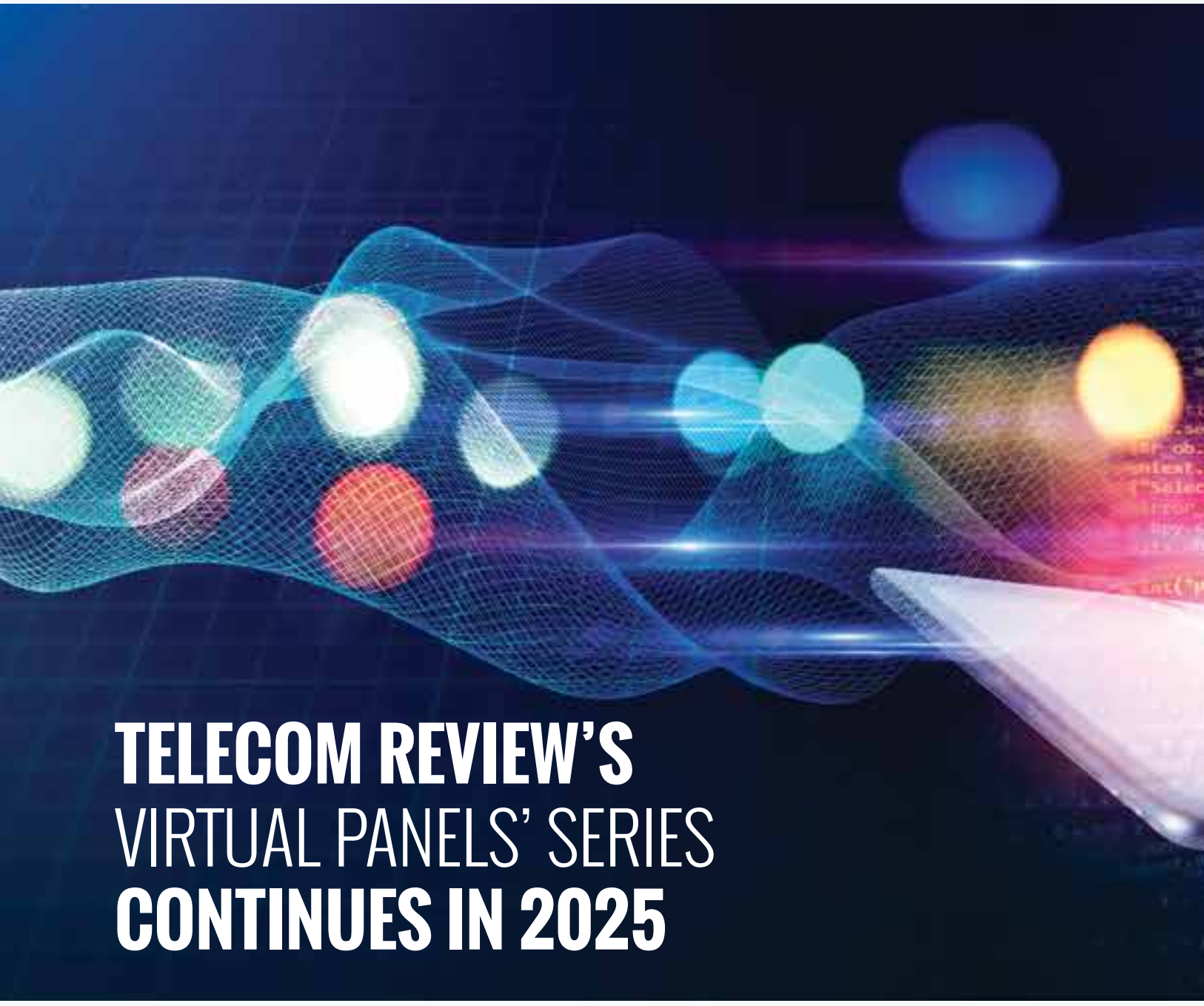

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3GPP Releases 18 and 19: Exploring the Evolution of the 5G Era

User equipment (UE)-related working groups (WGs) constitute 80% of the total participation in the 3GPP standardization, according to ABI Research. These innovative contributors include network infrastructure vendors, chipset vendors, network service providers, UE suppliers, and government and academic institutions.

Standing at the forefront of the communications evolution, the Third Generation Partnership Project (3GPP) continues to drive technological advancements in the 5G era.

The impending completion of the 3GPP Release 19 in 2025 demonstrates a major revolution in the telecommunications industry, delivering significant improvements in critical areas that improve the overall user experience.

With Release 18 already implemented and Release 19 on the horizon, the telecom industry is bound to experience substantial advancements that will reshape global communications.

Release 18: Setting the Foundation of 5G-Advanced

The 3GPP Release 18, officially branded as the first version of 5G-Advanced (5G-A), has introduced significant enhancements in existing 5G networks, lowering latency and improving connectivity speeds and coverage.

The release, which made waves in the industry, delivers improved support and access to non-terrestrial networks (NTN), such as satellite communications, expanding network coverage to remote and underserved areas.

The release also supports substantial improvements to the Internet of Things (IoT) ecosystem and Machine-Type Communication (MTC), fostering widespread innovation across various industries.

At the heart of Release 18 lies the power of artificial intelligence (AI) and machine learning (ML), which supports groundbreaking innovations and improves overall network efficiency.

Advanced antenna technologies are also being explored through Massive MIMO (Multiple-Input Multiple-Output) and beamforming. These advancements facilitate higher data rates and improved network coverage, enabling a more responsive user experience.

Network slicing, one of the main features of the 5G era, will also be enhanced, enabling operators to allocate resources more effectively. This improvement ultimately leads to enhanced network performance and reliability in different use cases.

Key enhancements in enhanced mobile broadband (eMBB) are helping to deliver high-bandwidth services, such as video streaming, online gaming, and virtual reality.

The growing demand for extended reality (XR) applications is also being addressed through Release 18, improving users' immersive experiences while delivering new possibilities that will transform the overall user experience.

In addition, energy efficiency will be significantly enhanced given Release 18's power-saving features, enabling longer battery life and reducing the technology's environmental impact. This feature paves the way for operators to achieve sustainability goals more efficiently.

New cases have also been enabled, such as ultra-reliable low latency communication (URLLC), which provides real-time services that require high reliability, low latency, and high availability for mission-critical applications.

Release 19: Unleashing the Full Potential of 5G-A

Following 3GPP Release 18, Release 19 is set to unleash the full potential of 5G-A while addressing the critical needs in commercial deployment to improve network performance.

This upcoming release will build on the enhancements delivered by Release 18, pushing the boundaries of 5G technology and laying the groundwork for cutting-edge features that will determine the future of connectivity.

Release 19 is poised to usher in the 6G era and introduce innovative cutting-edge solutions the world has never seen before.

A notable focus of this release is the expanded integration of AI and ML, particularly in optimizing mobility and improving network performance and end-user experience in private enterprises.

According to global technology company, Ericsson, Release 19 is set to support massive MIMO and accelerate 5G beam management.

Energy efficiency remains a crucial area, with 87% of the operators' energy usage being consumed by radio access networks (RAN), according to a GSMA report.

Release 19 is poised to deliver IMS real-time communications, transcending beyond the capabilities of existing communications. This feature will eventually provide seamless communication across multiple applications.

Furthermore, the upcoming release will focus on enriching the 5G experience, extending its reach to new segments, according to Finnish technology vendor, Nokia. This will support the further optimization of operational expenses and features beyond traditional communications.

In the satellite connectivity sector, Release 19 is set to address downlink and uplink coverage challenges while ensuring the ability of reduced capability (RedCap) devices to integrate NTN support.

Additionally, the release will explore responses to emerging cybersecurity threats in quantum computing through 256-bit security algorithms. This feature will set the basis to fortify the cybersecurity landscape against future security challenges.

Bridging the Present and Future of Connectivity

In the quest to advance global telecommunications, the industry has seen major contributions, particularly from key figures such as Nokia, Huawei, Ericsson, and Qualcomm. The active participation of organizations represents the industry's strong interest in advancing innovation through research and development (R&D).

According to ABI Research, more than 400 companies have contributed to the 3GPP standardization, reflecting the active participation of organizations to drive continuous advancements in the industry.

With more than ten leader rapporteur roles, Nokia has played an active role in completing the 3GPP Release 19, contributing to innovative areas such as XR, network energy efficiency, AI/ML at all layers, security, and new special use cases.

Huawei actively supported the unification of global standards. The technology giant made almost 12,000 contributions to standards organizations in 2023 alone.

Meanwhile, Ericsson also made significant contributions in various areas, including MIMO, AI/ML in mobility, and Dynamic Spectrum Sharing (DSS).

Qualcomm has contributed to 5G NR NTN and 5G IoT NTN standards and demonstrated the use of AI/ML to improve beam prediction on its 28 GHz massive MIMO test network.

Furthermore, the 3GPP Release 19 is set to focus on major topics that revolve around key innovations such as AI/ML air interface, ambient IoT, AL/ML for NG-RAN, mobility enhancement, network energy-saving improvements, and more.

Looking ahead, the upcoming release will facilitate the journey to the 6G era by exploring new frontiers in technology. With core pillars focusing on AI and ML, it will lay the foundation for the next wave of connectivity.

Final Thoughts

As we witness a new era in telecommunications, the forthcoming launch of Release 19 will support the paradigm shift in connectivity, allowing the industry to embrace the future of wireless networks and technologies that shape the very fabric of the digital landscape.

Every release unlocks new opportunities and possibilities to bring forth transformative changes and intelligent solutions across various industries.

Laying the groundwork for future innovations, Releases 18 and 19 will set the smooth transition from 5G-A to 6G, a monumental leap towards a more intelligent and connected world. TR

> Following 3GPP Release 18, Release 19 is set to unleash the full potential of 5G-A while addressing the critical needs in commercial deployment to improve network performance

How Telecom Leaders Are Leveraging AI and Data for Next-Level Transformation

Telecom leaders, among other business executives, are expected to align with emerging trends to foster digital transformation and build strategies that place technology at the heart of value creation.

AI, data analytics, and automation are heavily driving the technological revolution among businesses. AI capabilities are now embedded in every aspect of business, from strategy to execution. The UAE, for example, exemplifies this trend, with 42% of companies already incorporating AI into their operations. This proactive stance underscores the transformative potential of AI in shaping the future of businesses. As advanced tools become the standard, companies that fail to adopt these technologies risk falling behind, instead of leveraging the opportunity to shape new markets, scale digital operations, and enhance customer experiences.

Shifting Business Focus to Innovation

Tech-driven revenue generation has become an essential component of growth strategies. This shift means that tech leaders are moving beyond supporting internal business functions and are actively creating new revenue streams through digital products, customer-centric services, and advanced go-to-market capabilities.

One of the most booming technologies of today is generative AI (GenAI), as it is known to unlock competitive

advantages for businesses. The enterprises that are leveraging advanced automation, analytics, and GenAI capabilities are not only transforming their internal operations but also enhancing their customer engagement and service delivery.

Last year, NEC laid out its policy on the use of generative AI technologies, such as ChatGPT, in their business activities, internal operations, and R&D. The policy aims to promote the efficiency and productivity of employees, as well as develop innovative human resources and foster a dynamic corporate culture.

Figures have shown that GenAI is revolutionizing product management, resulting in a productivity increase of up to 40%. Reusing AI-generated code further accelerates development timelines, allowing companies to bring new offerings to market faster and more efficiently.

Indeed, AI has evolved from being a "nice-to-have" technology to an integral part of business transformation. According to a recent IBM Institute for Business Value report, companies that embrace AI in their transformation efforts often outperform their competitors.

Automation has also become critical in streamlining service operations, reducing manual work, and increasing productivity. By integrating automation with data analytics and AI, tech leaders can improve everything from network management to customer support, leading to enhanced operational efficiency and customer satisfaction.

In telecom, AI transformations employ a range of advanced technologies—such as machine learning (ML), computer vision, natural language processing (NLP), and generative AI—to automate tasks, improve decision-making, and create a responsive business ecosystem.

Utilizing generative AI, telecom operators can deliver personalized services, anticipate customer needs, and enhance the customer journey through tailored content, significantly impacting customer retention and loyalty.

In summary, there are four key trends shaping businesses of the future:

1. **Hyper-Personalization and Predictive Insights:** Predictive analytics allow companies to anticipate customer needs, providing a proactive approach to engagement and retention.
2. **Self-Optimizing Operations:** Autonomous networks that optimize themselves based on real-time data inputs are increasingly becoming a reality.
3. **Enhanced Decision-Making:** AI-based decision-making tools provide a 360-degree view of market conditions.
4. **Real-Time Adaptability and Resilience:** By analyzing data continuously, companies can adapt quickly to changes and reduce operational downtime.

Establishing a Modern Data-Driven Foundation

An effective AI strategy requires a strong data foundation that supports data analytics, predictive modeling, and intelligent automation. Telecom companies, particularly, rely on real-time data from networks and customer interactions to drive insights that inform strategic decisions.

To scale these efforts, companies are increasingly investing in modern data architectures that can handle large, complex datasets.

This modern data infrastructure facilitates the adoption of tools like DataOps and MLOps, which streamline the process of deploying AI models in production environments. By embedding these advanced practices into data management, businesses can rapidly introduce new capabilities while ensuring high data quality and reliability.

AI-powered decision-making is reshaping telecom strategies by equipping leaders with predictive and prescriptive analytics that reveal market trends, risks, and opportunities. This analytical capability enables leaders to act swiftly and accurately, positioning their organizations to thrive in a dynamic market.

As AI technologies advance, companies can also focus on ethical governance practices to maintain customer trust. Transparent and ethical AI policies—particularly in areas like data management and customer privacy—are becoming essential for long-term success.

Avoiding Common Pitfalls of AI Integration

While the benefits of AI in telecom are clear, successful integration requires a strategic, well-coordinated approach. The telecom industry's leaders have learned that isolated AI projects rarely deliver lasting value. Instead, a holistic approach that aligns AI initiatives with overall business goals can triple ROI compared to disconnected implementations.

In an effort to reduce human error in network operations to zero, Nokia's new Event-Driven Automation (EDA) platform is breaking down the barriers organizations face in the migration to data center automation. EDA is ushering in a new era of highly reliable, simplified, and adaptable lifecycle management to ensure that data center networks are designed for an AI world.

A critical component of this strategic alignment is ensuring that AI models are trained on data specific to a company's needs. According to Gartner, companies that carefully prepare their data for AI use experience 20% better business outcomes. This preparation involves organizing data with scalability in mind, ensuring quality, and embedding it in AI solutions tailored to business objectives.

A Future Built on Data and AI

For telecom leaders, the journey towards an AI-driven future is about more than implementing new tools; it's about transforming how they operate, innovate, and engage with customers.

By strategically integrating AI across business functions, companies, including telcos and techcos, are positioned to lead in an era where data and intelligence drive growth and differentiation. The next decade holds vast potential, and those who harness AI effectively will redefine the industry's landscape, creating lasting value. TR

The Challenges and Limitations of LEO Satellites

In the quest for optimal global connectivity, low Earth orbit (LEO) satellites are increasingly becoming an essential infrastructure component for bridging the digital divide, processing real-time data applications, and strengthening economic resilience across industries, including aerospace, defense, telecom, climate and agriculture, oil and gas, and more.

The demand for digital services and high-speed internet connectivity requires overcoming infrastructure limitations, such as inaccessible terrain where terrestrial network deployments are challenging. In this scenario, LEO satellites serve as a perfect solution.

LEO satellites, usually operating at altitudes of 300-2,000 km (186-1243 miles) above the Earth's surface, are advantageously cheaper as they are smaller and provide more efficient transmission with designated ground transceivers than GEO or MEO satellites, which are placed in higher orbits.

LEO Landscape

Leading the race in LEO satellite placement is tech entrepreneur Elon Musk's company, Starlink, which aims to provide global mobile broadband and "rebuild the internet in space" as part of its operations. As of September 2024, the Starlink constellation consists of over 7,000 mass-produced small satellites in low Earth orbit. Moreover, 12,000 satellites are in the pipeline for deployment, which could expand to 34,400 in the future as per recent industry news.

Recently, Chinese company, Geespace, launched a third batch of LEO satellites in response to Starlink's operations. This launch forms part of the company's first construction phase for its constellation, which aims to place 72 satellites in orbit to service over 200 million users worldwide by the end of 2025. In the pipeline for such constellations are Amazon's Kuiper, Canada's Telesat and direct-to-cellular satellite operations from Globalstar/ Apple, AST SpaceMobile, Iridium, and Lynk.

In August 2024, the UAE's flagship satellite solutions provider, Al Yah Satellite Communications Company (Yahsat), and AI-powered geospatial solutions provider, Bayanat, successfully launched their first LEO Synthetic Aperture Radar (SAR) satellite into orbit, in partnership with ICEYE, a pioneer in SAR satellite operations for Earth observation, persistent monitoring, and natural catastrophe solutions.

Moreover, Space42, a recently completed joint venture between Yahsat, Thuraya, and Bayanat, aims to become a global player in satellite-based, direct-to-device (D2D) activity. The joint venture also aims to launch a potential LEO constellation, which is expected to generate USD 7.1 billion in revenue by 2030.

Pressures Facing LEO Satellites

"The satellite communications market is a very competitive and difficult market to be profitable in," noted Gareth Owen, Associate Director at Counterpoint Technology Market Research. "There are simply too many systems chasing a limited market opportunity. As a result, every satellite operator will do whatever they can to impede or delay the entry of a competitor."

The many satellites that are currently being launched are already facing a myriad of concerns. One of the prominent problems is the accumulation of space debris due to inactive or defunct satellites left in orbit, posing the risk of collisions with floating satellites. Moreover, the overtly brilliant reflection interferes with ground-based observations using telescopes. So much so, that astronomers are experimenting with satellite constellation simulations to better understand the effect thousands of additional satellites will have on astronomy at optical and radio wavelengths.

Additionally, LEO satellites have a shorter life span than their GEO equivalent, with a typical lifespan of 7-10 years. Operating LEO satellites tends to be more expensive in terms of the number of satellites needed and the frequency of replacement. Moreover, LEO satellites orbit the Earth at a speed of 7.8 kilometers per second with a high chance of range instability, unlike GEO satellites, which are more stable. For this reason, LEO satellites need large constellations to provide uninterrupted transmission coverage. This concern is of prime importance. As the number

and size of satellite constellations grows, the area needs to be managed efficiently to ensure sustainable operations. Given the demand for low-latency transmission from LEO satellites, many nations will strive to secure their position in this global connectivity race. As such, a steep and competitive supply chain market lies on the horizon, further aggravated by a high recession-ridden global economy and volatile geopolitical environment.

Furthermore, the radio spectrum and orbits around the Earth are finite resources and warrant international cooperation among governments, globally accepted regulation, and structured coordination among radio and satellite operators worldwide. Satellite communication operators must navigate complex national and international regulations to secure fundamentals such as landing rights, service licenses, ground equipment, and ground station gateway licenses from individual regulators across the globe. Reaching such agreements is easier said than done as evidenced by the success of only two operators—Starlink and OneWeb—in the global market.

Subsea Challenges

LEO satellite services primarily focus on addressing consumer broadband and maritime connectivity. As such, it competes with the efficiency of submarine cable networks. Undersea fiber optic cables transport 98% of global digital data, ranging from "streaming videos and financial transactions to diplomatic communications and essential intelligence," according to the U.S.-based Center for Strategic and International Studies (CSIS).

Notably, subsea cables offer higher bandwidth capacity compared to satellites, making them suitable for high-volume data transmission and bandwidth-intensive applications, covering a wide range of industrial sectors that require ubiquitous connectivity.

Telcos and LEO

Telecom operators stand to gain from satellite communication by providing direct satellite connectivity to regular smartphones as well as IoT applications through direct-to-device (D2D) technology. This connection allows mobile phone users to switch from 4G/5G mobile networks to satellite connectivity for uninterrupted coverage.

Moreover, given the adoption of autonomous operations and AI applications in various industries, satellite communication provides diverse connectivity options for industrial use cases. To cash in on these opportunities, it is imperative for both telcos and satellite operators to enhance the interoperability of their networks to achieve efficiency in connectivity.

To support the cohesion between telcos and satellite operators, several technology companies are offering their solutions. For instance, leading software company, Netcracker, is helping satellite communication providers launch multi-orbit satellites through its Digital Satellite Solution. Powered by AI, the solution aids satellite operators by providing optimal digital engagement for its customers, helping satellite operators to integrate their offerings with that of telcos.

Similarly, integrating satellites with 5G infrastructure improves the Quality of Experience (QoE) of high-capacity applications, improving the resilience of each network. Nokia is partnering with operators to enable 5G connectivity directly via satellites, ensuring that devices can access the network even in remote or underserved areas with limited traditional coverage. This collaboration aims to make high-speed, reliable 5G services accessible to everyone, regardless of their location. Nokia is playing a leading role in the standardization of non-terrestrial networks (NTNs), ensuring robust interoperability and connectivity between cellular connections and satellite communications.

The Need for Conducive Collaboration

Despite the seemingly tangible challenges, the ebbing cost of satellite launches and advancements in chipset technology is making NTNs a more cost-effective solution for telcos to provide coverage across land, sea, and air. However, these potential opportunities require collaborative efforts to harness the strength of satellite and cellular technologies to create robust connectivity networks suitable for the growing demands of our globally-connected society.

Although satellite technology has been around for over 30 years or so, LEO has ushered the communications industry to the edge of the connectivity revolution. Despite its challenges, the LEO satellite industry's success will depend on strategic investments and robust regulatory support from respective governments and industry stakeholders. These collective efforts, bolstered by integrations with other communications technologies, will illuminate the path to a globally connected future. TR

Although satellite technology has been around for over 30 years or so, LEO has ushered the communications industry to the edge of the connectivity revolution

Mohammed Al-Marshed Appointed as New Zain Group CTO

Mohammed Al-Marshed has been appointed as the new Zain Group Chief Technology Officer (CTO), effective November 24, 2024. Prior to this, he held the position of Zain Group Executive Director of Networks.

Al-Marshed has over two decades of experience in telecommunications and ICT, having joined Zain in 2002 as a networks engineer. Over his 22-year-journey, he has gained a wide range of expertise across networks, ICT, digital transformation, wholesale, data governance, and climate change.

Career Highlights

Highlights of Al-Marshed's career include his role as CTO Zain KSA in 2012; participating in building greenfield operations in Bahrain, Iraq, Ghana, KSA, and South Sudan; and playing a key role in the rollout of 5G networks in Kuwait, KSA, Bahrain, and Jordan, which made Zain the largest 5G network operator in the MENA region.

Working across environments, projects, and countries has honed Al-Marshed's skills and experience in handling an array of projects, technologies, cultures, and people, all while being able to develop other peoples' skills and boost their productivity

Al-Marshed graduated with a BS in Electrical Engineering from California State University, Long Beach, attained a Master Certificate in Project Management from George Washington University, and an MBA in Telecom from ESI. He has also completed a course in Leadership as a Force of Change at Harvard Business School; an Advanced Leadership program at London Business School; a Coaching program at HEC & University of Oxford; an Executive Master's degree in Consulting and Coaching for Change at HEC Paris; and a Decision-Making, Negotiation and Adaptive Leadership Strategies course at Harvard Kennedy School.

Nokia and Ooredoo Oman Forge High-Capacity Network Alliance

Nokia has partnered with Ooredoo Oman to deploy a state-of-the-art Dense Wavelength Division Multiplexing (DWDM) wholesale network. This project will meet the evolving needs of hyperscalers' data centers, AI-driven applications, and cloud-based platforms while establishing Oman as a key connectivity hub between the Indian Ocean, the Gulf, and Europe.

This new nationwide network, powered by Nokia's flagship 1830 Photonic Service Switch (PSS) will deliver trusted performance using WDM transmission across both the C + L bands, will simplify network operations, and will accelerate service delivery using the WaveSuite optical automation software.

The commercial launch of network services is slated for March 2025, with the new network ensuring low-latency connectivity for hyperscalers and wholesale customers, while enabling seamless traffic flow to global destinations.

The deployment of this extensive high-capacity network through the strategic collaboration between Nokia and Ooredoo aligns with Oman Vision 2040. This initiative aims to enhance global competitiveness and strengthen the country's digital infrastructure, establishing Ooredoo Oman as a pivotal player in the global data traffic ecosystem and delivering world-class connectivity that empowers businesses and communities across the region.

Bassam Yousef Al Ibrahim, Chief Executive Officer of Ooredoo Oman, said, "At Ooredoo, our vision is to enrich people's digital lives, and to meet the growing demand for connectivity across the Sultanate. To achieve this, we will continue our network investment and planned network enhancements through this strategic partnership with Nokia, thus, further strengthening Oman's position within the region as major telecommunications hub. This project will cater to both national and international demand, driving growth and innovation across Oman."

Roque Lozano, Senior Vice President of Network Infrastructure for Nokia Middle East and Africa, said, "The partnership with Ooredoo Oman reflects our shared commitment to delivering reliable, high-performance connectivity that supports the growing global demand for AI-driven technologies and cloud-based data centers. By deploying Nokia's advanced DWDM solution, we are enabling an AI-hyperscale capacity and resilience-class network, while strengthening Oman's position as a regional connectivity hub. Together, we are leveraging cutting-edge optical networking technology to drive innovation and economic growth."

du and Telefónica Partner to Boost Innovation and Growth

du, the leading telecom and digital services provider, has announced a strategic partnership with Telefónica to accelerate innovation and enable mutual business growth. As part of the partnership, du will join the prestigious Telefónica Partners Program, which connects over 65 markets across Europe, Latin America, and the Middle East and Africa.

This partnership signifies a collaborative step towards enhancing operational capabilities, exchanging best practices and expertise, and driving mutual business opportunities, leveraging the extensive knowledge and expansive reach offered by the Telefónica Partners Program to work collaboratively on initiatives and projects that span various operations within du.

Fahad Al Hassawi, Chief Executive Officer at du, said, "du aims to propel the UAE onto the global stage of innovation excellence in alignment with the leadership's ambitious digital agenda. Our strategic partnership with Telefónica spans a broad spectrum of areas, enabling us to enhance and enrich our business and seamlessly integrate with the global digital ecosystem. It's also in line with our goal to enhance the nation's digital landscape and driving innovation in the UAE."

Additionally, du will join Alaian, an international telecom alliance that includes eleven major global members, further enhancing its collaborative and innovative capability. This affiliation grants du access to a network of leading telecom companies and the opportunity to collaborate with disruptive startups within a global ecosystem.

Mark Evans, Chief Strategy & Development Officer at Telefónica, noted, "The signing of this Strategic Partnership Agreement with du marks an important milestone in our ongoing efforts to pursue growth and foster industry collaboration. Working together, we have the opportunity to explore potential joint business opportunities in various strategic areas, including B2B, B2C, innovation, procurement, and digital services. We are confident that this partnership will create significant value for both our organizations and customers, and we look forward to a fruitful collaboration with du in the years ahead."

du and Telefónica will explore joint business opportunities across various domains. The partnership marks a pivotal step towards the UAE's digital vision by leveraging the combined scale, expertise, and market presence of both entities.

Umniah Enhances Digital Experience with New eSignature Service

Umniah has announced the launch of a project set to provide a new electronic signature service called eSignature. This project aims to enhance digital transformation and provide a smooth and convenient experience for customers by simplifying contract signing processes, consequently increasing operational efficiency and achieving environmental sustainability by reducing paper consumption.

This service allows individuals to sign documents and contracts electronically through the company's showrooms and digital channels with ease and security, reducing the need for traditional paper signatures and processes.

Achieving Comprehensive Digital Transformation

Stressing the importance of launching the eSignature service, Ehab Hafez, Head of Digital and IT at Umniah, noted, "Launching this service at the beginning of next year represents a strategic step in our journey towards comprehensive digital transformation and is a confirmation of our commitment to provide the best solutions that meet our customers' needs and keep pace with technological developments. This service not only facilitates the process of signing documents and contracts, but also contributes to enhancing operational efficiency and saving time and effort for all parties."

Hafez added that the e-signature service will support Umniah's vision to achieve sustainability by reducing reliance on paper and achieving a positive impact on the environment, noting that this step will bring about a tangible transformation in the customer experience, enhancing their trust in us and making their operations safer and easier.

Meanwhile, Hani Al Saadi, CEO of Business Consult, said, "We are proud to partner with Umniah on their digital transformation journey and implement the e-signature project in collaboration with our technology partner, Euronovate, from Switzerland. This project will simplify their document workflow, reinforce their commitment to innovation and sustainable practices, and provide exceptional service to their customers."

stc Group Gains Approval to Increase Stake in Telefónica

In a significant move to bolster its international investment portfolio, stc Group, Saudi Arabia's leading digital enabler, has announced that it has received formal approval from the Spanish Council of Ministers to increase its voting rights in Telefónica.

With this approval, stc's stake in the telecommunications giant will rise to 9.97%, and the company will gain the right to appoint a representative to Telefónica's Board of Directors. This governance will allow stc Group to engage directly with Telefónica's decision-making processes and help shape the company's strategic direction.

The approval comes following stc Group's previously disclosed acquisition of a stake in Telefónica. It marks a key milestone in the company's strategy to strengthen its position as a major global investor.

Innovative, High-Growth Investments

stc Group's decision to expand its stake in Telefónica aligns with its strategy to diversify investments in high-quality assets and strengthen its global digital presence. Telefónica's strong infrastructure and leading role in telecommunications across multiple markets make it an attractive opportunity. The Spanish government's approval reflects confidence in stc Group's positive contribution to Telefónica's future. By increasing its stake, stc Group becomes one of Telefónica's largest shareholders, enhancing its partnership with a major global telecom provider operating in over 14 countries, including key markets in Europe and Latin America.

"Obtaining the required approvals from the Spanish Council of Ministers reflects stc's role as a long-term strategic partner in Telefónica. As one of the company's largest shareholders, we remain confident in Telefónica's leadership and strategic outlook, and we look forward to working together to unlock value for all shareholders," noted Olayan Alwetaid, CEO of stc Group.

stc Group's increased investment in Telefónica comes in the wake of the telecommunications industry's significant transformation, which is being driven by technological advances and the increasing demand for high-speed connectivity, data services, and digital infrastructure.

Mobily and Sparkle Join Forces to Enhance Connectivity Via Submarine Cable Systems

During its participation as a Digital Infrastructure Founding Partner of the first edition of the Connected World KSA conference hosted in Riyadh, Mobily, a leading innovator in the Telecommunications, Media, and Technology (TMT) sector in the Kingdom of Saudi Arabia, signed a Memorandum of Understanding (MoU) with Sparkle, the first international service provider in Italy and among the top global operators.

The partnership will enhance connectivity solutions through Sparkle's state-of-the-art new submarine cable systems and advanced undersea telecommunications infrastructure, which seamlessly links key regions between Europe and the Middle East. This collaboration leverages Saudi Arabia's strategic position to offer low-latency connectivity between Asia and Europe, improving global connectivity.

Under the MoU, Mobily and Sparkle have outlined a strategic agreement under which Mobily is finalizing the acquisition of dark fiber from Sparkle's advanced submarine cable systems, which will enable seamless connectivity with strategic drop points in Chania, Palermo, Milan, and Marseille, further enhancing Mobily's international network capabilities. The project is expected to be fully completed in 2025.

Building on this MoU and the new digital path announced in October 2024 by Mobily and Sparkle, network providers, ISPs, OTTs, content and application providers, and enterprises will benefit from highly reliable, low-latency routes with scalable capacity options. Clients will also gain access to the expansive networks of both Mobily and its partner, leveraging a rich portfolio of services including Layer-1, Layer-2, and IP solutions.

"Our collaboration with Sparkle strengthens the resilience of global network connectivity between the East, the Middle East, and Europe. This partnership supports the expansion of data centers and fosters content diversification for OTT platforms and hyperscalers in the region, enabling robust digital growth and innovation," said Thamer A. Alfadda, SVP Wholesale of Mobily. "We are delighted to collaborate with Sparkle on this significant and impactful project, marking an important milestone in our partnership."

"We are pleased to cooperate with Mobily to strengthen Saudi Arabia's primary and pivotal role in the digitalization of the region and reinforce the Kingdom as a strategic digital hub enabling better communication between Europe, the Middle East, and beyond," said Enrico Bagnasco, CEO of Sparkle.

ICT Innovations Set to Dominate in 2025

In 2025, the ICT landscape is set to be shaped by advancements in connectivity, data management, automation, and immersive experiences. To truly pinpoint the industry's expected trajectory, Telecom Review evaluated the industry's pulse based on the progress made in 2024 and the evident trends that could dominate the upcoming year.

Intersection of Trends

We have heard about, and seen, the massive advancements in various technologies this year, including 5G, cloud, AI, automation, data analytics, and augmented reality (AR). These trends co-exist and correlate with each other in terms of usage, benefits, and impact on society overall.

The interplay of connectivity, data, automation, and immersive experiences represents the backbone of today's digital transformation. Connectivity acts as the enabler, ensuring seamless access and interaction between devices, people, and platforms globally while data management tools optimize the vast amounts of information generated by connected systems.

Similarly, automation leverages connectivity and data to perform repetitive tasks efficiently, reducing human intervention and enhancing productivity. Immersive experiences (like AR, VR, and the metaverse) depend on all three—fast and reliable connectivity, well-structured data, and automated processes—to deliver real-time, engaging, and personalized interactions.

Advanced Connectivity

By 2025, 5G, and the 5G-Advanced evolution, will be more widely implemented and integrated into industries like healthcare, manufacturing, transportation, and smart cities, supporting ultra-low latency applications like autonomous vehicles (AVs) and telemedicine.

In 2023, industry leaders joined hands to announce 2024 as the first year of the 5G-Advanced era in the Middle East. Scheduled for global launch in 2025, 5G-Advanced is poised to become the next generation of mobile connectivity. It promises enhanced capacity, improved mobility, and tailored connectivity, creating the foundation needed for new market opportunities on a greater scale. Among the cornerstones of 5G-Advanced is network sustainability and the introduction of new AI capabilities.

Nokia research revealed that 60% of CSPs in the MEA region are adopting 5G to enhance their digital transformation while Juniper Research predicts that there will be 30 million vehicles globally with embedded 5G connectivity by 2025. As embedded 5G connectivity becomes more prevalent in vehicles, it is anticipated that 25% of cellular data generated by vehicles will be attributable to 5G-capable vehicles by the same year.

Moreover, although 6G is expected around 2030, early R&D is already shaping its standards and roadmaps. 6G's potential to enable extreme bandwidth (up to 100 times faster than 5G), holographic communication, and advanced AI processing at the network edge is drawing early interest from telecom companies and governments.

In 2025, the competition in the internet space race will also intensify, with satellite transmission technology emerging as a beacon of hope for billions still lacking reliable, if any, access to the internet.

In a global telco-focused 2025 survey, 60% of the respondents affirmed that connectivity is a major priority in life as it helps them reach those closest to them. In the future, unlimited connectivity will become a given, enabling life-enhancing services like AI-powered home hubs integrated with the IoT.

Smarter Data Management

According to a 2024 AI and ML study, 18% of organizations have fully integrated generative AI (GenAI) across their operations. However, poor data quality remains a leading cause of AI project failures, underscoring the critical need for robust data management practices.

As data increases rapidly across on-premises data centers, multiple clouds, and edge devices, organizations demand more flexible management solutions; thus, innovative architectures like data fabrics address this complexity by seamlessly integrating disparate data sources into a unified framework.

In 2025, edge computing will continue to transform data processing by bringing it closer to the source of the data, improving response times and optimizing network resources. Industries such as logistics, manufacturing, and fieldwork, are expected to benefit the most as they demand real-time data processing.

Cloud-native data management will also gain momentum, driven by the need for agile, resilient strategies that support remote work and real-time analytics. With this in mind, Data-as-a-Service (DaaS) is emerging as a game-changer by providing on-demand cloud access to data and simplified data management process.

For non-technical users, low-code and no-code platforms are democratizing data integration by allowing them to connect, transform, and manage data effortlessly. Simultaneously, AI algorithms are enhancing modern data management by enabling advanced data classification and uncovering patterns within large datasets—tasks that are often beyond human capacity.

By 2025, in-memory databases will further streamline data handling, offering scalable, enterprise-level solutions that support rapid deployment. Miniaturizing big data (a notable trend) will also provide greater flexibility, enabling companies to tailor infrastructures to specific needs while optimizing costs.

The Automation Era

With the first robotaxis using Level-4 autonomous driving systems now in use in several cities, other carmakers are planning to launch their Level-3 and Level-4 autonomous driving systems in various countries in 2025. These autonomous vehicles are dependent on excellent wireless connectivity—both mobile and satellite—to keep the cars and their passengers safe and provide them with near-real-time data.

With all the hype around AI this year, in 2025, this technology is expected to play an enhanced role in optimizing automated processes and helping businesses to reduce costs, increase productivity, and enhance

customer experience. This aligns with estimations that, in 2030, as much as 30% of current work hours could be automated and human specializations will focus more on areas that AI cannot solve.

GenAI can automate tasks such as data cleaning, pattern recognition, and content generation, thereby freeing up human expertise for higher-level analysis, interpretation, and innovation. A 2024 report by Accenture corroborates that most organizations view GenAI as a pathway to greater innovation, aligning the technology with broader business goals to enhance efficiency and foster innovation.

As data grows in complexity and volume, businesses are turning to more automated solutions for data governance. By leveraging AI and machine learning, autonomous data governance streamlines manual tasks related to data quality, security, and compliance. This approach allows organizations to scale their governance processes efficiently while minimizing costs and human errors.

Additionally, the fusion of data analytics and automation is set to become a standard across all layers of data infrastructure. This integration enhances data management capabilities and maximizes value for end users, driving better decision-making and operational efficiency.

The introduction of 5G in industrial automation will also be accelerated, accompanied by a push for the development of smart factories and industrial use cases in the coming years. Hyperautomation will take business process automation to the next level, with special consideration for cost reduction and interoperability.

2025 will be pivotal for integrating robots, digital systems, and human endpoints. Analysts foresee GenAI and edge intelligence driving robotics projects, blending cognitive and physical automation, while developers are forecast to create GenAI-powered automation apps.

Immersive Realities

Immersive technology bridges the gap between the physical and digital worlds, offering users highly engaging experiences. Core technologies like virtual reality (VR), augmented reality (AR), extended reality (XR), and mixed reality (MR) facilitate interactions that feel genuinely real—either through fully immersing the user in a virtual environment or blending digital elements seamlessly into physical spaces.

AR and VR have revolutionized B2B customer experiences, especially remote support and technical workflows, offering precision and efficiency. Meanwhile, digital twins (virtual replicas of physical assets) are set to dominate industrial automation by 2025. Paired with the rising adoption of wearable devices like AR smart glasses and VR headsets, these innovations will redefine industrial and commercial operations.

The rollout of 5G technology has also been a game changer, enabling the ultra-fast data speeds and low latency essential for AR and VR applications. This ensures smoother, more immersive interactions, particularly for real-time VR experiences. Additionally, artificial intelligence (AI) is transforming XR by enhancing real-time data processing, creating adaptive, intelligent environments that respond dynamically to users.

Looking ahead to 2025, immersive technology will likely converge with emerging trends like edge computing and the metaverse. The future promises deeper integration of these tools into everyday workflows, further blurring the line between what's real and what's possible. TR

HDC·2024 HUAWEI MEA: Reaching New Heights in Digital Transformation

Held at the iconic Louvre Abu Dhabi, the HDC·2024 HUAWEI MEA Ecosystem Summit unfolded as a powerhouse conference on November 18, gathering visionaries, industry leaders, and innovators across the technology, gaming, and digital advertising sectors. This year's conference created an unparalleled platform for exploring advancements in Huawei's ecosystem, including AppGallery, Petal Ads, and Cloud, marking new heights in cross-market synergy and digital transformation.

Jerry Liu, Chairman of Huawei Technologies UAE, said, "At HDC·2024 MEA, we are committed to redefining digital bridges, connecting local and global markets through our dynamic ecosystem, and unlocking new avenues for growth and collaboration between the Middle East and China. As we look ahead, these connections will be pivotal in driving sustainable change across industries.

"We are proud to host this summit, bringing together visionary leaders, industry pioneers, and key partners from around the world to explore cutting-edge trends in digital marketing, gaming, esports, cloud solutions, and destination branding. This event serves as a powerful platform that not only empowers partnerships and fosters innovation but also enriches our ecosystem, paving the way for future success and transformative opportunities."

Huawei Ecosystem: Bridging Local and Global Markets

The conference highlighted the convergence of technology and opportunity, establishing the HDC·2024 HUAWEI MEA Ecosystem Summit as a digital bridge connecting the MEA region with China, fostering partnerships, and promoting business exchange across markets. By facilitating innovation and cooperation, HDC·2024 set the stage for new growth pathways and an exciting future in the digital ecosystem.

Throughout the summit, speakers emphasized the importance of collaboration within Huawei's ecosystem to drive technological advancement. His Highness Sheikh Sultan Bin Khalifa Bin Sultan Bin Shakhboot Al Nahyan, President of the Emirates Esports Federation, graced the conference with an inspiring speech, highlighting a shared commitment to growing the regional esports ecosystem with HUAWEI AppGallery. He commended initiatives like the AppGallery Gamers Cup (AGC), which has become a significant regional event for players and fans alike, marking a new chapter in the growth of esports in the Middle East.

In an inspiring session on digital art and cultural exchange, renowned Emirati surrealist artist, Moosa Al Halyan, shared his journey with the GoPaint app, underscoring the power of art in connecting cultures through digital innovation.

AWS Announces Data Center Innovations for 2025

Amazon Web Services (AWS) announced new data center components designed to support the next generation of artificial intelligence (AI) innovation and customers' evolving needs. These capabilities combine innovations in power, cooling, and hardware design to create a more energy efficient data center that will underpin further customer innovation.

The new data center components are built to scale across AWS's infrastructure worldwide, including its 34 Regions, 108 Availability Zones, and other infrastructure offerings like AWS Local Zones. Construction on new AWS data centers, with the full set of components, is expected to begin in early 2025 in the United States.

"AWS continues to relentlessly innovate its infrastructure to build the most performant, resilient, secure, and sustainable cloud for customers worldwide," said Prasad Kalyanaraman, VP of Infrastructure Services at AWS. "These data center capabilities represent an important step forward with increased energy efficiency and flexible support for emerging workloads. But what is even more exciting is that they are designed to be modular, so that we are able to retrofit our existing infrastructure for liquid cooling and energy efficiency to power generative AI (GenAI) applications and lower our carbon footprint."

AWS has been building large-scale data centers for 18 years and GPU-based servers for AI workloads for 13 years. Today, AWS's data centers support millions of active customers worldwide, including hundreds of thousands of customers using AWS AI and machine learning (ML) services, and tens of thousands of global customers using Amazon Bedrock to build their generative AI applications.

Accelerating Vision 2030: Nokia's NextGen Lab Champions Smart Cities and Open RAN

Nokia has opened a 'NextGen Lab', providing an interactive environment for local businesses and partners to experience and explore Nokia's latest technologies. The NextGen Lab is located in Riyadh's thriving technology district, Laysen Valley, and aims to accelerate Saudi Arabia's digital infrastructure ambitions as outlined in its Vision 2030 strategy.

Ali Jitawi, Market Unit Head of Mobile Networks at Nokia, Saudi Arabia, said, "Saudi Arabia is a technology innovation hub in the MEA region, with ambitious digital transformation initiatives under Vision 2030, making it an ideal testing ground for next-generation solutions. The launch of the Nokia NextGen Lab in Riyadh therefore reflects our commitment to supporting Saudi Arabia's vision for a connected, digitally-advanced society. By providing hands-on access to next-generation technologies, we're empowering local industries to unlock the benefits of modern connectivity. This lab represents our dedication to driving digital growth and supporting the Kingdom's leadership in the regional digital transformation journey."

Nokia's NextGen Lab: Hands-On Access to Next-Generation Technologies

With the growing interest in Open RAN's capabilities, there has consequently been heightened demand for private networks and smart city solutions. Moreover, the rapid deployment of 5G and 5G SA in Saudi and MEA has resulted in the need to accelerate the adoption of advanced mobile network technologies in the region. Therefore, in collaboration with leading technology partners such as Dell Technologies, the Lab will demonstrate Open RAN's capabilities and explore the possibility of flexible and interoperable networks to meet the demands of an increasingly connected society.

The Lab will explore the viability of innovative technologies such as O-RAN and Cloud RAN through Nokia's pioneering anyRAN approach, underscoring Nokia's commitment to pioneering open, flexible networks that drive industry collaboration. This includes exploring multivendor interoperability and advanced carrier aggregation to achieve high-speed connectivity.

Cisco Advances Wireless Innovations with Wi-Fi 7

Global solutions provider, Cisco, introduced a groundbreaking suite of wireless innovations, with smart Wi-Fi 7 access points and unified subscription licensing, revolutionizing workforce and customer connectivity, security, and assurance.

This cutting-edge wireless connectivity solution enables performance enhancements, transforming workspaces and experiences in various organizations, including retail, manufacturing, and health.

Commenting on the new wireless innovation, Jeetu Patel, Chief Product Officer at Cisco, highlighted how the company's innovations, such as sensors, cameras, and screens, blend with human behavior to enhance the digital experience. Moreover, Patel emphasized how Wi-Fi 7 is at the center of these experiences.

Driving Innovation for Customers

The new Wi-Fi 7 access points are set to deliver smart and scalable experiences to customers, which include:

- **Intelligence:** Cisco's new Wi-Fi 7 access points deliver one of the industry's most intelligent wireless offerings, featuring AI-native performance optimizations and out-of-the-box self-configuration. The access points are universal and can auto-detect location as soon as they are plugged in. With access to the Cisco Spaces platform now included in the subscription license, customers now utilize an operating system to turn their workspaces into smart spaces.
- **Security:** Powered by some of the industry's most advanced threat detection capabilities, Cisco secures every connection with AI-native device profiling, threat prevention, and advanced wireless security and data encryption.
- **Assurance:** Through Cisco ThousandEyes, customers can assure every connected experience using AI and automation to identify and remediate performance bottlenecks across wireless, owned, and unowned networks, unlocking the ability to deliver exceptional digital experiences to every user, wherever they are.

"With Cisco Wi-Fi 7 access points and Cisco Spaces, we are delivering the connectivity, assurance, and data that IT, real estate, and facilities teams need to reimagine employee and customer experiences everywhere," Patel concluded.

Is D2D the Key to Unlocking Seamless Connectivity Everywhere?

There is a race to build a new set of satellite-enabled telecom services for consumers, enterprises, and governments. In the Middle East, the D2D landscape has not been explored extensively yet, however, the rest of the world appears to be honing in on this opportunity.

Basic services for emergency communication, simple text messages, and IoT monitoring have already started, and moving forward, integrating satellite and terrestrial mobile networks could unlock new revenue for the satellite, semiconductor, and telecom industries.

D2D to Expand Global Connectivity and IoT

Deloitte predicts that more than 200 million smartphones boasting satellite connectivity will be sold in 2024, and these phones are expected to contain about USD 2 billion of special chips.

Space companies are now developing satellites that communicate directly with smartphones, while phone manufacturers are incorporating affordable chips to enable these satellite connections. These advanced direct-to-device capabilities could enhance two-way communication and expand the number of connected IoT devices in society.

According to the Center for Space Policy and Strategy, ubiquitous connectivity demand, lower costs for launch and satellite production, and increased synergies from network convergence and enterprise efficiencies are all key market drivers for D2D.

D2D capabilities are a combination of SATCOM technology, existing mobile network operator (MNO) infrastructure, and the rapidly expanding IoT market. The foundation for wireless networks, including IoT, SATCOM, MNOs, and D2D, is supported by international industry consortium standards, such as 3GPP, which has been working on non-terrestrial networks (NTN) standardization.

Among the different presumptions of this market's value, Northern Sky Research projects that new satellite D2D services could attract up to 386 million users by 2030. Over the next decade, it could generate over USD 65 billion in cumulative revenues for the satellite industry.

The Rise of Direct-to-Device Services

Basic emergency services via satellite are already in operation, with consumer, enterprise, and the government showing more interest in D2D services.

Those who are pushing for D2D services foresee a future governed by seamless connectivity. At present, by utilizing LEO satellites, D2D technology aims to offer coverage in regions where terrestrial networks are not available or remain unreliable, such as in remote areas, disaster zones, and maritime environments. This could greatly impact industries like agriculture, transportation, and emergency response, along with improving connectivity for people in underserved regions.

The rise of D2D came after decades of progress in terrestrial and satellite networks, starting with satellite backhaul for 2G and 3G in remote areas, and now evolving into non-terrestrial networks (NTN) that integrate with 5G.

As a result, D2D services also have the potential to strengthen existing mobile networks by adding an extra layer of connectivity. This could unlock new possibilities like global asset tracking, remote monitoring, and IoT applications, while boosting network resilience and redundancy.

One technology advancement related to this is Netcracker's new Digital Satellite Solution, which is helping satellite operators to expand their communication offerings through deeper integration with telco domains. This will help maximize their value in this growing market and deliver differentiating communication experiences.

Another example is Iridium's NTN Direct service, which aims to be the world's first truly global 5G NB-IoT offering. "When it comes to providing D2D, we don't have to be first, but we have to be the best," said Matt Desch, CEO of Iridium. The service allows smartphone companies, OEMs, chipmakers, and MNOs to use Iridium's network, delivering a global, low-latency LEO user experience based on 3GPP standards.

The Partnerships Catalyzing Satellite D2D Expansion

The satellite D2D value chain is growing with the involvement of diverse players who are establishing partnerships with different strategies. These include chipset manufacturers, OEMs, infrastructure equipment vendors, satellite operators, service providers and MNOs.

Since we are still at the nascent stage, successful D2D partnerships are anticipated to be those that will instil harmony across the members of the industry value chain and bring utmost value to target users and verticals.

For example, T-Mobile is working with SpaceX to use their Starlink LEO satellite constellation to provide text messaging services for customers in the United States. Moreover, Verizon is the first mobile carrier to launch a commercial D2D service offering with Skylo, with plans to offer the ability to text anywhere via satellite in select devices by next year.

> "The converging D2D market presents significant opportunities for increased customers and revenue for both satellite and terrestrial wireless communication providers, as well as IoT players"

Filipino telecom operator, Globe, has also announced that it will launch a D2D satellite service in parts of rural Philippines. To do so, it has partnered with Lynk Global. Globe will use Lynk's LEO satellite constellation to ultimately deliver SMS, IP messaging apps and emergency alerts to target regions currently lacking traditional terrestrial network coverage.

Brazil's complex geography leaves millions without access to terrestrial cell networks. In response, the National Telecommunications Agency (Anatel) has launched a regulatory sandbox to facilitate D2D satellite connectivity trials, motivated by the plans of mobile providers, Claro and TIM. Together, the entities will collaborate with AST Space Mobile on upcoming trials.

In Europe, OQ Technology has emerged as a leader since pioneering a Narrowband IoT Waveform mission in 2019. They've successfully connected cellular IoT devices to LEO satellites.

D2D Market Outlook

Overall, connecting the unconnected, improving safety and emergency response, expanding IoT applications, and increasing the resiliency and reliability of the global telecommunications infrastructure are the top benefits of D2D connectivity.

What is not clear at this point is which business models will dominate, how large the addressable market is, and the degree to which competition, cooperation, and disruption will shape the D2D landscape.

The converging D2D market presents significant opportunities for increased customers and revenue for both satellite and terrestrial wireless communication providers, as well as IoT players. Looking ahead, future 6G networks will enhance this integration, building on 5G standards.

Satellite D2D is one of the most exciting areas of the space industry and more revenue opportunities will be unlocked as D2D capabilities evolve and voice and wideband data services become commercially available.

The GSMA mentioned that wholesale partnerships between telecoms and satellite operators will likely be the most common revenue model for D2D services. Business/enterprise revenues will come primarily from connecting IoT devices in out-of-coverage areas. With an estimated total addressable market of USD 10.4 billion by 2035 just for connectivity, additional revenues will come from other associated value chain elements such as professional services and platform analytics.

Furthermore, the GSMA clarified that while D2D is branded as a '5G-enabled' service due to 3GPP standardization, actual speeds will likely resemble 3G, ranging from 3–5 Mbps, with occasional higher performance. The key benefit is its ability to deliver continuous coverage in rural and remote areas, compensating for the lower speeds compared to LTE.

Operators will need to carefully consider how the D2D service is marketed and the competitive differentiation that can be offered. TR

Hybrid Warfare at Sea? Baltic Submarine Cables Severed

The vast network of submarine cables forms the invisible backbone of global communication, carrying essential data for commerce, security, and daily life. Stretching over 1.2 million kilometers and transmitting 98% of the world's digital data, these cables enable everything from financial transactions to streaming services. However, their strategic importance also makes them a potential target for disruption—a reality brought to the forefront by recent incidents in the Baltic Sea.

Within 48 hours, two major submarine cables—C-Lion 1 and Arelion—were severed, sparking investigations across Finland, Sweden, Germany, and Lithuania. Officials, including Germany's Defence Minister Boris Pistorius, suspect sabotage, with Pistorius stating, "Nobody believes these cables were accidentally severed."

The incidents come at a time of heightened tensions in the Baltic Sea region, amid Russia's ongoing war in Ukraine and growing concerns over hybrid warfare tactics targeting critical infrastructure.

A Strategic Asset at Risk

Submarine cables carry immense strategic value. According to a report from the Center for Strategic and International Studies (CSIS), these privately owned and operated cables are "critical points of leverage against the security of Western nations." The increasing reliance on high-bandwidth technologies, including AI, further underscores their importance.

This vulnerability has not gone unnoticed. Russia, for instance, has been linked to suspicious activities near critical cable infrastructure. The Yantar, a Russian military vessel equipped to deploy mini-submarines capable of reaching depths of 6,000 meters, has been observed near transatlantic cables in recent years.

Eric Lavault, a French naval officer, explained the stakes: "Data is an extremely important commodity these days, and countries are increasingly in a position to attack each other's 'new vital interests' like the internet, which has direct effects on civil society and the economy."

As investigations continue, the incidents highlight a broader challenge—how to safeguard the infrastructure that underpins modern life. With hybrid warfare tactics becoming increasingly sophisticated, battles for control may not only be fought on land or sea but in the silent depths below.

Gauteng Expands Free WiFi Access to Empower Communities

Gauteng residents will gain enhanced access to free internet as the provincial government rolls out 30 new WiFi hotspots. This expansion aims to bridge the digital divide by connecting public clinics, libraries, schools, hospitals, and community centers across the province.

The initiative, led by the Gauteng Department of eGovernment, is part of the ongoing Provincial Network WiFi Project, which has connected over 1,200 sites since its launch in 2014. By the end of the 2024/2025 financial year, 353 sites will have Wide Area Network (WAN) access, with 250 converted into WiFi hotspots. To ensure secure connectivity, the department has strengthened cybersecurity measures, investing in upgraded network security and implementing the Gauteng Provincial Government Cybersecurity Strategy to safeguard digital infrastructure and user data.

This rollout reflects the government's broader strategy to promote digital inclusion and empower communities through connectivity. As internet access improves, residents gain better opportunities for education, economic participation, and access to essential services, driving growth and reducing inequality across Gauteng.

ITU Reports 5.5 Billion Global Internet Users as Digital Divide Persists

An estimated 5.5 billion people are online in 2024, marking an increase of 227 million individuals based on revised estimates for 2023, according to new figures from the International Telecommunication Union (ITU).

The estimates featured in ITU's Facts and Figures 2024 show that connectivity continues to increase worldwide but reveal the complexities of reaching communities in low-income countries.

While an estimated 68% of the global population is now online and all indicators tracked in the report show improvement, stubborn digital divides persist and about one-third of the world's population remains offline.

"Facts and Figures 2024 is a tale of two digital realities between high-income and low-income countries," said ITU Secretary-General Doreen Bogdan-Martin. "Stark gaps in critical connectivity indicators are cutting off the most vulnerable people from online access to information, education and employment opportunities. This report is a reminder that true progress in our interconnected world isn't just about how fast we move forward, but about making sure everyone moves forward together."

Level of Development and Connectivity Closely Linked

Facts and Figures 2024 shows that internet use remains tightly linked to the level of development.

In high-income countries, 93% of the population is estimated to be using the internet in 2024. This contrasts with low-income countries where only 27% of the population is estimated to be online.

China Reveals Plan for Next-Generation BeiDou System

The China Satellite Navigation Office (CSNO) recently announced plans for the future of the BeiDou Navigation Satellite System (BDS), which will include advanced technologies and improved services.

The plan involves launching three pilot test satellites around 2027 and completing the system by 2035. This announcement was made at a symposium in Beijing celebrating the 30th anniversary of the BeiDou project, which garnered an attendance of 100 participants.

The new plan outlines the development of China's satellite navigation network, which aims to create a more advanced, robust, and user-friendly next-generation BDS. Key technological breakthroughs are expected by 2025, with three pilot satellites launching in 2027 to test new technologies. By 2029, the deployment of the system's network satellites will begin, with full completion expected by 2035. The next-generation BDS will offer global users real-time, high-precision, and reliable navigation, positioning, and timing services with accuracy ranging from meter-level to decimeter-level.

LEO Integration

The system will cater to various user terminals on Earth and in space, integrating with other navigation and timing technologies. The new system will optimize the constellation architecture and establish an efficient ground system for continuous operations. China is also exploring emerging technologies like low Earth orbit (LEO) satellites to enhance the BDS system. By integrating LEO satellites with the existing medium Earth orbit (MEO) and high Earth orbit (HEO) satellites, the system will offer faster positioning speeds and better accuracy.

Disappearance of the IFT Will Impact Competition in Mexico's Telecom Sector

The proposed elimination of the Instituto Federal de Telecomunicaciones (IFT) has raised significant concerns about the future of regulatory oversight in Mexico.

With uncertainty surrounding the structure of new regulators, the restructuring is anticipated to place competition regulation under the Ministry of Communications, Infrastructure, and Transport.

This restructuring could resemble pre-2013 structures, potentially impacting the effectiveness and independence of regulatory oversight.

According to Fernando Borjón, analyst at Access Partnership, the expansion of the government entity CFE Telecomunicaciones e Internet para Todos—which may absorb Promtel's stake in the Red Compartida and exert increased influence over Altán Redes—could lead to a government-controlled entity dominating the internet service market.

This raises concerns about competitive neutrality and the potential stifling of private sector innovation and investment.

The proposed regulatory and competition framework changes may also conflict with Chapter 18 of the United States-Mexico-Canada Agreement (USMCA), particularly regarding competition policy and fair market access.

Such conflicts could have broader implications for Mexico's trade relationships and economic integration with its North American partners.

Independent Regulator

The Organization for Economic Cooperation and Development (OECD) has emphasized the importance of maintaining a strong, independent regulator in Mexico.

Alexia González, head of the OECD's Infrastructure and Services Unit, highlighted that the IFT was created to challenge a highly concentrated status quo and move towards a more competitive future.

Rwanda Launches Bold Fintech Strategy for Innovation and Inclusion

Rwanda is setting its sights on becoming a global fintech powerhouse with the launch of its National Fintech Strategy, announced by Paula Ingabire, Minister of ICT & Innovation. This ambitious roadmap aims to position the country as a leading fintech hub in Africa and beyond, with a target of attracting $200 million in investments, nurturing 300 fintech companies, and securing a place among the top 30 global fintech nations by 2029.

"This strategy marks a transformative step forward, demonstrating Rwanda's unwavering commitment to becoming a fintech leader in Africa," said Ingabire. "In just a decade, we've grown from a handful of fintech startups to over 75 active players, serving more than 3 million users. This progress has been instrumental in advancing the country's financial inclusion."

Rwanda's fintech sector has seen remarkable growth, with the nation's financial inclusion rate rising from 93% in 2020 to 96% today. The National Fintech Strategy envisions even greater strides by 2029, with plans to increase the number of fintech firms to 300, create 7,500 direct jobs in the sector, and achieve an 80% adoption rate of fintech solutions.

The strategy also aims to attract $200 million in investments to strengthen local fintech ventures and boost Rwanda's global standing in the fintech industry. By 2029, Rwanda aspires to rank among the top 30 countries worldwide in fintech, while leading Africa in innovation and digital finance.

Canada and the US: North America's Powerhouses in AI Leadership

According to a recent AI maturity index, out of 73 economies assessed, only Canada, Mainland China, Singapore, the UK, and the U.S. are categorized as AI pioneers. More than 70% scored below the halfway mark in categories like ecosystem participation, skills, and R&D.

AI is revolutionizing industries and economies, positioning itself as a cornerstone of future economic development. Its rapid implementation has made it a top priority for economies worldwide.

BCG advises policymakers to act now and adjust to a world of AI, in order to boost resiliency, productivity, jobs, modernization, and competitiveness.

AI will make up progressively larger shares of the pioneers' GDPs over the next several years, as these actors supply more and more AI technologies, services, skills, and investment to the world.

In South America, Chile, Brazil, and Uruguay were also categorized as AI pioneers by the Latin American Artificial Intelligence Index (ILIA), highlighting them as the region's leaders in AI readiness.

AI Pioneers in North America

In skills, the U.S. and Singapore stand out with powerful AI talent pools, which are crucial for driving innovation. The U.S. leads in investment, driven by its sophisticated capital markets and the abundance of industry players competing within the AI landscape.

Massive fiber investments by companies like Lumen and Corning are building the AI economy's backbone, supporting major cloud data centers. Hyperscalers, such as AWS, are also making a major push to entice the public sector to join the AI revolution and support startups for Generative AI development.

UK to Invest in Satellite Connectivity for Remote Islands

The investment will support hybrid satellite projects that combine low Earth orbit (LEO) and geostationary orbit (GEO) satellites to provide high-speed, gigabit-capable internet services to underserved areas. The initiative seeks satellite partners to deliver flexible, high-speed connectivity to rural islands, improving access to essential services and opportunities for residents and seasonal visitors.

Improving Connectivity on Remote Islands

Chris Bryant, the UK's Telecoms Minister, emphasized the importance of digital infrastructure in combating exclusion and supporting economic growth, "Digital infrastructure is essential for our modern way of life; but for too long, many businesses and communities have felt left behind," said Chris Bryant, the UK's Telecoms Minister. "This is why we must do whatever it takes to ensure we harness technological innovation to enrich people's lives and tackle exclusion, rather than entrench existing inequalities."

One of the critical projects, worth GBP 2 million, aims to improve connectivity on Rathlin Island, Northern Ireland's northernmost point. With a population of just 141 and over 40,000 annual visitors, Rathlin faces connectivity challenges due to the impracticality of installing submarine cables. The project will deploy hybrid satellite terminals capable of delivering 5G-level speeds, providing a much-needed boost for residents and tourists.

Fleur Anderson, Parliamentary Under Secretary of State for Northern Ireland, highlighted the project's transformative potential, noting that, "Reliable connectivity is a necessity that can open up opportunities and transform services, and this initiative will have a positive impact on business and the entire community."

Cabinet Approves Waiver of Bank Guarantees for Telecom Operators

The Union Cabinet has reportedly decided to waive the requirement for telecom operators to submit substantial bank guarantees (BGs) for past spectrum purchases.

This move is expected to provide substantial relief to major telecom firms, which together owe more than INR 30,000 crore in BGs to the government.

Bharti Airtel previously urged the Department of Telecommunications (DoT) to ensure fair treatment for all telecom companies, irrespective of their financial conditions, while backing the waiver of bank guarantees.

The recent decision is expected to provide significant relief to Vodafone Idea (Vi), which owes over INR 20,000 crore to the government. The company has highlighted its financial struggles and is seeking government support to remove the bank guarantee requirement for spectrum payments. Vodafone Idea believes that such a waiver would encourage banks to offer more credit, easing its financial challenges.

In August, the Cellular Operators Association of India (COAI), representing private telecom firms, also appealed to the DoT for the removal of BG requirements for spectrum auctions conducted before 2022.

Reports indicate that Vodafone Idea is expected to submit bank guarantees (BGs) amounting to around INR 24,600 crore. Reliance Jio's annual BG requirement from previous auctions is estimated to be INR 4,000 crore, while Airtel's stands at approximately INR 3,000 crore. Both Jio and Airtel have been prepaying installments on past spectrum dues to reduce interest costs.

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