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ZAIN KUWAIT

New Leadership
to Build on Strong
Foundations

—
NAWAF AL-GHARABALLY,
CEO, Zain Kuwait



**FTTR: Taking Fixed
Broadband to the
Next Level**

**Unleashing the Potential
of Global Spectrum
Management**

**Neutral Hosting: An
Innovative Approach to
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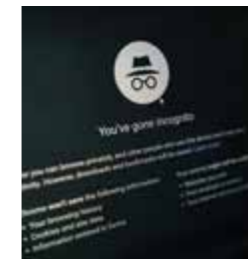
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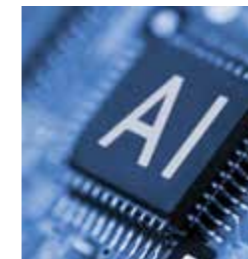
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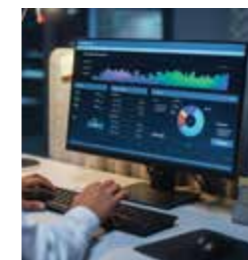
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Intel has unveiled new details regarding its latest chip, designed to rival Nvidia's market stronghold. The Gaudi 3 is expected to revolutionize generative AI (GenAI) in enterprise settings, boasting twice the power efficiency and 1.5 times faster processing compared to Nvidia's H100 GPU.

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Nawaf Al-Gharabally,
CEO, Zain Kuwait

Zain Kuwait: New Leadership to Build on Strong Foundations

From leading 5G infrastructure development in Kuwait and three other markets to pioneering the concept of Tower sale and leaseback across the region, as well as achieving an 'A-' score in the 'CDP Score Report – Climate Change 2023' for the third year in a row, staying ahead of the curve and pushing boundaries with sustainability at the core, are things that are deeply rooted in Zain's DNA. The Group's overall and particularly its highly profitable flagship operation in Kuwait performance has been nothing short of stellar in recent years. A key highlight of the Group's forward-looking approach in 2024 was the appointment of a new CEO for Zain Kuwait—with the goal of taking it to new heights and expanding innovative services in Kuwait and the greater GCC.

In an exclusive interview with Telecom Review, Nawaf Al-Gharabally, CEO, Zain Kuwait, elaborated on the operation's continuous contribution to the overall growth vision, enhancing the customer experience and brand value, solidifying its position as a dynamic and innovative telecommunications powerhouse in both Kuwait and the broader Middle East region.

First of all, a big congratulations on being appointed as the new CEO of Zain Kuwait. You have been a veteran in the company with over 25 years of service in various key roles, recently as the Group and Kuwait CTO. What is your assessment of the company's transformation throughout the years, and what are your aspirations for its future trajectory?

Thank you! I am truly honored to lead Zain Kuwait, a company that has played an instrumental national role in the telecom, economic and social landscapes, pioneering numerous innovations not just in Kuwait, but across the region. We take pride in the fact that Zain has always been at the forefront of technological advancement and innovation in the industry.

Since our journey began in 1983 in Kuwait as the first telecom operator in the Middle East and Africa, we've enjoyed a proud history of achievements, like being the first to launch commercial GSM in 1994, 3G in 2004, 4G LTE in 2012, and 5G in 2019. Additionally, Zain Kuwait pioneered the concept of tower sale and leaseback in the region as the first operator to do so, with this also expanding to our operations in KSA, Jordan and Iraq.

Staying ahead of the curve and pushing boundaries are things that are deeply rooted in Zain's DNA, and I'm privileged to have played a role in its journey and to lead its success today in Kuwait, working closely with our inspirational Vice-Chairman and Group CEO, Bader Nasser Al-Kharafi, and the group's executive team.

Over the years, we've successfully translated our vision to transform from a traditional telecom company to a



comprehensive digital service and ICT provider, bringing our customers the best world-class services, innovations, and enhanced experiences. Alongside traditional voice and data offerings, today, we provide a wide range of cutting-edge digital solutions for both our consumer and business customers. Naturally, this transformation is driven by changing market dynamics and made possible by continuous proactive investments in our people and systems to support the growing demand and provide the best services.

Looking ahead, we're excited to grow even further with more diverse offerings on both the B2C and B2B verticals by enhancing our existing services and tailoring them to the unique needs of consumers, businesses, and government projects. We do this by integrating cutting edge tools like artificial intelligence (AI), cloud computing, drones-as-a-service (DaaS), and more with our digital services portfolio. Of course, we achieve this by leveraging our robust ecosystem of strategic partnerships with the world's biggest technology leaders and local partners.

As a market leading unit of Zain Group, in what ways are Zain Kuwait's operations supporting the Group's

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Staying ahead of the curve and pushing boundaries are things that are deeply rooted in Zain's DNA

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communication commitments and the overall brand value?

As the flagship operator of Zain Group, we play a crucial role in supporting the Group's overall brand value through various strategic initiatives. Brand Finance's recent valuation of the home-grown Zain brand that saw an increase of 11% from USD 2.7 billion to USD 3 billion is a testament to the investment Zain has placed in establishing its name and identity over the past 17 years. The successful media campaigns, garnering over 27 million social media fans and over 250 million video views annually; the many corporate sustainability initiatives; and the DEI initiatives we have introduced over the years, combined with our ongoing innovation and investment in network upgrades—that result in quality mobile and digital services and exceptional customer experience—has made Zain one of the most inspirational and recognized corporate brands in the region and beyond.

Zain Kuwait complements the Group's image as a forward-thinking industry leader by spearheading initiatives across all business lines. From the introduction of new products like Red Bull MOBILE by Zain (launched as a sub-brand to target the youth segment) to MAX (the market's first converged value proposition supported by our first-in-class, award-winning 5G network) Zain Kuwait continues to take strategic steps in the B2C and B2B segment to maintain its position as an innovator and market leader.

Furthermore, not only do we embed our values in our products, but we also cascade them into our community via full-scale social outreach initiatives, campaigns, and programs. Diversity, equity, and inclusion initiatives are actively embedded into our organization. For example, WE ABLE, Zain's disability inclusion initiative, aims to develop an inclusive product and enhance accessibility to Zain's services. We're also an avid supporter of local youth, supporting the community's most vibrant segment by offering digital literacy and internship programs, as well as fostering local startups via our award-winning tech startup accelerator, Zain Great Idea (ZGI).

Our commitment to delivering an exceptional customer experience is ingrained in our culture, and, coupled with a strong focus on corporate social responsibility and community engagement, reinforces the Group's image as a socially responsible and customer-centric organization with a purpose.

How is Zain Kuwait fostering the best tech innovations for customers and businesses in Kuwait through global collaboration? Are there any specific initiatives you would like to highlight that align with these goals?

As I mentioned earlier, we boast a robust ecosystem of global partners, working closely with them to bring the best world-class innovations to our customers. To name a few, we have long-standing strategic partnerships with Huawei, Nokia, Oracle, and Ericsson, where we enjoyed fruitful collaborations that resulted in many successes thanks to our joint leadership in our respective markets, the strategic visions of our management teams, and, most importantly, the dedication and passion of our talented people across nations.



Zain Kuwait complements the Group's image as a forward-thinking industry leader by spearheading initiatives across all business lines



Moreover, our partnerships with technology giants like Microsoft, Google, Amazon (AWS), Samsung, and Dell have paved the way for us to strengthen our offerings, allowing us to stay at the forefront of tech and digital trends and meet the ever-evolving needs of our customers. By leveraging the collective knowledge and resources of our global partners, together with the talent of our national workforce, we can continuously enhance our customers' experience and provide unparalleled value to them.

To highlight a few initiatives, we're currently working with Huawei to establish an artificial intelligence (AI) Center of Excellence (CoE)—allowing AI-enabled services on our 5G and 5.5G networks. This proactive step will establish a new benchmark and create new opportunities for the telecom industry in Kuwait and the region, and will encompass innovations such as New Calling, network energy conservation, and efficient O&M solutions. Another example is our collaboration with Netcracker, the global provider of business support system solutions, through which we are aiming to digitally transform our infrastructure and further enable our journey into becoming an end-to-end digital service provider.

We also recently signed a memorandum of understanding (MoU) with Samsung at the Mobile World Congress (MWC 2024) in Barcelona to explore future joint collaboration and new opportunities, while expanding our long-term partnership and bringing the best tech innovations to consumers and businesses in the Kuwaiti market.

As part of this successful partnership, we hosted a special event to celebrate the launch of the all-new Samsung Galaxy S24 series in Kuwait. The event was attended by executive management teams from both Zain and Samsung, along with our dedicated customers, Samsung enthusiasts, and content creators from the local tech community. Users got to experience the new devices up-close prior to their official launch and learned more about the lineup's top innovations and best AI-powered features.

In another achievement, in 2022, Zain became the first operator, globally, to commercially launch voice over 5G (Vo5G) with nationwide coverage via the Samsung Galaxy S series, bringing crystal-clear voice calls over 5G to the nation's biggest network. The step reaffirmed the leadership position that our award-winning network enjoys as the first and best choice for a seamless digital experience.

These examples underscore how our partnerships help translate our vision. In the end, Kuwait is a small country in its size, but our partnerships that are fueled by Zain's ambition and our partners' innovations, placed it on the map as one of the region's leading markets in telecom and ICT.

Zain Kuwait's customer base in 2023 increased 4%, totaling 2.7 million customers, and revenue grew by 5%, reaching KD 360 million (USD 1.2 billion). In your opinion, what were the driving forces behind this remarkable achievement?

Our strong financial results can be attributed to a combination of key factors. First and foremost, it would not be possible to achieve such results without the dedication and amazing talent of our people and their team efforts. Furthermore, the market landscape in Kuwait is intense, and despite aggressive competition in the market, we remained resilient and used this competitiveness to fuel our passion for excellence.

On the operational side, the diversification of revenue streams through products such as MAX, Red Bull MOBILE by Zain, and the expansion of products such as Zain Plus have also driven revenue growth and customer retention. Investments into our 5G network expansion and optimization ensured the delivery of reliable and high-quality services and have supported the growth of business.

Moreover, our concerted focus on exploiting our leading 5G network—especially in the lucrative B2B space targeting enterprises and government bodies—has positively contributed to revenue growth and profitability. Overall, these factors collectively

underscore Zain Kuwait's resilience and adaptability in navigating the dynamic telecom and digital service landscapes, resulting in our impressive financial performance.

Zain Kuwait recently became the first, and only, operator in Kuwait to win three major awards in the same year from Ookla Speedtest, the renowned global leader in connectivity intelligence. What is the significance of these awards, and how did Zain achieve this milestone?

Receiving three prestigious awards from Ookla Speedtest—'Fastest 5G Network', 'Best 5G Video Experience', and 'Fastest Internet'—marks a significant milestone for Zain Kuwait, setting us apart in the telecom industry and cementing our leadership position. The three accolades came after our network successfully topped the extensive analysis carried out by Ookla on hundreds of thousands of user-initiated tests made by consumers in Kuwait. The tests were carried on all of Kuwait's major networks, and our network deservedly scored the highest results in the above three categories in Q2-Q3 2023.

At the heart of Zain Kuwait lies a relentless drive to explore the potential of technology. These accolades are a testament to the tireless efforts and dedication of our team, reflecting our strategic investments in network infrastructure. As pioneers of the 5G revolution in Kuwait and beyond, our goal has always been to ensure our network not only meets but also exceeds the expectations of speed, reliability, and quality our customers have come to expect from us.

The awards for 'Fastest 5G Network' and 'Fastest Internet' highlight our success in providing an exceptional internet experience, catering to the diverse needs of our customers, from streaming and online gaming to everyday browsing. Additionally, winning the 'Best 5G Video Experience' award emphasizes our commitment to supporting high-demand apps and platforms, ensuring our customers have access to smooth video streaming services—an essential component of today's digital lifestyle.

Our path to these achievements is deeply rooted in our vision to lead the telecom sector and contribute significantly to Kuwait's digital transformation. We have also invested extensively in enhancing the skills of our workforce and fostering an innovative culture within Zain Kuwait. Our dedication extends to sustainability and aligns with Kuwait's digital aspirations. We aim to do more than build a network; we're here to create experiences that connect and enhance the lives of our customers.

These honors from Ookla are a source of immense pride and motivation for everyone at Zain Kuwait, and they push us further in our journey in pursuing innovation and excellence. We are committed to continually enhancing and enriching the digital experiences of our customers today, and well into the future.

2024 will see the commercial launch of 5.5G or 5G-Advanced connectivity, bringing greater business opportunities across industries. How does Zain Kuwait intend to harness this technological paradigm shift?

Well before 2024, Zain Kuwait was at the forefront of the 5.5G revolution, a significant leap that's set to redefine connectivity and open new doors for business innovation across industries. We've invested early in upgrading and enhancing our network's infrastructure to prepare for the shift towards the 5.5G era, which will bring limitless opportunities and open up new horizons for businesses and consumers alike.

To test our readiness, we recently achieved speeds of 10 Gigabits per second after completing a 5.5G trial on our network in partnership with Huawei, making Zain the first operator to reach this milestone in Kuwait's telecom market. We've also succeeded in testing Ultra-Reliable Low Latency Communication (URLLC), a key 5.5G feature.

These achievements are a clear indicator of our readiness to lead the shift towards 5.5G. In the end, this is not just about faster internet; it's about reshaping how businesses operate



Our dedication
to advancing
sustainability and
nurturing ICT talent
is at the core of our
mission

and how services are delivered to meet the ever-evolving changes in market dynamics and customer expectations.

As noted earlier, we are currently working closely with Huawei to establish an AI Center of Excellence, something that is at the heart of our strategy right now. This initiative is a testament to our belief in the power of combining 5.5G capabilities with AI to unlock unprecedented opportunities. We're talking about a range of AI-enabled services that promise to enhance operational efficiency, drive energy conservation, and offer innovative network maintenance solutions.

The introduction of 5.5G, with its unmatched speed and efficiency, along with Ultra-Reliable Low Latency Communication (URLLC), sets the stage for transformative applications in cloud computing, big data, immersive AR/VR experiences, and manufacturing automation. These are not mere upgrades but game-changers that will redefine industry standards and user experiences.

Moreover, our AI-powered, real-time voice/video translation service,

which is nearing its commercial launch, highlights our commitment to innovation that bridges linguistic and cultural divides, offering new avenues in tourism, social networking, and business communications. This is part of our broader vision to foster a digitally inclusive society in Kuwait by leveraging technology.

In this new era, Zain Kuwait is not just adapting; we are setting the pace. Our focus on strategic partnerships and relentless innovation positions us to not only navigate the 5.5G landscape but to shape it. As we embark on this journey, our aim is clear: to harness the transformative power of 5.5G and AI, ensuring that Zain Kuwait remains at the vanguard of digital innovation, driving growth, and connectivity in a 'New Kuwait'.

Fostering sustainability and nurturing ICT talents, especially for women, has become one of the many focus areas for the ICT industry as a whole. Can you share some developments within Zain Kuwait that address these two critical components of the telecom industry?

Our dedication to advancing sustainability and nurturing ICT talent is at the core of our mission, not only to excel as a leading digital service provider but also to act as a catalyst for societal progress. This commitment aligns seamlessly with Kuwait's ambitions for digital transformation, reflecting our dual focus on environmental sustainability and the development of a skilled workforce capable of leading the future of technology.

Our approach is structured around four strategic sustainability pillars: Climate Change, Operating Responsibly, Inclusion, and Generation Youth, all of which are integral in our broader vision— embedding sustainable practices and innovation within our operations. These pillars direct our efforts to build a resilient future, promote digital literacy, and ensure a diverse and inclusive working environment.

To address the Climate Change pillar, we have set ambitious goals,

aiming to reduce our environmental impact, alongside our ultimate target—achieving a net-zero carbon footprint by 2050. This commitment underlines our broader responsibility towards environmental conservation and responsible operations. Notably, Zain is the only telecom operator in the MEA region to achieve an 'A-' rating in the CDP (Carbon Disclosure Project), which positioned Zain first in the region and among leaders globally, in accordance with climate control initiatives.

The Operating Responsibly pillar ensures our operations are guided by ethical practices and a commitment to sustainability. This encompasses everything from reducing energy consumption across our network to implementing green initiatives in our offices and facilities.

The Inclusion pillar ensures access to digital tools and education for all segments of society and it is a key part of our mission. We strive to eliminate the digital divide by providing educational programs and resources that enhance digital literacy, especially for our employees. We've launched numerous programs that are well aligned with this pillar. For example, the Zain Diversity, Equity & Inclusion University (DEIU) in collaboration with the IE University in Spain, which extended the opportunity to many of our employees, encouraging them to participate in inclusive programs, and highlighting the possibility of attaining a master's degree.

Women are an integral part of the Zain success story. From pioneering women in leadership positions to constructing a revolutionary HR policy and other innovative talent development programs, Zain's focus of integrating women fully into all aspects of the business is proving to be an enormous benefit to the culture and productivity of the company. Today, Zain Kuwait is proud to state that 26.9% of its leadership team are women.

Finally, the Generation Youth pillar aims to cultivate the next generation of ICT and digital professionals by

focusing on the youth. Our strategic partnerships with institutions like the Kuwait Foundation for the Advancement of Sciences (KFAS) and the Sabah Al Ahmad Center for Giftedness and Creativity (SACGC) are prime examples, where we offer programs designed to equip young Kuwaitis with critical digital skills, preparing them for the challenges and opportunities of the digital age.

Through these initiatives, we not only contribute to national sustainable development goals but also ensure that young professionals are well-prepared to navigate and lead in the digital world. Our efforts in education and training, particularly in emerging technologies and digital upskilling, are tailored to foster innovation, critical thinking, and a deep understanding of the digital landscape.

In conclusion, our endeavors in sustainability and talent development are driven by a comprehensive strategy that integrates our operational goals with our social and environmental responsibilities. As we move forward, our focus remains on utilizing technology to tackle modern challenges, affirming our position as a catalyst for positive transformation in the telecom industry and beyond.

Regarding your expansion into the B2B corporate segment, what can we expect in terms of innovation in Zain Kuwait's digital service offerings?

Expanding within the B2B corporate sector is more than a strategic move for Zain Kuwait; it's a vision to redefine the digital landscape for businesses in Kuwait, paving the way to becoming the digital transformation partner of choice for governments and enterprises. Our approach centers around initiating a digital transformation journey that will drive growth, efficiency, and innovation across industries. We're setting our sights on empowering businesses with digital solutions that are as forward-thinking as they are reliable.

At the heart of our expansion strategy is a commitment to innovation. We continue to lead the way by working closely with our subsidiary, ZainTECH,

and introducing a suite of digital services designed to meet the ever-evolving needs of the corporate sector. This includes advanced connectivity solutions, drones-as-a-service (DaaS), cloud computing and cybersecurity services, cutting-edge Internet of Things (IoT) applications, and insightful big data analytics. These offerings are crafted to not only enhance operational efficiencies but also unlock new possibilities for growth and innovation within the businesses we serve.

As we embark on this expansion, our partners can expect a commitment to excellence, innovation, and a partnership that goes beyond traditional service offerings. We aim to be at the forefront of digital transformation, empowering businesses to navigate the complexities of today's digital age with confidence and agility. **TR**



At the heart of our
expansion strategy
is a commitment to
innovation





Salvador Anglada,
CEO, e& enterprise

From UAE to Global Heights: e& enterprise's Vision for the Future

Focusing on the company's expansion from the UAE to the world, Salvador Anglada, CEO of e& enterprise elaborates on the company's vision, the influence of emerging technologies and the importance of innovation in an exclusive interview with Telecom Review.

Could you please provide us with your vision for e& enterprise? We are a part of e&, one of the verticals, and our primary focus lies in maximizing the digital potential of our customers.

Our mission revolves around enabling our customers with robust solutions platforms, thereby facilitating their transformation into fully-fledged digital entities. In the UAE, we hold leadership positions, and our ambition extends globally as we endeavor to provide our services across different geographical regions.

Our offerings encompass end-to-end solutions, aiding customers in migrating their infrastructure to the cloud seamlessly. Furthermore, we prioritize the security of this infrastructure through our comprehensive cybersecurity services, ensuring the safeguarding of data. Throughout this journey, we stand alongside our

customers, offering unwavering support and guidance. Our ultimate aspiration is to emerge as the foremost champion in our field. Currently, there is no clear champion in the region capable of delivering the breadth of services that we provide. Hence, we are driven by the ambition to continuously expand our reach and offerings. Our growth trajectory reflects this ambition, with a remarkable year-over-year growth rate of over 30%.

What role will emerging technologies such as AI and IoT play in the future growth of the company?

When considering future growth, one cannot ignore the pressing importance of AI, a topic that has garnered widespread attention. Indeed, the emergence of generative AI, exemplified by innovations like ChatGPT and large language models (LLMs), has propelled discussions about the transformative power of artificial intelligence (AI). However, it's essential to recognize that AI has been evolving for many years, prefacing these recent breakthroughs. Previously known as predictive AI, efforts were focused on developing algorithms to automate specific processes and enhance intelligence.

With the advent of generative AI, we have witnessed a significant explosion in capabilities. As a result, one of our primary objectives is to assist customers in harnessing the potential of AI, guiding them through the adoption process and optimizing its benefits. Particularly in the realm of IoT, this initiative stands as one of our most substantial endeavors. Over the years, we have amassed a track record of successful projects, integrating sensors into a comprehensive platform and developing numerous applications and use cases.

Our contributions extend across various domains, including smart city solutions, where we have implemented innovative systems for building management and city intelligence. Notably, our Safe City solutions, such as the National Fire Alarm system, exemplify the intelligence and connectivity embedded within our platforms. These systems are designed to detect and respond to fire-related incidents swiftly and effectively, enhancing safety on a national scale.

Moreover, we have modernized traditional utilities, such as the smart grid, by implementing advanced technologies to monitor and manage energy consumption in real-time. Through creative ideas and cutting-edge solutions, we strive to optimize efficiency and promote sustainability.

Today, we are augmenting these solutions with artificial intelligence, adding another layer of sophistication and efficiency. Combining AI with existing infrastructure not only enhances intelligence but also unlocks unprecedented value for our customers. As we continue to innovate and evolve, we remain committed to leveraging the full potential of AI to create transformative solutions that redefine the way we live and work.

What precise strategies are you considering to enable smooth collaboration among stakeholders in advancing e& enterprise's goals?

I believe this is where our expertise truly lies. Collaboration with various stakeholders is essential in our line of work. The term 'coopetition' perfectly encapsulates our approach, as we often find ourselves both collaborating and competing with others in the industry.

One of our standout features is our extensive ecosystem of partners. We have forged strong relationships with all the major technology companies, integrating their state-of-the-art solutions into our own platforms. This collaboration enriches our offerings and enhances the value we deliver to our clients.

Moreover, we possess the ability to create ecosystems ourselves. A prime example is our blockchain venture, which we nurtured into fruition, establishing a platform that has brought together 15 banks and financial institutions. This ecosystem facilitates financial trades, risk management, and risk mitigation, showcasing the power of collaborative innovation.

Currently, we are embarking on initiatives to connect smaller companies with our Salesforce,

fostering a collaborative environment conducive to value creation. These activities are not out of the ordinary for us; they are simply part of our standard practices. It's all about connecting the dots and leveraging our network to create value where others may not see the opportunity.

In essence, what sets us apart is our ability to forge connections and create value through collaboration. By harnessing the collective strengths of our partners and stakeholders, we are continually pushing the boundaries of innovation and driving positive change in the industry.

With increasing competition in the digital sector, how do you plan to differentiate e& enterprise and maintain a leading position in the market?

This is a market that is quite significant, robust, and experiencing rapid growth, averaging between 10 to 12% annually, with numerous players involved. It's characterized by a lack of concentration, with each company holding approximately 3% of the market share. This diversity allows ample room for expansion and presents opportunities for consolidation.

One key aspect that sets us apart is our unique position within the industry. As part of a leading telecommunications company, we benefit from the strength of our brand and reputation. Originating from the UAE— a hub of technological advancement— we boast an incredible portfolio of solutions that cater to diverse customer needs. Our offerings span the spectrum of end-to-end solutions, underscoring our commitment to comprehensive service provision. Additionally, our exceptional track record of delivery further solidifies our position in the market.

Looking ahead, our focus is on continual improvement and enhancement. We aim to gain access to more innovative solutions to better serve our customers. This pursuit involves both organic growth and strategic acquisitions, as we seek to expand our capabilities and remain at the forefront of technological advancement in the industry. ■

Rosenberger



Rosenberger's Structured Cabling Solutions: Creating Smart Network Connectivity for the Middle East

Smart cities use information and communication technologies to enhance quality of life, sustainability, and efficiency in infrastructure and processes. By 2025, the Middle East expects to invest nearly USD 50 billion in smart city projects. In densely populated urban areas, services like building management systems, video, and Wi-Fi use huge amounts of internet bandwidth. Therefore, smart cities need the construction of high-bandwidth, highly secure, reliable, and flexible all-optical networks to reduce operational expenses (OpEx) and support future growth.

Rosenberger leads the way in data center cabling solutions, holding a long-standing position at the top in the cabling and fiber optic connectivity market. With the rise of the digital economy and artificial

intelligence (AI), Rosenberger continually innovates to deliver value, introducing new solutions for various application scenarios, and consistently providing exceptional products and services to its customers.

Empowering Smart Enterprises with HDCS® Enterprise Cabling Solution

As technologies like mobile internet, 5G, and cloud technologies grow, industries such as finance, energy, public sectors, and others face more challenges. For example, banks are facilitating more transactions, oil companies require better data analysis and managing various IT systems becomes trickier. In short, enterprises need better network connection for data analysis, processing, and storage than ever before, leading to new requirements for enterprise network cabling systems, with high performance, reliability, and network security becoming increasingly important.

Rosenberger's enterprise network cabling systems are user-centric, making installation and maintenance easy, while considering the total cost of ownership (TCO). They offer different types of cables, including copper and fiber optic, to suit various needs. The CAT 6A cables provide fast speeds of up to 10 Gbps while ensuring there's enough room for the system to work smoothly. The shielded cables are great at protecting against interference, keeping the system secure and stable. With fiber optic cables, there are different types available, such as G652D/G657A, OM3, OM4, OM5, ensuring good performance over long-distance connections and high-speed data transmission.

Rosenberger's smart cable system uses both software and hardware to improve how cables are managed. Using a software platform, users can quickly find and fix issues with the hardware (modules, patch panels, jumpers, etc.), making it easier to see how the system is set up and used. Additionally, reporting and graphical management functions can be integrated with enterprise digital systems to improve management efficiency.

Boosting AI with HDCS® Data Center Cabling Solution

Data centers are booming due to the advent of AI, represented by hotspots like ChatGPT and Sora from OpenAI. AI data centers not only demand clustered and scaled computing power but also stringent requirements for the transmission rate and latency of underlying data. Moreover, due to the rapid iteration of AI technology, the ability

of data center cabling to seamlessly upgrade quickly becomes paramount.

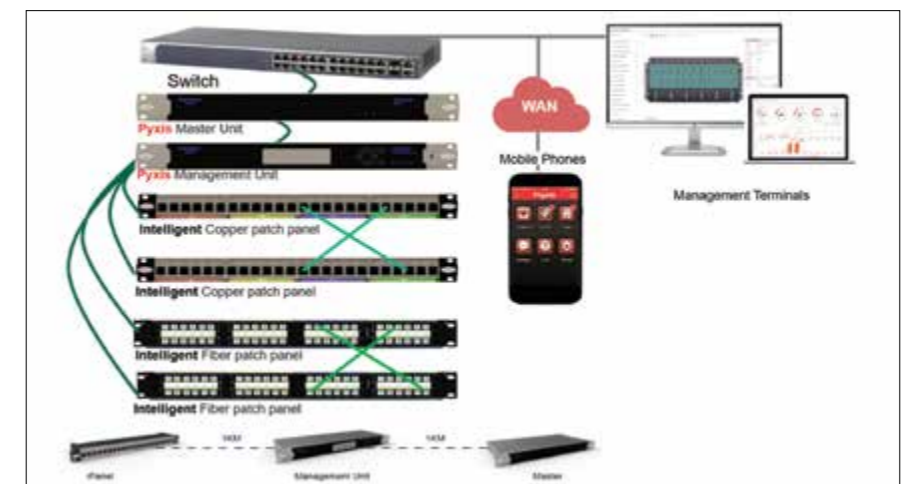
Rosenberger's data center cabling solutions, based on PreCONNECT fiber optic technology, comes in different types—like Vela, Taurus, and Norma—to adapt to different cabling densities, achieving ultra-high cabling densities with 1U 192-core LC connectors, and providing a basic guarantee for the scale and density of AI computing clusters. These cables support different speeds like 40G/100G/400G/800G, making upgrades easy.

Rosenberger also makes cables with ultra-low loss, so data can travel long distances without losing much speed. This helps supercomputers work better and leaves room for even faster networks in the future. Rosenberger's ultra-low loss connection products greatly reduce the overall loss of OM3/OM4/OM5 fiber optic links, extending the maximum length of the system links to 1.5 times the standard, meeting the needs of ultra-long links in supercomputing centers, and reserving space for future upgrades to higher-speed 1.6T/3.2T networks.

Entering Smart Tomorrow with Leading Technology Today

As the world gets warmer and we consume more energy, liquid cooling technology has emerged as a new trend for building green and energy-efficient data centers. Rosenberger's liquid-cooled data center cabling solutions provide specialized liquid-cooled cable distribution frames, featuring IP67-rated Mini-RMC multicore connectors compatible with liquid cooling. This keeps the cables safe from the cooling liquids, making sure they stay stable and reliable even with ultra-high bandwidth transmission.

Moreover, Rosenberger has developed customized products for customers' specific needs. For example, it offers CAT 6A cables that work great, without needing a lot of operational experience and usage skills; RJ45 POE field termination connectors supporting POE++; RFID-based smart jumpers for rapid port identification and system management; and pollution-resistant jumpers based on coating technology that resists dirt, keeping fiber ends clean.



Rosenberger's cabling solutions adopt a structured, intelligent, design philosophy; with simple operation, flexible configuration, and convenient scalability and upgradeability. To realize the vision of smart cities in the Middle East, Rosenberger will continue to lead technological innovation by continuously promoting the development of intelligent network infrastructure and bringing the latest tech. Rosenberger is dedicated to

making sure its solutions are fast, use less energy, and keep data safe, helping customers achieve greater success on the path of digital transformation. Whether customers are facing mobile internet, 5G, and artificial intelligence (AI) challenges or are adapting to emerging technological innovations in the future, Rosenberger is a trusted partner, jointly creating a brighter future for a smart tomorrow. 



Empowering the Future: How 5G-Advanced (5G-A) Redefines Connectivity for Businesses and Society in the Middle East

In the Middle East, operators are gearing up for the commercialisation of 5G-Advanced (5G-A) in 2024. This significant leap forward promises to reshape the digital connectivity landscape across the region. With its ground-breaking features, including the first phase to achieve 5 Gbps downlink, 500 Mbps uplink speed, and 20 ms latency, eventually reaching 10 Gbps downlink, 1 Gbps uplink, and 4 ms latency in phase two. 5G-A stands at the forefront of ushering in an era of enhanced connectivity services. This evolution is not merely about faster speeds; it represents a transformative shift that will fuel social and economic development, catalyse the digitisation of industries, and revolutionise enterprise operations in the region.

A **New Beginning for SMEs**
The advent of 5G-A and its evolution from Fixed Wireless Access (FWA) to FWA² heralds a transformative era for SMEs in the Middle East, characterised by ultra-low latency and heightened reliability, offering a compelling alternative to traditional connectivity methods such as microwave and copper lines.

This technological leap is not merely a technical upgrade but extends the benefits of FWA from residential scenarios directly to the region's SMEs,

which are integral to its rapidly expanding digital economy. Enhanced connectivity via 5G-A is set to underpin enterprise operations, enabling unparalleled levels of interconnectivity, efficiency, and access to advanced digital tools such as IoT, AI, and big data analytics. By facilitating smoother integration with the global digital economy, improving operational efficiencies, and fostering innovation, the shift to 5G-A technology positions Middle Eastern SMEs at the forefront of digital transformation, empowering them to thrive in an increasingly competitive and interconnected market landscape.

The Digital Transformation Catalyst
The advent of 5G-A technology,

propels the Middle East at the brink of a digital evolution, marking a significant shift, transform towards an integrated digital ecosystem. 5G-A, offering a wide bandwidth up to 10Gbps, low latency as low as 4ms, and high reliability, is poised to meet the region's specific needs in networking, computing, cloud services, and the Internet of Things (IoT), across various sectors such as healthcare, education, manufacturing, and logistics. In healthcare, for example, 5G-A could enable real-time remote monitoring and telemedicine services, providing critical healthcare access in remote areas. In education, it could transform learning experiences

through virtual and augmented reality, making education more accessible and engaging. Moreover, 5G-A is critical for the realisation of smart city ambitions in national projects, Saudi Arabia and UAE, facilitating the seamless integration of IoT devices for efficient management of resources and environmental monitoring.

Revolutionising Enterprise Production Processes

Also, the 5G-A technology is poised to transform key industry sectors in the region such as oil and gas, renewable energy, manufacturing, and logistics, by redefining their core production processes, with its 1Gbps high uplink, 4ms latency, and unmatched reliability. In the oil and gas sector, essential to the region's economy, 5G-A will enhance operational efficiency and safety through real-time monitoring with high-definition cameras and AI integration, proving critical in remote and challenging environments. Renewable energy projects will benefit from optimised energy production and predictive maintenance, enabled by real-time data on weather conditions. The manufacturing sector is on the brink of embracing smart factories with IoT and AI-driven automation, quality control, and supply chain optimisation, catering to the demand for personalised products. The logistics sector, vital for regional and global connectivity, will see improvements in operational efficiency and customer satisfaction through enhanced real-time tracking and fleet management.

Fulfilling the Promise of Comprehensive IoT

More promising, 5G-A will herald a new era for the Internet of Things (IoT) ecosystem, presenting unprecedented connectivity and innovation. With capabilities such as enhanced uplink bandwidth, and reduced latency, 5G-A supports a diverse range of IoT applications, enabling the region's transformation into a digital and innovation hub. This advancement is crucial for industrial sectors aiming for diversification and modernisation, enabling real-time CCTV monitoring, predictive maintenance, and resource optimisation, particularly in the pivotal oil and gas industry.

Furthermore, the vision for smart cities in Dubai, Riyadh, and Doha, among others, will be enhanced through optimised smart infrastructure, making urban areas more efficient, sustainable, and convenient. Additionally, the affordability of RedCap and Passive IoT terminals is expected to accelerate IoT adoption, potentially creating a trillion-device market, transforming agriculture, retailing, and logistics sectors. This vast network of IoT devices, enhanced by 5G-A, will accelerate economic growth, drive innovation, and improve quality of life across the region, with the burgeoning e-commerce sector benefiting from improved logistics and supply chain management, thus offering better customer service and reliability.

Enhancing Road Safety and Traffic Efficiency through Vehicle-to-Road Collaboration

Many Middle Eastern countries are in the midst of significant urban advancements. Their rapidly growing cities and smart infrastructure investments are positioning them for a major leap forward. Now, with the emergence of 5G-A technology, the region aims to revolutionise urban mobility. Keeping an eye on the global emergence of 350 million connected vehicles by the end of 2030, 5G-A's vehicle-to-everything (V2X) communication capabilities herald a future of enhanced driving safety, optimised traffic management, and environmental sustainability. This is thanks to its wide-area coverage, ultra-low latency, and very high reliability.

Major cities like Dubai, Riyadh, and Doha could be inspired by Shanghai's 5G-A-driven improvements in traffic efficiency and commuting times, and harness these advancements to meet their smart mobility and sustainability goals. The collaborative efforts between entities like Huawei and its industry partners underline the importance of a unified approach in developing the necessary ecosystem for 5G-A deployment. Moreover, the successful hosting of large international events has highlighted the role of innovative technologies in transportation logistics, suggesting that 5G-A could further

elevate real-time traffic management and autonomous vehicle support. The commercialisation of 5G-A in the Middle East will not only enhance urban mobility but also stimulate economic growth, technological innovation, and quality of life, marking the region's stride towards becoming a global pioneer in smart city development and technological advancement.

In Conclusion: Pioneering a Connected Future

The arrival of 5G-A technology in the Middle East transcends mere technological advancement, heralding a transformative shift in the operational dynamics of businesses and the societal fabric at large. This leap forward equips operators with the means to offer superior connectivity services, paving the way for a deeper integration of ICT, bolstering core production processes, and catalysing the widespread embracement of IoT technologies. Such strides in technology are instrumental in propelling the digitisation of industries, boosting the efficiency of enterprises, and fostering an overall enhancement in the socio-economic landscape of the region.

As the Middle East stands on the precipice of this new technological era, the symbiotic collaboration between industry magnates and technological pioneers becomes imperative. This collective endeavour is vital for unlocking the extensive capabilities of 5G-A, setting the stage for a future where the proliferation of intelligent, interconnected applications is not just a vision, but a reality. This future promises not only to redefine the operational blueprint of industries but also to enrich the quality of life, making smart, sustainable living an attainable goal across the region. The integration of 5G-A into the Middle East's digital ecosystem signifies a step towards realising its ambitious goals for technological leadership and innovation, ensuring that the region remains at the forefront of the global digital revolution. **IT**

By Allen Tang, President of Huawei Middle East and Central Asia ICT Marketing & Solution Sales



Navigating the Quantum Landscape: From Cloud Computing to AI and Beyond

In contemporary technology, cloud computing stands out as a significant advancement, impacting various sectors and serving as a driving force for individuals, businesses, and data access. Its ongoing journey of improvement reflects a commitment to resolving intricate challenges effectively.

Cloud computing's impact extends beyond specific industries, igniting a data science revolution. Despite presenting challenges, cloud computing has introduced innovative algorithms that play a pivotal role in addressing and navigating these complexities.

The Revolution of Data Processing
Quantum computing addresses mathematical problems by executing quantum models based on the principles of quantum theory. What distinguishes supercomputers from regular ones is the method of data transfer; quantum computers use 'quantum bits' or qubits, enabling the observation and measurement of vast amounts of data. This advancement

benefits data scientists, particularly in terms of data processing and handling complex scenarios such as molecular formations.

Quantum Computing's Role in AI and Data Science

Quantum machine learning (QML) and quantum artificial intelligence (QAI) lead major advancements in artificial intelligence (AI). These computers are

trained similarly to neural networks, utilizing physical control parameters to solve problems through the coding process. Data workflows in computing occur in milliseconds, promising significant advancements.

An illustrative use case involves a machine learning (ML) model trained to categorize content within documents, achieved by encoding the document into the physical state of the device for measurement. Quantum computing, coupled with AI, promises intricate data science workflows, offering actionable insights beyond imagination.

Quantum Machine Learning Research

Major industry players have made substantial investments in quantum computing. Despite not yet being considered a practical business-level solution, ongoing research in the field is rapidly advancing. The technical challenges associated with quantum computing are expected to be addressed sooner rather than later, especially with the integration of machine learning.

In 2019, experimental research showcased the potential fusion of machine learning and quantum computing, utilizing a two-qubit quantum computer to enhance supervised learning classification. This breakthrough paves the way for further exploration of the complete potential of this technological synergy.

Exploring Quantum Machine Learning Initiatives

Delving into cutting-edge quantum computing endeavors exemplifies the vast potential of this transformative technology. Initiatives, such as the Quantum Initiative, focus on developing an open-source platform, empowering developers to construct quantum machine learning models using python. This effort propels ongoing innovation in quantum algorithms and the practical applications of machine learning.

The Quantum Challenge, a multi-day event, emphasizes the integration of traditional software development with

quantum computing applications. Attracting nearly 2,000 participants, this challenge educates developers and researchers, preparing them for the imminent quantum computing revolution.

The Cloud-Based Quantum Random Number Generator (QRNG) Project, launched in September 2021, brings together experts in the field of quantum computing. This collaborative effort introduces a cloud-based QRNG developed by combining the expertise of various stakeholders. Beyond enhancing cybersecurity through advanced data encryption, this groundbreaking application contributes to the development of sophisticated AI systems capable of unpredictable outcomes.

Pioneering a New Era in AI

While current research is in its early stages, the technology's potential is increasingly evident, heralding a new chapter in AI. As ongoing research and educational initiatives progress, quantum computing emerges as a transformative force, empowering versatile real-world applications of machine learning models. In sectors like finance, the integration of quantum AI promises substantial benefits, enhancing capabilities in areas such as stock investment and AI-driven options trading. The advent of tangible quantum computers is poised to revolutionize the application of kernel methods, offering new perspectives for the linear classification of intricate datasets.

Challenges in Cloud Computing

Cloud computing, being a current and emerging topic, encounters numerous challenges, particularly concerning its features and resources. One of the primary obstacles in cloud computing revolves around data privacy and security, with several factors contributing to privacy breaches. This encompasses various areas such as cloud data management and insecure APIs.

Another significant challenge is presented by multi-cloud environments, which is closely tied to

issues of data governance and data management policies.

Moreover, performance challenges emerge as a significant aspect among the array of issues in cloud computing, originating from the services offered by vendors to their clients.

In conclusion, the future of QML holds immense promise, however, significant strides are required before its integration into mainstream applications. Notably, industry leaders play a pivotal role by providing open-source software and educational resources, enabling larger access to quantum computing architecture and fostering the development of expertise in the field. As the journey unfolds, the convergence of quantum computing and machine learning charts a course towards innovative solutions and transformative advancements in various fields. **TR**



The convergence of quantum computing and machine learning charts a course towards innovative solutions and transformative advancements in various fields





Technologies that Are Transforming Daily Living

As of January 2024, 66.2 percent of the global population was connected to the internet. In Saudi Arabia and the United Arab Emirates alone, 99 percent of the population used the internet as of April 2023. As such, this explosion in connectivity has already brought on major changes across industrial sectors, resulting in improved operational efficiency. Out of the 5.35 billion internet users, 5.04 billion (or 62.3 percent) were using social media. Furthermore, following the growth in mobile device adoption, technology has become all the more personal and portable, ushering in a new era of personal technology.

Keeping People Connected
There was once a time when people waited for weeks, if not months, to receive letters from loved ones to know about their health

and wellbeing. Now, connecting with loved ones is just an app away. With the introduction of Voice over Internet Protocol (VoIP) technology, it is now possible to conduct voice and video calls using an internet connection in place of the analog phone line. On a personal level, VoIP calls can bring family

members living in different countries together and strengthen family bonds.

Studies have shown that staying connected has resulted in better mental and emotional health, leading to fewer medical consultations, etc., and leading to better employability prospects.

Moreover, it's a cost-efficient way for international calling and also gives one the option of complete portability.

From a business perspective, VoIP calls offer cost-saving benefits by eliminating the necessity for installing private branch exchange (PBX) systems. These traditional systems require on-site hardware to connect multiple landline phones within an organization, incurring additional expenses for office wiring, maintenance, and repairs. Additionally, the advent of remote work has introduced a new aspect to modern office culture, enhancing productivity while also yielding cost savings in office space rentals and equipment expenses.

Digital Payments

One of the most transformative digital innovations in the internet era is the digital payment system. The capability to conduct transactions by simply tapping a card or utilizing a smartphone appears almost magical; however, behind these seemingly effortless transactions lies a complex web of technology that enables their facilitation.

Emerging tech such as artificial intelligence (AI) and machine learning (ML) are making it possible to track transaction patterns and fraudulent activities as well as consumer behaviors. Similarly, NFC (Near Field Communication) facilitates secure smartphone-to-point-of-sale terminal payments without the need for physical credit cards or cash. MST (Magnetic Secure Transmission) offers users the flexibility to make secure transactions at both traditional and chip-based card terminals. All of these data exchanges require reliable, secure and ubiquitous connectivity from network providers.

Health Tech

Health has, and always will, remain central to human activities. New technologies such as artificial intelligence (AI), virtual reality (VR) and augmented reality (AR) are becoming integral to delivering next-generation, interventional care with real-time insights at the point of care.

Moreover, complicated areas in healthcare such as neurology have undergone massive changes with

technologies such as brain-machine interface (BMI). Medical conditions such as strokes, and spinal cord injuries are some of the common causes of disability worldwide; however, recovery treatment options have remained limited so far.

Nowadays, experts hope that by utilizing BMIs, restoring lost function and promoting recovery can be improved beyond the imagination of the medical world. Although, it's worth noting that medical treatment for neurological problems is capital intensive. However, with accessible and affordable devices, BMIs can provide new approaches for prevention, diagnosis, treatment and rehabilitation for low- and middle-income countries, which are invariably affected by brain disorders.

Public Entertainment

Humans are social animals. We are at our best when we do activities together and share those with friends and families. Today, concertgoers and sports enthusiasts have been able to do that through their smartphones, thanks to fast speed and low latency network connectivity that allow the use of social media and other applications in real-time.

CSP and vendors are now using 5G core technology to facilitate seamless streaming experiences at these large event venues. Technology such as network slicing can provide prioritized access in densely populated areas, enabling great user experiences.

Blockchain technology is disrupting the entertainment industry by enabling secure and transparent transactions, copyright protection, and new revenue streams through the sale of NFTs. NFTs are digital assets representing ownership or authenticity of digital content such as artwork, music, and collectibles.

Furthermore, interactive technologies like gamification, motion sensing, gesture recognition, and touch screens are enhancing visitor engagement in museums, theme parks, and live events.

Disaster Management

Natural disasters impacted 1.5 billion

people from 2005 to 2015, with 700,000 lives lost, 1.4 million injured, and 23 million left homeless, according to the Sendai Framework for Disaster Risk Reduction 2015-2030 developed by the UN Office for Disaster Risk Reduction (UNDRR). Thus, the International Telecommunication Union's (ITU) Focus Groups are constantly exploring new AI use cases to deliver technical reports and address key dimensions of natural disaster management.

Technologies like IBM's Palantir, and Google's TensorFlow are being used to analyze vast amounts of data from various sources such as satellite imagery, weather forecasts, and social media posts to predict and model disaster events, their impacts, and potential response strategies.

Platforms like Esri's ArcGIS and QGIS enable disaster managers to visualize and analyze spatial data, including terrain, infrastructure, population density, and hazard zones, to improve decision-making in preparedness, response, and recovery efforts.



One of the most transformative digital innovations in the internet era is the digital payment system



Tools such as Planet Labs, DigitalGlobe, and Sentinel Hub provide high-resolution satellite imagery and data that aid in disaster monitoring, damage assessment, and resource allocation during emergencies like wildfires, floods, and earthquakes.

UAV technology, including drones, is used for rapid aerial reconnaissance, search and rescue operations, and mapping inaccessible or hazardous disaster areas, providing real-time situational awareness to first responders.

Technologies like Sahana Eden and Ushahidi facilitate communication, coordination, and information sharing among emergency responders, government agencies, NGOs, and affected communities during disasters, improving situational awareness and response coordination.

Applications like FEMA's app, Zello, and PulsePoint provide emergency alerts, preparedness tips, and real-time communication tools for individuals and communities to access during disasters. Additionally, wearable devices enable location tracking and SOS alerts for personal safety and emergency response.

Green Tech and Climate Change

The Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA) recognize technology as an important factor in reaching net zero greenhouse gas emissions (GHG) and limiting climate warming. Enabling low-power consumption or energy-efficient communication networks is the core objective of 'green networks.'

Green networks use tools such as adaptive link rate (ALR), interface proxying, energy-aware infrastructure, and energy-aware applications (virtualization) for energy-efficient operations of their own as well as other sectors' CO2 reduction efforts.


Several specific technologies are transforming green tech and climate change mitigation efforts. These include renewable energy technologies like solar photovoltaics



(PV), wind turbines, and hydropower systems, developed by companies such as SunPower and Vestas. Energy storage solutions, including lithium-ion batteries and flow batteries from companies like Tesla and ESS Inc., are crucial for storing renewable energy, while smart grid and energy management systems from Schneider Electric and Enel X optimize grid operations and enable demand response.

In Conclusion

Technological intervention has been a transformative agency in upgrading individual's quality of life. However, the over-arching importance of connectivity in achieving all of these objectives cannot be overlooked. Network infrastructure transformation will always be the driving factor behind delivering innovative technologies that provide real value to the world at large.

Continuous innovation is the key focus for Communications Service Providers (CSPs), equipment providers, and other industry stakeholders aiming to capitalize on 5G. Their goal is to deliver fast, reliable, and secure services to customers consistently. 



Technological intervention has been a transformative agency in upgrading individual's quality of life



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TDRA Aims to Pioneer 6G Services Before 2030 in UAE



The Telecommunications and Digital Government Regulatory Authority (TDRA) has unveiled an extensive strategy to spearhead research and studies concerning the advancement of 'International Mobile Telecommunications' (IMT-2030) technology, also called the sixth generation of mobile networks (6G).

This initiative is a proactive response to the ever-evolving dynamic landscape of International Mobile Telecommunications (IMT) and focuses on detailed technical specifications that can be leveraged to advance the functionality and performance of mobile systems.

Furthermore, it aims to address the evolving needs of society and the economic sector, bridging the gap between current communication services and future requirements. The ultimate goal is to foster a comprehensive, digitally-integrated, and interconnected way of life in the future.

The release of this roadmap aligns with the decisions made during the Radiocommunication Assembly 2023 (RA-23), hosted by the UAE from 13 to 17 November in 2023. During the Assembly, a resolution was determined, urging stakeholders in the communications sector to focus on developing radio technical standards and specifications for the sixth generation of the International Mobile Service (IMT). It's important to highlight that the RA-23 has approved Recommendation (ITU-R M. 2160), also known as IMT-2030, which outlines the framework for 6G.

This lays the groundwork for the future development of network standards.

According to the plan, 6G is poised to introduce a suite of new capabilities, encompassing applications in artificial intelligence, network virtualization, sensing, and comprehensive coverage. Simultaneously, the existing capabilities of 5G will undergo enhancements, targeting improved efficiency in frequency spectrum utilization, connection density and traffic management. These advancements aim to optimize performance within specific regions and reduce the response time significantly.

The TDRA will play a pivotal role in facilitating these experiments by providing the necessary frequencies and regulatory frameworks. This support, coupled with advanced spectrum management practices enabled by the 'ICT Regulatory Sandbox,' will pave the way for the launch and widespread adoption of 6G services in the UAE before 2030.

Saudi City Joins the Ranks of Smart Cities



Al-Khobar, located in Saudi Arabia, has been acknowledged as a smart city. The city has secured the 99th position out of 142 cities worldwide, highlighting its development and progress in embracing smart technologies and initiatives.

This recognition by the International Institute for Management Development (IMD) not only showcases Al-Khobar's commitment to innovation and sustainability, but also positions it as a leading

city in the region that is harnessing technology to enhance the quality of life for its residents.

The global smart cities market is poised for substantial revenue growth, with forecasts indicating that revenue will reach USD 104.80 billion by 2024. This upward trend is projected to persist, with a compound annual growth rate (CAGR) of 12.15% expected from 2024 to 2028. By 2028, the market volume is anticipated to soar to USD 165.80 billion.

This trajectory underscores the increasing adoption and investment in smart city technologies worldwide, driven by the demand for sustainable urban development, improved efficiency, and enhanced quality of life. As smart cities continue to pave the way for urban evolution, Al-Khobar's ranking serves as a testament to its dedication towards creating a more connected, efficient, and sustainable urban environment.

The IMD's Smart City Index serves as a crucial benchmark for evaluating a city's readiness to embrace and incorporate advanced technologies in fostering smart, sustainable communities. The ranking provides valuable insights into the innovative capabilities and technological infrastructure of cities worldwide.

The Saudi Smart City Market

Notably, the smart cities market in Saudi Arabia is poised for significant growth in the coming years. Projections indicate that revenue will reach USD 0.71 billion by 2024, with a strong compound annual growth rate (CAGR 2024-2028) of 11.82%, leading to a market volume of USD 1.11 billion by 2028. This growth aligns with the broader trend of increasing investment in smart city technologies globally.

Al-Khobar's recognition as a smart city adds to Saudi Arabia's portfolio, joining Riyadh, Makkah, Madinah, and Jeddah in advancing towards urban innovation and sustainability.



Analyzing the Dynamic ICT Supply Chain Landscape

The basic objective of a supply chain strategy is to help organizations deliver their products and services to customers with minimal interruption and build credibility. However, supply chain disruptions are volatile, to say the least, and companies often face many challenges when it comes to delivering goods on time as technology has transformed the industry through digitalization in recent years.

Supply chains have to navigate hurdles such as geopolitical, economic and natural calamities to maintain their flow of deliverables. For

instance, the Taiwan Semiconductor Manufacturing Company (TSMC)—which dominates more than half the world's output of semiconductors or 'chips' (used in electronic devices from smartphones to fighter jets)—is building a second foundry in Japan

as a result of trade wars between the US and China. The strategic move will see TSMC pumping over USD 20 billion into joint venture, Japan Advanced Semiconductor Manufacturing (JASM)—its majority-owned manufacturing subsidiary



where the first factory (which begins operation in 2024) and the second factory (which begins construction in 2024) will be located. The increased combined production of over 100,000 12-inch wafers per month is expected to improve overall cost structure and supply chain efficiency for JASM's customers' demands. TSMC has also built a plant in Arizona, which is supported by the US.

Similarly, in the global race for AI supremacy, Vietnam, aided by the US, is emerging as a promising semiconductor production hub. South Korean semiconductor giant, Amkor, recently announced its intention to invest USD 1.6 billion into a new packaging factory in Hanoi. Once operational, the factory will be among the biggest operated by Amkor globally. In September, Hana Micron, also from South Korea, opened a USD 600 million packaging factory in the Bac Giang province. The US is strengthening its own chip supply chain and planning to inject funding worth USD 1.5 billion into GlobalFoundries— the world's third-largest contract chipmaker.

If the semiconductor industry is undergoing the mentioned changes, it's important to note that advanced strategic technologies like displays, secondary batteries,

ultra-high-performance computing, and superconductivity— crucial for future national competitiveness— are also experiencing significant transformations in the sector.

Leveraging Technology

As disruptions taking place within traditional commercial trading routes at the Red Sea, the logistics sector is witnessing a nightmarish situation. Following the Red Sea crisis, freight shipments have seen a 25-50% increase, resulting in costly transit operations for companies. In such a scenario, it is difficult to relocate companies to different geographies every time something happens in the host countries. However, technology is helping companies speed up the delivery process by efficiently transcending borders. To illustrate the point, Vodafone and its joint-venture companies offer digital services that speed up the flow of goods worldwide. The new service, backed by advanced technologies such as cloud, SATCOM and IoT, will verify the origin of data on the move and the content of cargo for easy freight handling as well as compliance to trade laws, leading to quicker customs and port authority clearance.

Conversely, maintaining real-time visibility of the value chain and pinpointing supply chain bottlenecks

is not always an easy task as a result of the diverse supply chain landscape. The telecom sector also suffers greatly from this challenge. However, through the use of advanced analytics, AI modeling and optimization algorithms, telecom supply chain teams can analyze complex data, assess complex developments and make data-driven decisions to optimize supply chain networks, leading to improved customer service, reduced costs, enhanced agility and increased competitiveness in the market.

The Dynamics of Supply and Demand

Research and development (R&D) and ICT investments increase the possibilities of product innovation and process innovation, which in turn make a company profitable. However, with the current global economic headwinds and high interest rates, securing funding for R&D projects has become that much more difficult. Reacting to higher capital costs, suppliers reduce their inventory levels and place buyers at risk of running into shortages.

Furthermore, global economic and political factors sometimes lead telecom companies to stockpile their inventory in response to impending supply chain threats. The orders surpass the actual requirement and thus cause longer delivery times, intensify scarcity and destabilize supply chains.

Moreover, the increasing demand for digitalization has also given rise to counterfeit products in the supply chain which is a major setback in the ICT industry. Network infrastructures are major components of the telecom sector. The quality of network assets such as towers, base stations, fiber cables, cell site equipment, etc. is vital for meeting the growing connectivity demands. GSMA estimates telecom operators to invest over USD 1 trillion in networks, globally, through 2025. Furthermore, counterfeit and substandard equipment pose a great risk of malfunctioning.

The ITU defines a counterfeit ICT device as "a product that explicitly infringes the trademark, copies

hardware or software designs, or infringes brand or packaging rights of an original or authentic product and, in general, infringes applicable national and/or international technical standards, regulatory requirements or conformity processes, manufacturing licensing agreements, or other applicable legal requirements." Inferior or substandard devices pose an impediment to the growth trajectory of the telecommunications industry, especially within the cybersecurity sector. To fight the circulation and use of counterfeit ICT devices, the ITU has developed several standards that different stakeholders are encouraged to consider when deploying solutions.

Technology Diplomacy

In this volatile supply chain landscape, the collaboration of public and private sectors to foster healthy competition, mutual trust and innovation on a global scale cannot be overlooked. This collaboration will set the right path for both consumers and businesses today and for generations to come. Technology diplomacy is a proven approach that is essential to global success where security becomes a top priority. The ICT industry must work towards a zero-trust model for security and privacy, where compliance must be proven and verified continuously across the products and services.

To thrive as a digital economy, the public and private sectors must work together and collaborate across borders to set common technology standards and certification practices. Completely independent conformity and testing programs should provide government and private organizations with an impartial and clear foundation for recognizing the networks, systems, third-party services, and products that merit trust. Through the technology diplomacy approach, governments can effectively apply supply chain risk, while promoting healthy competition and fostering innovation.

Collaboration and Knowledge-Share

There is a growing consensus that AI technology is empowering governments worldwide. The scope of AI extends to helping the government provide innovative digital services

to citizens, nurturing education and supporting research in the field, as well as promoting governance and industrial innovation. To that end, the UAE's Advanced Technology Research Council (ATRC) recently launched the 'ATRC Global Tech R&D Platform' to help other countries to access the UAE's technological expertise to address their technological challenges.


The primary objective of the ATRC is to close the existing technology gaps in nations by offering customized solutions. To initiate applications through the platform, the ATRC is allocating USD 200 million in funding to accelerate innovation, particularly for emerging and developing nations in the fields of aerospace, agriculture, healthcare safety and security, sustainability, environment, energy and transport. ICT remains at the heart of such developments, aiming to build transparency with accurate, real-time, end-to-end supply chain visibility.

Diversifying Global Supply Chains

The close geographical proximity between suppliers and customers will bolster efficient and rapid go-to-market strategies. Therefore, diverse global supply chains are imperative at this juncture. The rapid pace of digital transformation across industries warrants efficient and uninterrupted supply/resources. In line with developing advanced technologies and sustainable industrial development, the UAE's Ministry of Industry and Advanced Technology (MoIAT) recently signed a Joint Declaration of Intent (JDI) with the State of Baden-Württemberg— a global manufacturing hub— to boost supply chain resiliency. Some of key sectors of the JDI include artificial intelligence, smart manufacturing, smart health and aerospace.

Similarly, in preparation for developing radio and optical products in future mobile communications systems based on 5G-Advanced and 6G standards, Nokia has set aside EUR 360 million in funding, which is dedicated to the research of software, hardware and chip design in Germany. The project aims to strengthening Europe's competitiveness and

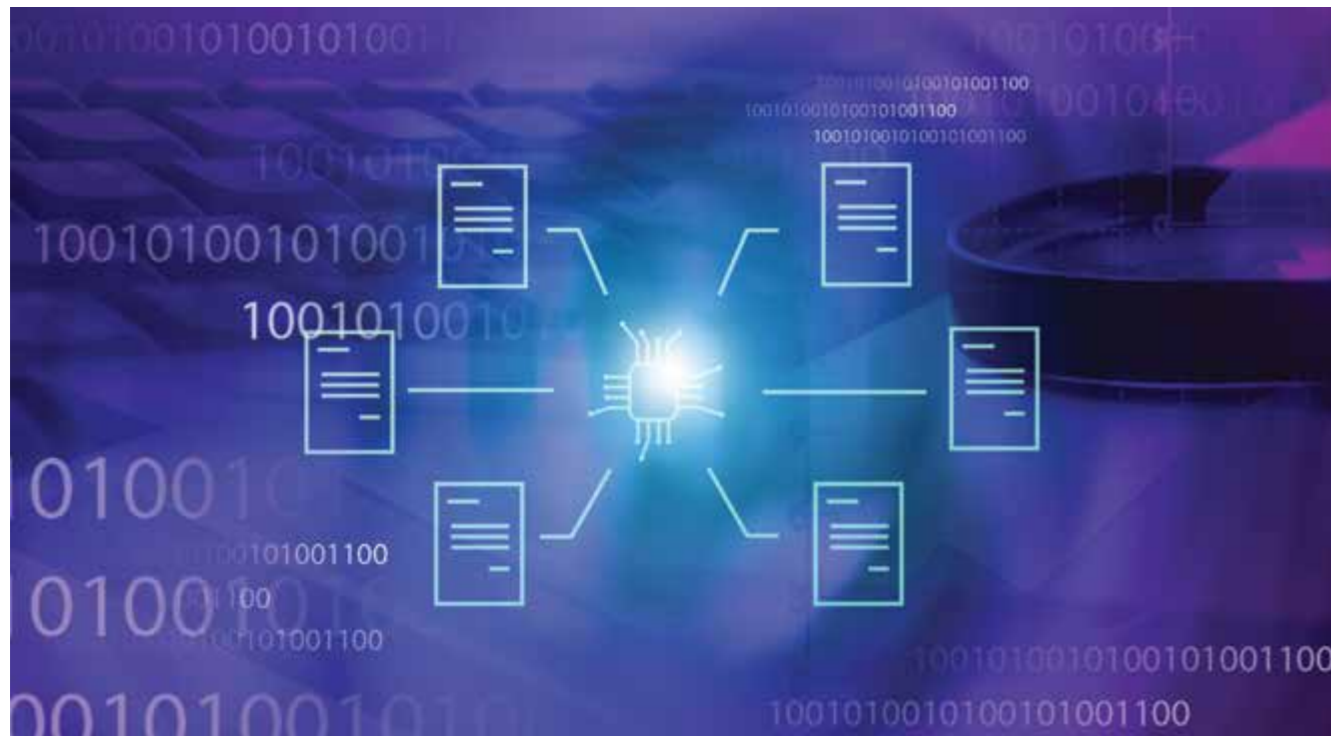
innovative prowess, particularly in the field of microelectronics for future technologies, such as 6G and artificial intelligence (AI), as well as the metaverse and advanced digitalization.

The current geopolitical and economic uncertainties warrant a global supply chain that is resilient enough to meet the multi-pronged demands of innovation, energy efficiency, cost efficiency and security. In the Middle East, it is encouraging to witness the ongoing progress in digital infrastructure, marked by the establishment of numerous data centers, subsea cables, and the initiation of Fourth Industrial projects. Supported by the availability of robust resources, the adoption of disruptive technological innovations will be instrumental in ensuring the transition from digital vision to digital reality. 



A robust supply chain mechanism will be instrumental in ensuring the transition from digital vision to digital reality





Exploring the Potential of Distributed Ledger Technology (DLT) in Revolutionizing Industries

Distributed Ledger Technology (DLT) stands at the forefront of technological innovation, offering unparalleled potential to revolutionize industries across the globe. At its core, DLT represents a decentralized database system that records transactions across a network of computers in a transparent and immutable manner. This transformative technology has gained widespread attention due to its ability to enhance security, streamline processes, and foster trust in a wide range of applications.

One of the most notable features of DLT is its capacity to create a tamper-proof and transparent record of transactions, eliminating the need for intermediaries and reducing the risk of fraud. By

utilizing cryptographic techniques and consensus mechanisms, DLT ensures that data remains secure and verifiable, paving the way for enhanced efficiency and integrity in various sectors.

Moreover, DLT has the potential to streamline complex processes by enabling real-time, peer-to-peer

transactions without the need for centralized oversight. This not only accelerates transaction speeds but also reduces operational costs and minimizes the risk of errors or discrepancies.

Furthermore, DLT has sparked significant interest in its potential to

transform industries beyond finance, including supply chain management, healthcare, government services, and beyond. By providing a decentralized and transparent platform for data management and exchange, DLT has the power to enhance collaboration, improve traceability, and optimize resource allocation across various sectors.

As organizations and governments continue to explore the capabilities of DLT, the technology is poised to drive unprecedented innovation, reshape traditional business models, and unlock new opportunities for growth and development. In this rapidly evolving landscape, understanding the potential of DLT is essential for stakeholders seeking to harness its transformative power and unlock the full benefits of decentralized technology.

Elevated Security and Transparency

Distributed Ledger Technology (DLT) offers a unique advantage in establishing an incorruptible and transparent transaction record, eliminating the need for intermediaries and reducing the risk of fraud. Through the implementation of cryptographic techniques and consensus mechanisms, DLT guarantees data integrity and authenticity, thereby enhancing efficiency and trust across various industries.

As businesses and organizations increasingly recognize the transformative potential of DLT, a paradigm shift is underway. By embracing DLT, industries can chart a course towards a decentralized future, where transactions are conducted with unprecedented security, transparency, and efficiency. Whether it be safeguarding sensitive financial transactions, optimizing supply chain logistics, or ensuring the integrity of healthcare records, DLT offers a versatile and robust solution. By harnessing the power of DLT, industries can unlock new opportunities for growth, innovation, and collaboration, ushering in a new era of trust and efficiency in the digital age.

Enhancing Operational Efficiency and Reducing Costs

Moreover, DLT holds the potential to streamline complex processes by enabling real-time, peer-to-peer transactions without centralized oversight. This not only accelerates the speed of transactions but also diminishes operational costs and minimizes the risk of errors or discrepancies. Businesses stand to benefit from optimized workflows and resource allocation, thereby fostering increased productivity and competitiveness in the global market.

Ultimately, the benefits of DLT extend beyond cost reduction to encompass increased productivity and competitiveness for businesses. By streamlining processes, accelerating transaction speeds, and minimizing risk, DLT enables businesses to operate more efficiently and effectively in today's fast-paced global market. This enhanced productivity not only allows businesses to deliver products and services more quickly but also enables them to adapt and respond to changing market conditions with greater agility and flexibility, ultimately driving sustainable growth and success.

Extending DLT's Influence across Industries

DLT's impact extends far beyond the realm of finance, resonating across sectors such as supply chain management, healthcare, and government services. By providing a decentralized and transparent platform for data management and exchange, DLT catalyzes collaboration, enhances traceability, and optimizes resource allocation across various domains, thereby driving industry-wide transformation.

Driving Innovation and Business Model Evolution

As organizations delve deeper into the capabilities of DLT, the technology is poised to drive significant innovation and reshape traditional business models. Whether it's facilitating seamless cross-border transactions, improving healthcare data management, or enhancing

procurement transparency, DLT harbors the potential to revolutionize industry operations and unlock new growth opportunities on a global scale.

Embracing the Decentralized Frontier

In this rapidly evolving landscape, understanding and leveraging DLT's potential is paramount for stakeholders seeking to harness its transformative power. By staying abreast of DLT developments and exploring potential applications within their respective sectors, organizations can position themselves for success in an increasingly digital and interconnected world. Embracing DLT transcends mere technology adoption; it signifies embracing a paradigm shift towards decentralization, transparency, and innovation, thereby reshaping the future of industries across the globe.

DLT's decentralized nature, coupled with cryptographic techniques and consensus mechanisms, ensures elevated security, transparency, and efficiency in transactions. DLT not only eliminates the need for intermediaries, reducing the risk of fraud, but also streamlines processes, accelerates transaction speeds, and diminishes operational costs.

Moreover, DLT extends its influence across diverse sectors, including finance, supply chain management, healthcare, and government services, driving industry-wide transformation and innovation. As businesses and organizations embrace DLT, they embark on a journey towards a decentralized future, characterized by unprecedented security, transparency, and efficiency.

By harnessing the power of DLT, industries can unlock new opportunities for growth, innovation, and collaboration, ushering in a new era of trust and efficiency in the digital age. Embracing DLT signifies embracing a paradigm shift towards decentralization, transparency, and innovation, reshaping the future of industries across the globe. ■



FTTR: Taking Fixed Broadband to the Next Level

The demand for faster, more reliable broadband connectivity is greater than before, and fiber-to-the-room (FTTR) represents a quantum leap forward in broadband technology, offering unparalleled advantages over traditional in-home networks.

With its high bandwidth, robust transmission capabilities, and minimal latency, FTTR transcends the limitations of conventional connectivity solutions. Whether it be enhancing in-home Wi-Fi networks, powering IoT applications, or facilitating smart offices, FTTR emerges as a game-changer.

Beyond its immediate applications, FTTR holds vast potential for driving innovation across various sectors. From revolutionizing telemedicine and remote learning experiences to supporting the

infrastructure requirements of self-driving cars. As the demand for high-speed, dependable, and low-latency internet access continues to soar, FTTR emerges as the standard bearer of broadband connectivity, paving the way for a more connected and advanced digital ecosystem.

FTTR Advantages

FTTR is a fundamentally technical element of optical fiber access, which refers to the laying of optical fibers to remote nodes. In the gigabit era, here are the key benefits of this technology:

- **High-Speed Internet**

FTTR solutions ensure high bandwidth and rapid internet speeds, delivering

genuine gigabit connectivity directly to the room. Utilizing cutting-edge technology, the main Optical Network Unit (ONU) establishes an upstream connection via XGSPON or 10G EPON, supporting a maximum rate of 10Gbps. The slave ONU, connected to the room via optical fiber, features a Gigabit Ethernet port and Wi-Fi 6 capability. By eliminating performance degradation associated with Wi-Fi signals passing through walls, this approach guarantees optimal performance. Moreover, the Wi-Fi 6 air interface rate surpasses gigabit speeds, providing true gigabit bandwidth within the room.

- **Seamless Roaming and Switching**

Through the use of a unified SSID for

terminal device access throughout the household, both 2.4GHz and 5GHz Wi-Fi frequencies are consolidated. The primary FTTR optical modem dynamically selects the frequency band for device access based on terminal equipment signal strength. Preference is given to the 5GHz band to ensure optimal bandwidth capacity. Thus, multiple slave OTN access points operate under the same SSID, enabling rapid switching between access points within 100 milliseconds when the master OTN detects poor signal strength. This seamless transition ensures uninterrupted service during activities like video calls, online education, and gaming, even as occupants move between rooms.

- **Multi-Terminal Connectivity**

Supporting up to 256 terminal device connections— eight times the capacity of traditional networks— the FTTR system facilitates connectivity for a wide array of smart devices including computers, TVs, mobile phones, tablets, and VR equipment. This robust capability ensures efficient internet access for all household devices.

- **Comprehensive Coverage**

Utilizing a 10 Gigabit OTN 1-to-N configuration, FTTR whole-house smart gigabit fiber ensures full coverage throughout the residence. By employing optical fiber connections, whether it be within corridors or rooms, the system boasts enhanced transmission capacity, higher rates, and longer network cable lifespan. Furthermore, it supports 10 Gigabit uplinks and dynamically displays wide technical signals, ensuring comprehensive connectivity throughout the household.

- **Intelligent Operation and Maintenance**

The FTTR cloud management platform streamlines network visualization and management, empowering operators to enhance user Wi-Fi experiences, optimize operational efficiency, and minimize on-site visits. Leveraging advanced analytics, the platform identifies marketing opportunities, uncovers potential customers, and enhances the success rate of home networking promotions through precise insights into household networks.

FTTR Use Cases

Based on an ITU technical paper, here are some use cases for FTTR scenarios:

- **Improved In-Home Wi-Fi**

Backhauling: FTTR technology offers a notable enhancement to home Wi-Fi networks by providing a dedicated backhaul. This proves particularly advantageous for bandwidth-intensive devices such as streaming media gadgets and gaming consoles.

- **Efficient Broadband Deployment in Dense Apartment Buildings:** FTTR's installation process is convenient and seamlessly integrates with existing infrastructures, eliminating the need for extensive cable installations.

- **Robust Network Infrastructure for Smart Offices:** FTTR facilitates critical functions like video conferencing, cloud computing, and various Internet of Things (IoT) applications. This enables uninterrupted connectivity, thereby bolstering productivity levels.

- **Delivering Low Latency Services in Home Networks:** By minimizing data transmission delays, FTTR significantly enhances the overall user experience, enabling seamless real-time interactions.

Telco Initiatives Featuring FTTR

The Middle East has witnessed pioneering efforts in the realm of FTTR offerings, with the aim of delivering exceptional home broadband experiences. Notably, in October 2021, stc conducted the first FTTR pilot in a multi-story villa in Riyadh. Leveraging fiber networking solutions and Wi-Fi 6 ultra-band technologies, this initiative enabled gigabit Wi-Fi access in every room, ensuring smoother experiences with smart applications.

In March 2022, e& UAE announced the successful testing of an FTTR solution tailored for intelligent home networks. This development promises to establish a solid foundation for enhancing digital capabilities for millions of consumers in the UAE. Similarly, in July 2022, Ooredoo Kuwait introduced FIBER+— a novel FTTR solution designed to elevate internet coverage in homes and expansive areas through optical fibers.

In March 2023, Ooredoo Qatar announced its readiness to deploy a cutting-edge FTTR solution, marking a significant milestone within Qatar's home internet landscape. Subsequently, in December 2023, Omantel became the first internet service provider in the Sultanate to offer an advanced FTTR solution, aimed at significantly enhancing customer experiences across all rooms.

Furthermore, BNET emphasized the implementation of FTTR within its network operations, aiming to ensure the delivery of top-notch home broadband services.

Key vendors such as Huawei and ZTE have made notable advancements in FTTR development. Huawei's FTTR solution comprises various gigabit Wi-Fi 6 master/slave units, all-optical components, and optical cable construction tools. This enables users to enjoy stable gigabit Wi-Fi experiences seamlessly throughout their spaces. Since its launch in 2022, Huawei's FTTR solution has been adopted by over 90 major operators worldwide.

In October 2023, ZTE introduced RoomPON 5.0, its newest addition to the all-optical series product lineup. This release marks a significant overhaul in design, performance, features, installation, maintenance, and operations and maintenance (O&M), reshaping conventional FTTR solutions.

FTTR in the Future

In 2024, we anticipate witnessing more innovations that focus on integrating and expanding FTTR to urban and rural areas, as well as emerging technologies. With more enhancements on track for deployment, a faster, more reliable, and stronger connectivity is guaranteed to users indoors.

FTTR presents ISPs with an opportunity to gain a distinctive edge in the home broadband and networking service market. Undoubtedly, FTTR will emerge as a pivotal factor in driving the expansion of home-based enterprises and facilitating the continued growth of the digital economy. **TR**



From Earth to Orbit: Harnessing IoT and Space Tech for Industry Progress

In a world where technology evolves daily, there are now limitless possibilities. Numerous innovations continue to unfold along this endless path of progress. The Internet of Things (IoT) molds this evolving technological landscape, transforming the way in which people interact with their surroundings. While IoT devices are not yet implemented everywhere, they are poised to be ubiquitous one day, providing seamless connections across all areas, and all industries.

Today, leaders are dedicating their focus to space technology, which presents numerous opportunities. Lot of improvements have been made in this realm, such as direct to cell satellites and laser data transmission from space. However, the challenge persists in uncovering the

unknown to unite not just industries but also communities. So, what impact could space technology have on IoT devices and networks? And how will it aid in reshaping the future?

The Interconnection of Physical Devices

The concept of the IoT involves integrating physical objects or environments with digital systems,

enabling them to communicate and interact with each other. This integration extends beyond specific industries and encompasses a wide range of sectors, including agriculture, transportation, pipeline management, environmental, mining, and more. In essence, IoT technology bridges the gap between the physical and digital worlds, transforming everyday objects into interconnected smart devices.

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Over the past few years, the IoT industry has witnessed exponential growth. This growth can be attributed to advancements in technology, increased connectivity, and the rising demand for automation and data-driven insights across various sectors. As a result, organizations and industries are increasingly adopting IoT solutions to streamline operations, enhance efficiency, and unlock new opportunities for innovation.

Key components of IoT implementation include robust network connectivity, sophisticated software systems, and sensors embedded in various objects or environments. These components work together to facilitate seamless communication and data exchange between IoT devices. For example, vehicles equipped with IoT sensors can collect and transmit real-time data detailing its location, performance, and surrounding conditions. Similarly, smart buildings can utilize IoT technology to monitor energy usage, optimize resource allocation, and enhance occupant comfort.

Navigating Challenges in the IoT Landscape

In addition to its numerous benefits, the IoT is encountering several challenges. Foremost among these is security, which is crucial for building user trust. The proliferation of connected devices increases the risks of cyber-security breaches and data breaches.

Furthermore, experts are focusing on enhancing the functionality and efficiency of IoT systems. The absence of standardized protocols for device communication poses a significant limitation in this regard.

Additionally, data management and scalability present difficult challenges. Efficient management becomes imperative to derive valuable insights from the vast amount of data generated by IoT devices. This necessitates the implementation of robust network infrastructure and efficient data processing systems.

Regulatory compliance is also a critical aspect, especially concerning industries utilizing artificial intelligence.

IoT operations are subject to specific requirements, including industry-specific regulations and consumer protection laws.

Moreover, sustainability poses a significant challenge for IoT, particularly in terms of energy consumption and network management. Ensuring efficient energy usage and accommodating the growing number of interconnected devices are essential considerations in this regard.

Leveraging Space Technology to Enhance IoT Capabilities

Exploring the potential of space technology in advancing the IoT unveils numerous advantages and contributions to its progression.

Firstly, space technology eliminates the necessity for terrestrial towers. Utilizing space satellites, IoT devices can establish seamless connections, offering global coverage regardless of location. Moreover, satellites serve as reliable backup communication channels in the event of terrestrial network disruptions, ensuring uninterrupted connectivity.

In addition to connectivity, space-based remote sensing plays a pivotal role in optimizing IoT device operations. By providing real-time data on environmental conditions and weather patterns, satellites empower IoT devices to make informed decisions. This capability has proven to be invaluable in sectors such as agriculture, where precise environmental data is crucial for efficient resource management.

Furthermore, satellite-based navigation systems deliver accurate positioning data, addressing a critical need in various industries. For instance, in agriculture, precise positioning information enables IoT devices to perform tasks like automated planting and crop monitoring with unparalleled accuracy.

Moreover, IoT devices can leverage satellite-derived data, including weather forecasts, agricultural monitoring, and disaster management information, to enhance their functionalities. By

integrating satellite data, IoT devices can make data-driven decisions and execute automated actions, optimizing performance and enhancing overall efficiency.

Lastly, the fusion of satellite data with IoT sensor data inspires innovative applications across diverse sectors. This synergy enables the development of solutions for environmental monitoring, smart cities, precision agriculture, and beyond, unlocking new possibilities for IoT-driven advancements.

In summary, space technology serves as a catalyst for enhancing IoT capabilities, offering unprecedented connectivity, data insights, and innovative solutions across various industries. **TR**



Space technology catalyzes IoT capabilities in offering unprecedented connectivity, data insights, and innovative solutions across various industries



The Evolving Path of Sustainable Telecom in the Middle East

Climate change is one of the prime concerns of our time, commanding the attention of nations and industry leaders alike due to its profound impact on both humanity and the environment. Within this global discourse, the telecommunications industry occupies a crucial role in the ecosystem.

Numerous initiatives are underway, including efforts to achieve zero carbon footprints. Moreover, the adoption of

renewable energy has emerged as a pivotal solution for many telecom companies. Transitioning to sustainable practices is no longer merely an option but an imperative. This shift not only reflects the responsibility of ICT stakeholders and companies but also

holds the power to shape the future trajectory of the telecommunications industry.

Initiatives by Telecom Companies in the Middle East

The telecom sector in the Middle East

is leading the way in renewable energy adoption, driven by governmental initiatives and regional commitments to sustainability. The United Arab Emirates, for instance, aims to have clean energy constitute 50 percent of its total energy supply by 2050, reflecting a prioritization of this agenda. Additionally, the Arab League's Clean Energy Initiative, adopted in 2013, underscores the region's commitment to boosting renewable power generation capacity, with a target of increasing capacity from 12 gigawatts (GW) in 2013 to 80 GW by 2030.

This dedication to cleaner energy is evident in the numerous renewable energy projects underway across the region. NEOM, a major project in Saudi Arabia, exemplifies the region's embrace of a sustainable, AI-driven future. The NEOM Green Hydrogen Project, a key initiative within NEOM, aims to combine solar, wind, and energy storage technologies to produce 600 tons of daily green hydrogen by 2026, leveraging cognitive technology to create a disruptive, sustainable ecosystem.

Telecommunication companies are also making significant contributions to renewable energy efforts. For example, du has implemented a Solar on Tower solution to support the UAE's Net Zero objectives, achieving impressive energy savings and CO2 reductions. This trend of solarizing tower sites is just one example of telecom companies' commitment to reducing their carbon footprint and embracing sustainable practices.

Leveraging Renewable Energy in the Telecom Industry

In addition to its environmental advantages, renewable energy offers numerous benefits for the mobile sector, particularly in terms of energy efficiency and cost savings. Embracing solar and wind power— either through on-site installations or power purchase agreements— eliminates the need for costly grid infrastructure and reduces transmission losses.

This localized energy generation ensures a reliable and resilient power


supply for mobile networks, minimizing downtime and enhancing overall performance. Financially, the adoption of renewable energy is increasingly attractive due to the declining costs of renewable technologies and supportive government policies. Mobile companies are investing in solar panels and wind turbines to generate their own power, thereby reducing reliance on conventional energy sources and leading to long-term energy savings.

Moreover, telecom companies are actively integrating renewable power sources into their operations, driving the demand for telecom power systems that seamlessly integrate with renewable energy sources. Additionally, the popularity of mobile energy storage systems is on the rise, offering benefits such as providing backup power to storm-prone areas and facilitating additional power generation.

Building a Sustainable Pathway for Telecommunications

Telecom operators worldwide are increasingly recognizing the imperative to address their environmental impact and are committing to sustainability goals with greater urgency. According to experts, telecom companies have made significant strides in 2022, improving their scores in key areas of sustainability commitment. Notably, progress has been seen in the establishment of ambitious targets for emissions reduction (including Scope 3 emissions) and the adoption of circularity and waste management goals. Additionally, operators are integrating climate-related concerns into their corporate culture, appointing leaders dedicated to sustainability, and refining procurement policies to prioritize low-carbon and environmentally friendly sourcing practices. Some operators have already achieved early targets in emissions reduction and renewable energy adoption, signaling tangible progress towards broader sustainability objectives.

In conclusion, as the telecommunications industry continues its journey towards achieving net zero emissions, the milestones reached

along the way stand as vital markers of progress. These achievements not only serve as tangible evidence of the sector's commitment to sustainability but also provide essential benchmarks for measuring success. By transparently communicating these advancements to stakeholders and customers, the industry demonstrates its accountability and dedication to environmental stewardship. The increasing commitment to sustainability within the telecom sector in the region not only highlights its proactive stance but also solidifies its role as a key contributor to global efforts in combating climate change. Through continued collaboration and innovation, the industry is poised to make even greater strides towards a more sustainable future for all. 



The telecom sector in the Middle East is leading the way in renewable energy adoption, driven by governmental initiatives and regional commitments to sustainability



e& UAE's In-Depth Guide to Strategic AI Application in the Telco Sector and Beyond



e& UAE has released a new whitepaper, outlining a blueprint for navigating the future of telecommunications with artificial intelligence (AI). Titled "Unleashing the Power of AI: How e& UAE is Shaping the Future of AI in Telecommunications and Beyond" the whitepaper offers an in-depth exploration of e& UAE's journey towards becoming an AI-driven organization, significantly contributing to the nation's digital future. The whitepaper explores e& UAE's strategic integration of more than 400 AI use cases and 160 machine learning (ML) models across its operations.

Dena Almansoori, Group Chief AI and Data Officer, e&, said, "This whitepaper demonstrates the thoughtful approach, guiding principles, and remarkable AI

achievements within e& UAE over the years. Whether adopting AI to improve customer experiences, optimize operations, scale productivity, or reduce costs, we cannot underscore enough the significant impact AI has on the telecommunications sector and beyond."

The comprehensive document provides a meticulous overview, detailing how AI is ushering in a new era in which telecom players, like e& UAE, transcend their traditional role as connectivity providers to become architects of complete digital experiences. It offers a unique behind-the-scenes look at e& UAE's proactive AI and data-driven adoption, including key enablers, use cases, and ethics. It also provides practical guidance and best practices for businesses initiating their AI journeys.

Khalid Murshed, Chief Technology and Information Officer, e& UAE, said, "We're well-versed in the advantages AI can bring to telcos, and our whitepaper leaves no stone unturned in showcasing how we leverage it to deliver more

sustainable, efficient, and innovative operations."

AI in Action

As of 2024, e& UAE has accelerated its AI deployment to drive sustainability in its resource allocation and energy efficiency and has developed AI processes for network optimization.

The company's strategic AI implementations provided the telco with insights to identify improvement areas, significantly lowering operational costs. By creating a dedicated Robotic Process Automation (RPA) team and establishing a Robotics Centre of Excellence (CoE), the company successfully implemented RPA solutions across departments, streamlining tasks and reducing manual work.

e& UAE also revamped its approach to sales and marketing by leveraging AI. Whether it be launching the first AI-powered telecom store in the world or deploying AI-driven recommendations, e& UAE ensures every customer enjoys a seamless and personalized experience.

stc Bahrain Appoints New CEO



The Board of Directors of stc Bahrain has announced the appointment of Eng. Khalid bin Baijan Al Osaimi as the new CEO of stc Bahrain, succeeding Eng. Nezar Banabeela.

Commenting on the new leadership appointment at stc Bahrain, Eng. Moa'ed Huwajj Alsaloom, Chairman of the Board of Directors of stc Bahrain expressed his confidence in the appointment of Eng. Al Osaimi as one of stc Bahrain's leaders, who has witnessed transformation of the

region's telecommunications sector for more than 22 years.

His extensive experience and knowledge of the telecommunications industry and the evolving digital transformation landscape will contribute significantly in driving stc Bahrain's digital-champion strategic growth forward, while enabling the enterprise and business sector to adapt to digital transformation by leveraging stc Bahrain's innovative digital services.

In his tenure of more than 20 years with the stc Group, Eng. Al Osaimi has held several leadership positions across the technology, mobile, carriers and wholesale sectors. Since 2022, he has served as the Vice President of Marketing for the Wholesale business at Mobily.

Amongst his academic accomplishments, Eng. Al Osaimi holds a Bachelor's degree in computer science and a Master's degree in Business Administration from King Saud University in Riyadh.

The Board of Directors of stc Bahrain extended their gratitude to the outgoing CEO, Eng. Banabeela, applauding his leadership and contribution over the past years. The Board of Directors of stc Bahrain wish him success in his new role—Head of Special Projects, stc Group.

The appointment of the new stc Bahrain CEO falls in line with the stc Group's strategic vision to solidify its positioning in the regional telecommunications landscape by bringing in business leaders with distinguished expertise in the ICT industry.

du Pay to Offer Transformative Fintech Solutions for UAE



du, commercially rebranded from Emirates Integrated Telecommunications Company (EITC), has announced the launch of du Pay, marking a significant milestone in the UAE's transition toward a cashless economy and aligning seamlessly with the national agenda for digitalization.

The innovative digital financial solution is poised to play a pivotal role in enhancing financial inclusion, accessibility and security.

Licensed by the Central Bank of the UAE, du Pay is on a mission to simplify digital financial services for everyone, everywhere, in the UAE. du Pay offers a diverse suite of digital financial

services and payment services, from international money transfers and peer-to-peer (P2P) transfers to mobile top-ups and bill payments. Additionally, it supports salary deposits through an IBAN, serving as a versatile account for users. With features available in six languages—Arabic, English, Hindi, Bangla, Malayalam, and Tamil—du Pay ensures inclusion across its varied user base.

Fahad Al Hassawi, CEO at du, said, "du Pay underlines the company's commitment to leveraging technology for financial empowerment, contributing to the directives of the UAE's leadership towards a fully digitalized and inclusive financial ecosystem. Our vision with du Pay is to challenge the status quo and redefine the future of digital financial services. This is an essential step forward in realizing the vision of a digital UAE, enabled by seamless transactions for all residents in a truly inclusive, secure, and convenient financial ecosystem."

By drawing on the strengths of our partnerships and our innovative approach, we aim to make significant contributions to the UAE's journey towards becoming a global leader in the digital economy."

du Pay Service Offerings

With an impressive USD 39.7 billion in outward international money transfer volumes from the UAE, du Pay is positioned to tap into this extensive market by providing services that prioritize simplicity and a customer-centric experience. Capitalizing on du's robust infrastructure and market reputation, du Pay leverages du's assets and expertise to deliver a superior platform that is not only convenient and cost-effective but is also tailored to meet the evolving needs of customers. This move falls in line with market projections, which anticipates substantial growth in the digital payment sector and is forecasted to reach USD 3.3 trillion in payment services by 2031.

Vodafone Qatar's 5.5G Trial Achieves Remarkable 10+ Gbps Speed



In an effort to advance its commitment to pioneering next-generation 5G technologies, Vodafone Qatar has set, and achieved, a significant milestone. Through 5.5G high band network testing, the company has successfully demonstrated peak speeds exceeding 10 Gbps.

This landmark trial underscores Vodafone Qatar's dedication to pushing the boundaries of innovation, showcasing unprecedented data speeds and reaffirming its position at the forefront of technological advancement.

High band network testing involves evaluating the performance of telecommunications networks operating on high-frequency bands, particularly in the context of advanced 5G technology. Vodafone Qatar's 10 Gbps achievement was successful due to the utilization of advanced technologies such as mmWave frequencies, Massive MIMO, beamforming, and advanced modulation techniques. These innovations enable the delivery of ultra-fast speeds, making them particularly suitable for densely populated urban areas.

Ramy Boctor, Chief Technology Officer at Vodafone Qatar commented, "As Vodafone Qatar continues to push the boundaries of technological innovation, the journey towards a fully connected world accelerates. Vodafone Qatar's achievement in this trial marks a significant milestone in the evolution of telecommunication. Through pioneering spirit, relentless dedication,

and unwavering commitment to innovation, Vodafone Qatar reaffirms its position as one of the leaders in the telecommunications industry regionally and globally."

5.5G Advancement

The advent of 5.5G (5G-Advanced) technology heralds a transformative era for global mobile users. This advancement, characterized by enhanced user speeds and expanded spectrum bandwidth, holds the potential to revolutionize connectivity.

With network speeds surpassing those of 5G by up to tenfold, this clear advantage extends to various sectors, from immersive virtual reality experiences to holographic video communication, autonomous vehicles, smart homes, and manufacturing. This evolution paves the way for a future marked by seamless connectivity and unprecedented innovation across diverse industries.

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Zain KSA Unveils 100% Saudi-Made Fleet Management System



Zain KSA has launched the first 100% Saudi-made fleet management system for the business sector. This comprehensive solution incorporates state-of-the-art tracking devices designed, manufactured, and assembled locally. Leveraging the advanced capabilities of Zain Cloud and hosting all data locally, Zain KSA is the first telecom operator in the Kingdom to offer a fleet management solution for the 'Made in Saudi' Program.

Streamlining Logistics

The Fleet Management System is a comprehensive cloud-based platform that helps businesses of all sizes streamline their logistics operations, improve travel routes, and reduce fuel consumption, thereby lowering carbon emissions, safeguarding the environment, and promoting sustainability. By offering real-time GPS tracking, this innovative system enhances road safety and security across the transportation and logistics sectors, empowering decision-makers with crucial insights through comprehensive reports based on accurate data. This allows for informed

decisions that boost operational efficiency and save costs.

Commenting on the milestone, Eng. Saad bin Abdulrahman Al-Sadhan, Chief Business and Wholesale Officer at Zain KSA said: "We are proud to be the first telecommunications and digital services provider to offer an integrated solution designed and developed in the Kingdom, aligning with our sustainability strategy of supporting local content. This achievement demonstrates our commitment to the aspirations of our astute leadership and Saudi Vision 2030, promoting the digital economy and localizing technology."

Leveraging Digitization and Automation

'Made in Saudi' is a national program that supports homegrown goods and services, building a trusted brand for consumers. By positioning national products and services as a preferred choice and enhancing consumer loyalty, the program aims to activate the role of Saudi-made goods in bolstering non-oil GDP.

This aligns with the economic objectives of Saudi Vision 2030, aiming to boost

revenue diversification and elevate national products to meet the highest standards of reliability and excellence.

"At Zain KSA, we are steadfast in our commitment to building a robust technology ecosystem that leverages digitization and automation to empower the Kingdom's productive, service, and logistics sectors. The Fleet Management System is a direct result of this commitment, and we take immense pride in being at the forefront of companies providing 100% national digital solutions, joining hands to bolster our cherished homeland and uphold its prosperity," continued Al-Sadhan.

Zain KSA has recently secured the HRSD Labor Award for 'Talent Localization' in the ICT sector. This recognition highlights its pioneering efforts and achievements in fostering innovation and development, driven by a dynamic and youthful national workforce. Demonstrating its commitment to local talent and innovation, Zain KSA has also signed a strategic partnership agreement with Pioneers Systems—the renowned Saudi company specializing in the design, development, manufacture, and assembly of electronic circuits—aiming to develop Internet of Things (IoT) solutions and localize specialized products and expertise in this field to achieve sustainable innovation within the Kingdom's communications and digital services sector, ultimately contributing to increasing the sector's local content contribution.

Umniah Hailed as Fastest Mobile Network in Jordan



During the last quarter of 2023, Umniah claimed the prestigious Speedtest Awards

title for Jordan's fastest mobile network. An exhaustive analysis revealed Umniah's impressive Speed Score of 40.57, boasting median download speeds of 30.76 Mbps and median upload speeds of 22.75 Mbps.

Ookla conducted a thorough comparison, analyzing 211,452 user-initiated tests from Speedtest iOS and Android apps across all major mobile carriers in Jordan—Umniah, Orange, and Zain—to ascertain the leader

in mobile network speed during the same period.

In terms of city network speeds, Umniah achieved the following download and upload speeds:

- **Amman:** 30.65 Mbps (DL), 22.77 Mbps (UL)
- **Irbid:** 35.07 Mbps (DL), 28.83 Mbps (UL)
- **Az-Zarqa:** 33.63 Mbps (DL), 28.58 Mbps (UL)



Next-Gen Government: How Generative AI is Changing the Citizen Experience

Consider the convenience of accessing government information or assistance around the clock. This possibility occurs through the utilization of AI tools such as Generative AI service desks, ChatGPT-like AI chatbots, and virtual assistants.

Generative AI transcends mere industry jargon; it represents a valuable asset for government agencies, introducing novel approaches to operations and citizen engagement. Through the adoption of generative AI, governments can not only streamline digital services and enhance accessibility but also bolster organizational efficiency, thereby enriching the citizen experience.

Establishing transparency and fostering knowledge-sharing with residents lays the foundation for effective integration of generative AI into governmental processes. It is imperative to comprehend residents' interactions with government services and AI, thereby facilitating informed decision-making and enhancing service delivery.

In 2024, governments will embark on a journey of exploring innovative avenues for resident engagement.

During this period, we could witness more initiatives that the public sector will undertake towards the utilization of generative AI.

Why It Matters?

As the tech landscape rapidly evolves, there's a growing expectation among citizens for instant, personalized, and efficient government services. Poor citizen engagement and communication can significantly hinder government efficiency and governance quality. When citizens feel

excluded or uninformed, trust in the government diminishes, leading to non-compliance with laws, increased discontent, and potentially, social unrest. Moreover, it could hamper the government's ability to address urgent issues by missing out on crucial public input. Therefore, enhancing citizen engagement and communication is crucial for transparent, accountable, and responsive governance.

Introducing generative AI into public services necessitates a strong focus on responsible AI controls, data readiness, and workforce upskilling. Early use cases highlight its potential to enhance government operations, prompting the need for a systematic approach to assess value and manage experimentation and deployment. Forward-thinking leaders are beginning to explore generative AI's capabilities to enhance and expand public services.

Digitally-Enabled Citizen Engagement

In a Deloitte Digital and Adobe survey, 65% of respondents expressed a desire to access government information and services via multiple channels, including web, email, chat, social media, broadcast, phone, and physical offices. This underscores the potential of generative AI to significantly enhance the citizen experience when integrated effectively.

The World Bank highlights that digitally enabled citizen engagement hinges on governments' ability to collect, process, analyze, and respond to vast amounts of citizen feedback. Without the capacity to handle this data alongside real-world phenomena, governments cannot fully leverage citizen input for decision-making. Yet, emerging technologies such as large language models (LLMs) have the potential to close this divide by assimilating feedback, cross-referencing it with social media and online news data, and extracting valuable insights. This aggregation enables LLMs to offer concise summaries of key citizen concerns.

The Impact of GenAI on Citizen Experience

Here are some key benefits of

generative AI (GenAI) for citizens:

- **Personalized Services:** Generative AI (GenAI) utilizes citizen data to tailor services which are specific to a person's lifestyle choices, individual preference, and even medical background.
- **Smart Cities:** GenAI facilitates data-driven decision-making in smart city initiatives, such as optimizing traffic management and energy usage to elevate urban living standards.
- **Natural Language Processing (NLP):** NLP-driven GenAI enhances citizen-government interactions through efficient chatbots and virtual assistants, enhancing convenience.
- **Predictive Analytics:** GenAI empowers the creation of predictive models to anticipate citizens' needs, aiding in proactive public safety measures by identifying high-risk areas.
- **Policy Development:** GenAI assists policymakers in analyzing intricate datasets for evidence-based decision-making that aligns with citizen demands and societal shifts.
- **Civic Engagement:** GenAI promotes citizen involvement in decision-making processes through online forums, crowd-sourced initiatives, and problem-solving endeavors.
- **Accessibility and Inclusion:** GenAI bolsters accessibility for citizens with disabilities, offering features like speech recognition and natural language interfaces, which, in turn, ensures inclusivity.
- **Creative Expression:** GenAI enhances various mediums such as art, music, literature, and multimedia, enriching cultural diversity and fostering citizen engagement.

A Generative AI Pioneer: UAE

The forecasted growth of generative AI (Gen AI) in the Middle East, as projected by consulting firm, Strategy&, suggests a potential annual revenue of nearly USD 24 billion by 2030. This growth is anticipated to have a significant impact, particularly in Saudi Arabia and the UAE, where combined annual growth could reach USD 17.5 billion. Other GCC countries are also expected to experience substantial economic benefits, with estimated gains of USD 2.6 billion in Qatar, USD 1.6 billion in Kuwait, USD

1.3 billion in Oman, and USD 0.6 billion in Bahrain.

The UAE— positioning itself as a leader in the field— has already made significant strides, exemplified by partnerships with entities like OpenAI and the introduction of advanced LLMs such as Falcon and Jais. The launch of initiatives like the 'Generative AI' guide and the AI-powered chatbot 'U-Ask' further underscores the country's commitment to advancing AI adoption and enhancing citizen-government interactions.

Moreover, the Dubai Future Foundation (DFF) unveiled the Dubai Generative AI Alliance, aiming to accelerate the integration of cutting-edge technologies and establish Dubai as a global hub for emerging technologies. Khalfan Belhouli, CEO of DFF, emphasized the potential of AI at the Dubai Assembly for Generative AI event, envisioning groundbreaking innovations through the fusion of generative AI with robotics and quantum computing.

In November 2023, the Ministry of Finance in the UAE successfully revamped critical government services through an accelerator program, aligning with the Government Services Development Guide 2.0, in which the government's commitment to digitalization was reflected. The integration of AI in service delivery has enhanced efficiency and user experience, exemplifying the country's dedication to providing high-quality government services.

Looking ahead, Dubai aims to strengthen its position in the global AI landscape with initiatives like the 'Global Prompt Engineering Championship,' dedicated to harnessing the power of generative AI across literature, art, and coding. This championship not only seeks to foster talent and entrepreneurship but also positions Dubai and the UAE as leading innovators in prompt engineering. Scheduled for May 2024, this visionary initiative underlines Dubai's commitment to leveraging AI for transformative impact and sustainable growth. **IB**



Unleashing the Potential of Global Spectrum Management

5G technology is forecast to cover about 84% of the global population by 2028, while the compound annual growth rate (CAGR) of global mobile data traffic per smartphone from 2022 to 2029 is expected to reach 22% in Sub-Saharan and Latin America. Northeast Asia follows, with a mobile data traffic per smartphone CAGR forecast to amount to 20% between 2022 and 2029, according to Statista. Thus, in the age of rapid technological advancement and ever-expanding connectivity, the management of global spectrum has emerged as a critical imperative.

Unlocking the Full Potential of Spectrum Management
Spectrum, the finite resource enabling wireless communication, is the lifeblood of modern telecommunications, powering everything from mobile networks to satellite communications and beyond. Unleashing the potential of global spectrum management requires

a nuanced understanding of its complexities and the foresight to adapt to evolving needs.

At its core, effective spectrum management involves allocating frequencies for various uses while minimizing interference and maximizing efficiency. This task has become increasingly challenging as demand for spectrum continues to soar, driven by the proliferation of wireless devices, burgeoning

internet connectivity, and the advent of groundbreaking technologies such as 5G and IoT. Moreover, the global nature of communication necessitates international coordination and cooperation to harmonize spectrum usage across borders.

To unlock the full potential of spectrum management, stakeholders must prioritize collaboration, innovation, and regulatory agility. International organizations like the International

Telecommunication Union (ITU) play a pivotal role in facilitating dialogue and standardizing spectrum usage globally. Furthermore, technological innovations such as dynamic spectrum sharing, and cognitive radio offer promising solutions to optimize spectrum utilization and address growing demand.

However, realizing the benefits of enhanced spectrum management also requires a commitment to addressing challenges such as spectrum scarcity, regulatory barriers, and geopolitical tensions. By fostering a conducive environment for innovation, embracing emerging technologies, and promoting inclusive policies, the global community can harness the transformative power of spectrum management to drive economic growth, empower communities, and shape the future of communication on a global scale.

Navigating Complexity in Spectrum Management

The management of global spectrum entails a multifaceted process involving the allocation of frequencies for various uses while minimizing interference and maximizing efficiency. However, this task has become increasingly complex in recent years, driven by unprecedented demand fueled by the proliferation of wireless devices, the exponential growth of internet connectivity, and the advent of transformative technologies such as 5G and IoT.

The Need for International Collaboration

Given the global nature of communication, effective spectrum management necessitates international coordination and cooperation to harmonize spectrum usage across geographical borders. International organizations like the International Telecommunication Union (ITU) play a pivotal role in facilitating dialogue, establishing standards, and promoting best practices for spectrum management on a global scale.

Various global spectrum management and standards bodies, akin to the ITU, play crucial roles in coordinating telecommunications activities and

developing standards worldwide. These organizations, including CEPT, APT, RCC, CITELECOM, ASMG, ATU, ETSI, 3GPP, and the Wi-Fi Alliance, facilitate cooperation among member countries or regions, promote the adoption of common standards, and ensure the efficient use of spectrum resources. From coordinating spectrum allocation to developing technical specifications, these bodies contribute to the advancement and interoperability of telecommunications technologies on a global scale.

Embracing Innovation and Regulatory Adaptability

To fully unlock the potential of spectrum management, stakeholders must prioritize collaboration, innovation, and regulatory flexibility. Technological advancements, including dynamic spectrum sharing and cognitive radio, offer promising solutions to optimize spectrum utilization and address the ever-growing demand for wireless connectivity.

Addressing Challenges Head-On

Nevertheless, realizing the benefits of enhanced spectrum management requires addressing various challenges, including spectrum scarcity, regulatory barriers, and geopolitical tensions. By fostering a conducive environment for innovation, embracing emerging technologies, and promoting inclusive policies, the global community can overcome these hurdles and harness the transformative power of spectrum management to drive economic growth and empower communities worldwide.

Balancing Stakeholder Interests

Efficient spectrum management necessitates striking a delicate balance between the diverse needs of stakeholders, including governments, telecommunications companies, and consumers. Policy frameworks must be agile and adaptable to accommodate evolving technologies and market dynamics while safeguarding the interests of all parties involved.

Investing in Research and Education

Promoting research and innovation in spectrum management is crucial for developing novel technologies and approaches to address emerging

challenges. Moreover, prioritizing spectrum management education and capacity-building initiatives can equip stakeholders with the required knowledge and skills to navigate the complexities of spectrum management effectively.

In conclusion, unleashing the full potential of global spectrum management demands a comprehensive approach that encompasses collaboration, innovation, and regulatory adaptability. By surmounting challenges, embracing technological advancements, and fostering an environment conducive to innovation, the global community can harness the transformative power of spectrum management to drive socio-economic development and shape the future of communication on a global scale. ■



Spectrum, the finite resource enabling wireless communication, is the lifeblood of modern telecommunications



Internet Safety: A Moving Target

The commercial internet era kicked off in 1995, marking the start of the dot-com boom. The access to global information, which was hitherto primarily enjoyed by the military and academia was now open to the masses. Internet companies attracted tech investors in droves, taking IT companies profit margins to unprecedented heights.

The advent of wave division multiplexing (WDM) and the rollout of fiber optic cables in the mid-1990s greatly expanded the capacity of the internet, which had a ground-breaking impact on culture, commerce, and technology. As a result, the world witnessed the rise of near-instant communication via e-mail, instant messaging, voice over Internet Protocol (VoIP) telephone calls, video chat, and the World Wide Web, giving way to communication platforms such as blogs, social networking services, and online shopping, etc.

Since then, the internet has become the center of focus in every aspect of modern life, including the political, economic, environmental and cultural sectors. Hence, its proper governance and safety are of prime importance for every country in an increasingly digitized world.

The Murky Side of the Internet

The internet helped the world overcome the physical restrictions imposed during the COVID-19 impasse and helped economies to stay afloat; however, at the same time, it has also become a network for clandestine and nefarious operations. For example, cases of illegal sexually explicit content operated by

minors have surfaced on the net in recent years.

The creation and trading of Child Sexual Abuse Material (CSAM) is often regarded as the most harmful abuse found across online communication and social media platforms. The FBI in the US discovered that some adult sites lured minors monetarily to produce such content. In other cases, minors are forced into producing illicit sexual content, known as sextortion.

Investigations have shown that popular social media platforms offer self-generated child sexual abuse material (SG-CSAM) in private channels. The

Internet Watch Foundation reportedly discovered SG-CSAM featuring minors on more than 100,000 web pages in 2023. Shockingly, this represents a 66% increase compared to the figures reported in 2022.

Another debilitating activity that is becoming increasingly prevalent on the internet is the spread of disinformation via generative artificial intelligence (GenAI) tools. Fabricated content ranging from political mudslinging to fake videos of well-known personalities has become so convincingly realistic that it is nearly impossible to detect using traditional tools or human reasoning.

Such developments are undermining public trust, especially during a country's election campaigns where influencing public opinion takes center stage. "Auto-generated misinformation is likely to be a major part of the 2024 elections. Scammers are using [Generative] AI left, right and center," a New York University professor recently told a news agency.

Furthermore, the future trajectory of AI is under scrutiny as two distinct investor camps have emerged regarding the technology's progression. In a notable development, tech magnate, Elon Musk, unveiled the Grok chatbot, an open-source competitor to ChatGPT, directly challenging OpenAI, a company he co-founded with its current CEO, Sam Altman.

Companies such as Meta support an open-source system in which researchers and other companies can access the technology's inner workings to develop new products or innovations. Recently, Meta, IBM and dozens of startups and researchers launched an alliance defending more open and collaborative AI-based project trials. On the other hand, OpenAI and Google support a higher level of secrecy to protect the technology from bad actors and monetize their deep investment in developing industry-leading tools. Regardless of the eventual outcome, the increasing prevalence of AI-generated content on public-facing platforms raises concerns due to its

potential to blur the lines between truth and falsehood.

The dark web, often referred to as the alternate internet, has become a haven for a wide array of illicit activities. From extortion and arms trafficking to the sale of illegal substances and global money laundering schemes, virtually anything is possible within its depths. Shockingly, ransomware developers, operating under the disguise of Ransomware-as-a-Service (RaaS) operators like LockBit, not only create and maintain ransomware tools and infrastructure but also offer them as a service in RaaS kits to other hackers, known as RaaS affiliates. These affiliates then deploy the ransomware to compromise organizational data, demanding hefty ransom payments in exchange for its release.

Moreover, Google researchers have pointed out that several surveillance software companies, who offer their products for national security usage, were enabling the use of dangerous hacking tools to target organizations, politicians and journalists. The spyware software infected the user's device via the browsers Google Chrome, Mozilla Firefox or iOS apps, according to Google.

Dealing with the Deluge

Undoubtedly, the internet serves as the lifeline for the modern economy, supporting its reliance on e-commerce, remote communication, and seamless connectivity. Conversely, the International Telecommunications Union (ITU) estimates that around 2.6 billion people worldwide remain offline and unable to access the benefits of digital technology. In an equitable world, the remaining population needs to be connected to the internet as part of the digital world.

Estimates suggest that closing the digital divide will require four times the USD 100 billion target set by the UN for raising funds by 2026. Despite the challenges posed by internet connectivity to our society, it's a reality that cannot be disregarded or wished away. Deliberate internet outages around the world cost the global economy billions of dollars every year. A

day without the internet would cost the world upwards of USD 43 billion, as per global estimates.

Safeguarding Telecom Networks

Currently, mobile networks have been the easiest attack surface for digital perpetrators. Hackers constantly implement tactics to access networks through backdoors, intercepting calls, stealing data and causing network outages for vested gains. Protective measures from industry authorities such as 3GPP, GSMA and ENISA for enhanced security controls have been put in place. Nevertheless, there is a notable absence of collaborative efforts and universally applied practices when it comes to utilizing these tools, even as the sophistication of attackers' tactics continues to evolve alongside advancements in technology.

Implementing a network-based defense mechanism like Internet Protocol Security (IPsec) can play a crucial role in preserving data privacy and integrity, thus enhancing the security of communications. Additionally, adopting robust data sovereignty best practices will further contribute to mitigating the misuse of the internet.

Furthermore, as the digital economy grows, the number of internet users will only increase. Dubbed the 'new oil,' the data flow on the internet has not only become a valuable commodity for organizations to derive insights that are critical for their decision-making processes but also a key target area for cyber criminals. In the Middle East and MENA alone, the e-commerce market is forecast to reach USD 57 billion by 2026 and the trend is expected to follow suit globally.

To guarantee safe activity on the internet, in the face of stiff market competition, the implementation of awareness and effective educational campaigns becomes imperative. It calls for all ICT stakeholders and industry specialists to exchange cooperative prospects, and exchange know-how on the latest strategies and technologies in information security. Thus, resulting in the development of long-term security processes for a better and safer internet. **IB**



Connecting Customers, Driving Growth: Leveraging Loyalty and Rewards

Loyalty programs, driven by new technology, have evolved to empower connection, collaboration, and customer-led control.

There is a plethora of loyalty programs offered by banks, telcos, airlines, hotel chains, and countless retail chains nowadays. What makes them a hit for end users? Are these programs key to business growth and increased customer retention?

Why Customer Loyalty Matters?

Customer loyalty is a valuable asset and a significant driver of sales. It represents a lasting, mutually beneficial connection between a brand and its customers, which is essential for maintaining competitiveness and fostering growth, particularly in times of

economic uncertainty and inflationary pressure.

Loyalty initiatives present companies with a distinct opportunity to cultivate direct relationships with consumers, transitioning from transaction-focused to emotionally-developed ones.

In the realm of customer relations, loyalty is the outcome of consistently delivering outstanding, tailored experiences that meet customers' desires and expectations. Research indicates that companies boosting customer loyalty may potentially elevate the customer lifetime value (CLV) by up to 85%. Moreover, a majority of consumers have acknowledged that

they make more frequent purchases from brands offering loyalty programs.

Technology Is Key

By employing suitable technologies, engaging in loyalty programs becomes easier, leading to higher participation rates and more frequent rewards redemption through diverse channels, including mobile and in-store. This comprehensive approach ensures smooth interaction with the brand, enabling the monitoring of customer behavior for tailored marketing campaigns.

Today, people expect experiences that seamlessly integrate into their daily lives. Thus, ensuring smooth purchases across platforms and maintaining consistent customer preferences regardless of channel or location is crucial. Customers demand data continuity, personalized convenience, and reliability.

As consumer tech-savviness grows, personalized loyalty programs are paramount, and incorporating cutting-edge technologies like artificial intelligence (AI) and machine learning (ML) enables advanced data analysis, expansion into virtual realms, and the creation of engaging gamification programs. This enhances member experiences, driving increased engagement levels.

Implementing Artificial Intelligence in Customer Loyalty Programs

AI is revolutionizing how customer loyalty programs are offering enhanced customer experience and stronger customer-brand relationships. As AI adoption grows across industries, its impact on shaping loyalty strategies becomes increasingly apparent.

AI-powered chatbots and real-time feedback analysis have elevated customer satisfaction levels, fostering deeper retention rates. It also plays an important role in fraud detection, optimized rewards systems, and dynamic pricing, supporting a better, more streamlined program management.

Companies investing in AI-driven personalization witness improved

consumer satisfaction, paving the way for long-term growth. Tailored interactions build consumer trust and loyalty, resulting in enhanced retention rates and optimized revenue streams.

For instance, Comviva's GenAI-powered MobilYtix™ Rewards platform is setting new standards for loyalty programs in the telecom sector. MobilYtix™, a leading global marketing platform, integrates customer engagement, data science, and intelligent automation to execute real-time, scalable campaigns, enhancing customer loyalty and driving business success.

Utilizing Data Analytics

A data-driven loyalty program relies on leveraging customer insights to enhance the reward experience. This involves utilizing customer data platforms, marketing automation, and loyalty technology providers. By analyzing customer behavior, such as redemption patterns and purchase history, businesses can tailor rewards effectively. Careful selection of datasets is crucial to ensure accurate analysis. This includes avoiding the inclusion of incomplete or redundant data.

Through customer data analysis, businesses can achieve various objectives, including profiling, personalization, predictive analysis, campaign optimization, fraud prevention, feedback analysis, and performance measurement. This data-driven approach transforms loyalty programs into customer-centric powerhouses, fostering lasting relationships and driving sustained growth.

For instance, Comarch offers an AI-powered loyalty platform designed to seamlessly integrate into existing IT ecosystems. This flexible system enables the management of immersive loyalty programs, captivating marketing campaigns, personalized customer experiences, and comprehensive data collection and analysis.

A Strategic Move for Telcos

A recent study indicates that approximately half of marketplaces and independent software vendors (ISVs) within the media and telecom sectors prioritize operational enhancements,

such as faster transaction processing and improved profitability, as top priorities for innovation.

Loyalty programs play a crucial role in retaining customers for telecom brands, offering incentives like airtime credits and exclusive perks through tiered loyalty structures. The key challenge lies in meeting customer expectations while fostering engagement and retention through adaptable, customer-centric approaches.

According to the Database Marketing Institute, telecom businesses face average churn rates ranging from 10% to 67% annually. Robust loyalty programs can effectively reduce churn and boost customer lifetime value by incentivizing long-term engagement.

Telecom loyalty programs are designed to enhance customer touchpoints, offer personalized experiences, and integrate gamification to drive engagement. Ooredoo Kuwait's Nojoom Program exemplifies this, earning recognition as the 'Best Loyalty & Rewards Program in the Middle East' during the Telecom Review Excellence Awards 2023. Recognized as Kuwait's largest loyalty initiative, the Nojoom Program offers diverse rewards across various partner outlets to enhance everyday experiences for Ooredoo's valued customers. Operating seamlessly throughout the GCC and the Middle East, it adds substantial value, addressing distinct customer needs, resulting in unwavering loyalty.

Similarly, e& UAE's Smiles application and T-Mobile's Magenta Status loyalty program offer wide-ranging rewards and exclusive benefits to customers, reinforcing engagement and satisfaction.

For those living in the UAE, e& UAE's Smiles application offers points and rewards for redemption across a wide range of establishments and merchants. These Smiles points can be earned by paying your e& UAE account bills or making purchases within the app or at eligible stores. The points can then be used both in-app and in-store in exchange for discounts and other rewards applicable at outlets, as well

as for entertainment, shopping, dining, travel, and wellness experiences.

In the US, T-Mobile launched its new loyalty program (Magenta Status) that provides exclusive benefits and privileges across a range of services like hotels, rental cars, movie tickets and concerts. The new app, T Life, allows customers to oversee all their Magenta Status perks and offers T-Mobile Tuesdays (existing program), and other benefits included within their wireless plan.

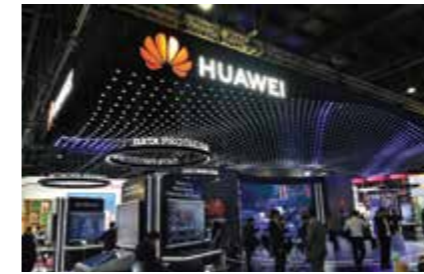
Additionally, a forthcoming cross-border rewards program by leading telcos in the Asia Pacific promises seamless access to further enhance customer experiences and loyalty. Benefiting those who will travel to Singapore, Thailand, the Philippines, Hong Kong, Australia, Taiwan or Indonesia, Singtel, AIS, Globe, HKT, Optus, Taiwan Mobile and Telkomsel are set to launch a first-of-its-kind cross-border rewards program in the second half of 2024. The program will enable customers to conveniently access and redeem unique benefits seamlessly from their individual telco apps while travelling. While abroad, customers will also have complimentary access to customer support from their telecommunications provider via calls or online channels.

Closing Note

Loyalty and rewards programs represent powerful tools for businesses seeking to innovate and drive growth in today's competitive landscape. By leveraging customer data, embracing technological advancements such as AI, and prioritizing personalized experiences, companies can strengthen customer relationships, reduce churn, and unlock new revenue streams.

As demonstrated by successful examples in the telecom landscape, loyalty initiatives have the potential to create lasting impacts on telco's customer engagement, retention, and overall business success. In the years ahead, loyalty and rewards programs will continue to play a vital role in driving sustainable growth and nurturing long-lasting brand loyalty, especially within the telecommunications sector, through ongoing innovation and adaptation to evolving consumer expectations. **IT**

Huawei's Smart Cloud Native Security Solutions for Enterprise



Huawei Cloud showcased its industry-leading intelligent and simplified cloud native security solutions, which protect entities across the Middle East and Central Asia against sophisticated cyberattacks, during GISEC Global 2024 in Dubai.

Under the theme "Towards a Trusted, Resilient and Fully Connected Intelligent World," Huawei participated as GISEC Global's Lead Strategic Partner for 2024. Huawei Cloud's Chief Security Expert of Enterprise Digitalization and Cloud Transformation, Eagle Wan, delivered a keynote speech on the first day of the event entitled "Full Compliance

Security, No Breakdowns, No Data Loss. No Problem." In his speech, Eagle emphasized that the Huawei Cloud cloud-native security system is rooted in a cloud platform that integrates assets, security, and security operations together, making it the optimal solution for the digital intelligent world.

Combating Incidents, Enhancing Security

Huawei Cloud has built a full-stack, cloud-native, defense-in-depth security system that leverages global synergy to protect the Huawei Cloud platform, services, and customer workloads from emerging security challenges. With its three security operation centers (SOCs) around the world, Huawei Cloud can defend against massive attacks with ease, with over 70% of security incidents cleared in one minute and over 99% of incidents cleared in five minutes.

Huawei Cloud launched the SecMaster at GISEC Global 2024, which leverages a full-stack cloud

native security system based on a single security operations center (SOC) and seven layers of defense. The SecMaster works with other services to protect workloads at identity, network, application, server, data, and O&M layers.

Technologies like AI, networks, and cloud are pushing the boundaries of business design, boosting productivity, and redefining business models. Industries are plotting new roadmaps and forging ahead with greater speed. As digital transformation picks up speed, cybersecurity and privacy protection will become key to business success in the future digital world.

At GISEC, Huawei demonstrated the class-leading capabilities of its HiSec SASE solution for multi-branch enterprises, providing all-round protection at the cloud, network, edge, and endpoint levels; along with the HiSec Endpoint EDR for efficient threat detection, one-click recovery, and lightweight deployment.

Netcracker Recognized as Disruptive Leader in Automation and Monetization



Netcracker Technology has received the highest ranking for its innovative products and solutions and successful record of service delivery and digital transformation projects with operators around the world.

Telco Republic's Disrupter Quintant for Next-Generation Telecom Operations and Business Support Systems assessed vendors on a wide range of criteria, including strategy, execution and how well they can help communications service providers (CSPs) implement cutting-edge

use cases and the next level of IT architecture.

Innovative Technology and Unbroken Service Delivery

Ari Banerjee, SVP of Strategy at Netcracker commented, "As we continue to successfully deploy large-scale IT transformation projects and help operators deliver the best value and experience to their customers, this recognition is a strong validation of our innovative technology and unbroken service delivery record."

Telco Republic has positioned Netcracker as the leader, for the second time, in this assessment due to its multi-vertical, multi-domain strategy across 5G, fiber and satellite networks; support for all cloud deployments (telco cloud, public cloud and edge cloud) with scalability and end-to-end

security; a mature, cloud-native BSS/OSS platform that gives operators the ability to support new digital business models and partner ecosystems; and the implementation of sustainability initiatives.

Martina Kurth, CEO and Founder of Telco Republic said, "As CSPs transition to next-generation architectures to maximize their network investments and launch and monetize advanced services with improved customer experience, Netcracker has demonstrated its ability to support large-scale transformation projects for telecom providers of any size."

With Netcracker continuing to excel in all critical areas and working on a long-term strategy, it is anticipated to meet the needs of CSPs today and is well-positioned for future success.

e& UAE and Nokia Address Connectivity Solutions for Hyperscalers



Nokia has announced that e& UAE, the telecom arm of e&, will leverage Nokia's cloud interconnect solution to provide connectivity services for hyperscalers in the UAE. By using Nokia's FP5-based technology, e& UAE can now offer significantly-higher, quality connectivity to hyperscalers in terms of performance, scale, and security to support mission-critical applications delivered across evolved business-class services.

Strengthening Network Performance Driven by the rapid growth of cloud services, e& UAE is evolving its network to streamline its current architecture. By seamlessly connecting to leading cloud service providers, e& UAE customers will benefit from decreased latency in response times,

uninterrupted connectivity, and easy access to cutting-edge applications.

Nokia's cloud interconnect solution focuses on optimizing and strengthening network performance within hyperscaler environments. It addresses key connectivity challenges, ensuring efficient routing, traffic management, network security, and resource allocation to meet the specific demands of hyperscalers.

Nokia's FP5-based platforms are the industry's first terabit-class routers that deliver high performance, capacity, and security for cloud-scale networks. Additionally, Nokia's ANYsec technology provides end-to-end encryption and authentication for all data traffic across the network, ensuring data privacy and integrity. Also Read: Nokia's People & Planet 2023 Report Emphasizes Digital's Role in Sustainability

Unleashing Cloud Potential
Khaled Al Suwaidi, Senior Vice President, Core Networks & Platforms

at e& UAE, said, "We are delighted to work with Nokia to deliver cutting-edge cloud-based network connectivity services in the UAE. This collaboration allows frictionless access to innovative applications that enhance the user experience. It also supports e& UAE's objective of optimizing our current network architecture to seamlessly integrate with public clouds while ensuring the highest levels of security and reliability for our customers."

Samer Makke, Head of Customer Team for e& UAE and Network Infrastructure for the Middle East and the United Arab Emirates at Nokia, said, "We are proud to support e& UAE in its journey to become a cloud-native operator and provide innovative network services to the hyperscaler community. Our FP5 platforms and the ANYsec capability are designed to meet the demands of cloud-scale networks with high performance, capacity, and security. We are confident that our collaboration with e& UAE will help unleash the full potential of the cloud and drive economic growth in the country."

Ericsson Q1 2024: Gross Margin Improvements and Cost Efficiencies



During Q1 2024, Ericsson continued to execute its strategy to strengthen its leadership in mobile networks, drive a focused expansion in enterprise, and pursue cultural transformation.

"We maintained our leading market position, but, as expected, our customers continued to exercise caution with their investments. Against this tough market backdrop, we delivered solid expansion in gross margins. This underscores the

competitiveness of our solutions, our commercial discipline, and our actions on costs," explained Börje Ekholm, President and CEO of Ericsson. Ericsson's reported sales decreased organically to SEK 53.3 billion, a 15% YoY decline, due to the Networks' segment performance. Despite these figures, Ericsson's net income surged by 66% YoY to SEK 2.6 billion. Moreover, net cash increased by 38% QoQ to SEK 10.8 billion, compared to Q4 2023's SEK 7.8 billion.

Impressively, the reported gross margin was 42.5%, increasing from the previous quarter's 39.8%, due to competitive product portfolio, cost actions, improved commercial discipline, as well as increased IPR licensing revenues.

"We will continue to proactively optimize the business, including through strategic cost-saving measures, to ensure Ericsson is best positioned to increase shareholder value," the PCEO continued.

The company also reportedly delivered SEK 3.7 billion of free cash flow in Q1 2024, benefiting from operational improvements, and lower working capital as the 5G roll-out phase in India concluded.

To improve cost efficiency and streamline operations, further measures were announced in the first quarter of the year, including headcount reductions. "This is a necessary action to position the company for longer-term success," Ekholm commented.

Resilience Amidst Market Volatility: Nokia's Q1 2024 Performance



Due to the ongoing market weakness, Nokia reported a 19% year-on-year constant currency decline in net sales in the first quarter of 2024. Within a challenging environment, order trends continue to improve year-on-year, particularly in the Network Infrastructure business unit.

The continued improvement in order intake has kept Nokia "confident in a stronger second half and achieving [their] full year outlook," President and CEO, Pekka Lundmark, commented.

Driven by the patent licensing deals signed by Nokia Technologies, the Swedish

vendor achieved a comparable operating margin of 12.8% in Q1, compared to 8.2% the year before. The company also generated almost EUR 1 billion in free cash flow in the quarter, depicting a "very strong performance."

Nokia disclosed that its Mobile Networks business unit was impacted by particularly low levels of spending in North America and India, which led to a Q1 net sales decline of 37% in constant currency.

"Globally, we expect Q1 to mark the low point in demand with activity, then progressively pick up through the remainder of 2024, consistent with more normal seasonality," added Lundmark.

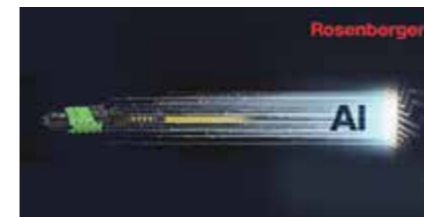
Nevertheless, Nokia experienced a notable increase in its gross margin, reaching 42% during the quarter. This marks a robust improvement from the 34% recorded in Q1 2023. Approximately

half of this improvement is due to the improving regional and product mix, while the remainder was due to low indirect cost of sales.

In the Cloud and Network Services segment, Lundmark highlighted making good progress with the company's Network as Code platform, which enables operators to monetize their 5G investments, creating new revenue streams by offering developers advanced API access to the network. "We now have a total of 11 operators signed up to the platform, with many more in active discussions."

On a positive note, Nokia Technologies had a "very strong start" to the year as the company concluded a number of outstanding licensing deals in the quarter. The annual licensing net sales run-rate improved from EUR 0.9-1.0 billion in Q4 2023 to approximately EUR 1.3 billion in Q1 2024.

AI in the Data Center: Are MTP® Connectors Revolutionizing the Technological Landscape?



In the ever-evolving landscape of technology, few advancements have promised as much transformative potential as artificial intelligence (AI). With its ability to analyze vast amounts of data, recognize patterns, and make informed decisions autonomously, AI is poised to revolutionize industries across the board. As we look ahead to the next few years, the growing importance of AI is undeniable, particularly in the realm of data centers.

The Growing Importance of AI
AI is not just a buzzword; it's a paradigm shift in how we approach problem-solving and decision-making. Over the

next few years, artificial intelligence is set to become increasingly integrated into various facets of our lives, from healthcare and finance to transportation and entertainment. Its ability to streamline processes, optimize operations, and drive innovation makes it a cornerstone of the digital age.

Artificial Intelligence's Impact on Data Centers

Data centers serve as the backbone of digital infrastructure, housing massive amounts of data generated and processed by AI systems. As AI applications become more sophisticated and widespread, the demand for data processing and storage capacity will skyrocket. According to Statista, the volume of data created and replicated in 2027 is expected to amount to around 284 zettabytes. This surge in data traffic poses significant challenges for data centers, including scalability, efficiency, and reliability.

To meet these challenges, data centers must embrace AI-driven technologies themselves. Notably, AI can optimize resource allocation, improve energy efficiency, and enhance predictive maintenance in data center operations. Moreover, AI-powered analytics can provide valuable insights into performance metrics, enabling data center operators to make data-driven decisions and preemptively address potential issues.

Importance of MTP® Connector Interface

At the heart of every data center lies its physical infrastructure, including the network cabling system. The MTP® (Multi-Fiber Push-On) connector interface plays a crucial role in facilitating high-speed data transmission within data centers. With its ability to accommodate multiple fibers in a single connector, MTP® connectors enable faster data transfer rates and greater bandwidth capacity, which is essential for supporting AI workloads.



Neutral Hosting: An Innovative Approach to Network Expansion

The digital transformation of the enterprise sector is crucial to every country's economic growth. Digital transformation helps enterprises achieve improvements in quality and efficiency and encourages dynamism in their operations.

In today's digital-first world, technologies such as 5G, automation, artificial intelligence (AI), machine learning (ML), and cloud technologies are transforming business models. In such a dynamic environment, communications service providers (CSPs) stand at an interesting juncture, enabling new

revenue streams for the enterprise sector.

To keep pace with a hyper-agile business environment, CSPs are investing heavily in automating their network infrastructure, processes and applications for improved efficiencies. However, for CSPs, despite the unmissable upsurge in wireless broadband and media consumption,

monetization from digital engagements remains a challenge. The coming years will usher in an era of intelligence, where services will become more diverse, and the scale and complexity of network operations and maintenance will increase exponentially.

Rise of Neutral Hosting

Traditionally, towercos have been providing CSPs with passive elements

of network infrastructure such as cell towers, shelters, air conditioning plants, security, electrical supply and backups, technical premises, and pylons. Yet, amid increasing competition for network monetization, numerous tower companies are broadening their scope by providing active assets. This includes owning and managing active radio access network (RAN) equipment, as well as cell towers equipped with open-access antennas. Additionally, they are installing small cells and distributed antenna systems (DAS) to enhance in-building coverage.

At a time when there are many geopolitical issues as well as a tight economic environment, CSPs have to manage their capital well. The Neutral Host Network (NHN) business model suits modern CSPs as it helps them cut down on the heavy capital expenditure (CapEx) on infrastructure and replaces it with manageable OpEx payments. Neutral hosts enable CSPs to concentrate on their unique offerings instead of being burdened by infrastructure development details. Meanwhile, neutral hosts generate revenue by hosting multiple operators on a shared infrastructure.

Likewise, fiber-based neutral hosts supply mid-haul and back-haul capacity for 5G networks. CSPs can leverage FTTH connections to residential areas and businesses to enhance their cell site capacity. Simultaneously, data center firms can rent server space and transition to active domains, providing storage, computing, and connectivity services for edge computing, IoT, and similar applications.

NHN Considerations

The NHN business model is a fairly new dimension in traditional tower asset management. While opting for a NHN provider, it is worth considering a few primary areas to benefit from their offerings.

Overall TCO: CSPs need to calculate the overall total cost of ownership when negotiating with the NHN as they are long-term contracts. The responsibility of operations and maintenance should be ideally taken by the host. NHN

providers need to be global players with a good capacity for investment in future technologies.

Ease of Process: Network-sharing solutions for operators must be simple and practical for space and energy cost efficiency. The leased infrastructure should provide CSPs with faster ROI from the new investment.

International Expertise: NHN companies must offer both international and localized support, while also demonstrating expertise in complying with ICT regulations.

Transitioning to a Connected Future

As 5G transitions to 5G-Advanced and beyond, CSPs will need to expand their networks to provide new areas with the connectivity needed for digital services requiring ubiquitous access and high bandwidth capacity. At the same time, CSPs need to take into consideration their operating cost and capital expenditures. Furthermore, as more and more companies globally and regionally adopt digital transformation and the need to connect the unconnected grows, CSPs must continuously innovate to stay relevant in the competitive market.

NHN offers a business model whereby the cost is shared among multiple operators, thus giving individual operators a chance to optimize their OpEx. NHN also proves advantageous as a long-term investment as the technological upgrade and compatibility with future technologies are built into the negotiations. CSPs know that in the digital era, the integration of edge services and built-in connectivity becomes crucial for network monetization opportunities emanating from the emergence of technologies such as AI, IoT and cloud. However, given the economic headwinds, summing up a vast amount of capital to build a robust network infrastructure is not easy.

According to ABI Research, NHN and managed service providers are projected to see a USD 1.3 billion opportunity in the enterprise cellular connectivity market by 2030. This growth will be fueled not only

by verticals like commercial real estate, media and entertainment, healthcare, and public venues, but also by industries such as industrial manufacturing, logistics, warehousing, and energy generation, which are expected to contribute over 65% towards revenue opportunities.

Industry experts point out that NHN may not be for some CSP's 5G strategy; however, for many, it is a business model that guarantees them the financial and operational flexibility to embrace the new opportunities that 5G promises to offer. As NHN companies enhance their offerings to accommodate future use cases driven by rapid technological advancements, collaboration between CSPs and NHN providers could mark the inception of lucrative 5G ventures. **TR**



The NHN business model suits modern CSPs as it helps them cut down on the heavy CapEx on infrastructure and replaces it with manageable OpEx payments



Bandwidth IG Delivers Dark Fiber Connectivity to SFMIX

A new partnership between Bandwidth IG and the San Francisco Metropolitan Internet Exchange (SFMIX) will deliver high-capacity dark fiber to internet service providers and content delivery networks across the San Francisco Bay Area, allowing them to connect to their customers with unmatched speed and performance.

SFMIX, an internet exchange point based in Silicon Valley, is one of the first customers to utilize Bandwidth IG's newly expanded San Francisco Bay Area dark fiber network, announced earlier this year. The new project brings 310 route miles and more than 2 million fiber miles of high-capacity dark fiber to the Bay Area, including a new and unique subsea route across the San Francisco Bay.

SFMIX has deployments in eight data centers throughout the Bay Area and boasts over 90 participants. Bandwidth IG's newly expanded network creates a ring around the market, including the first fiber cable under the Bay to be installed for communications services in decades, providing near ubiquitous connectivity throughout one of the busiest data center markets in the world. The ability to connect to its facilities across the Silicon Valley market allows SFMIX to interconnect its deployments at intervals of 400Gbps, using diverse routes with future expansion capabilities.

Ericsson and Orange Egypt Embark on Transformative Journey

Ericsson has been selected by Orange Egypt as a strategic partner to accelerate its digital transformation and build a resilient architecture across its network. The collaboration seeks to enable superior service experiences for consumers and streamline partner ecosystem.

The two companies have signed a multi-year bundle deal that involves the deployment of the market-leading Ericsson Catalog Manager and Order Care products, part of Ericsson's Business and Operations Support Systems (Core Commerce) portfolio which is aligned to Open Digital Architecture (ODA) TM Forum's Open Digital Architecture standards. These will serve as cornerstone technologies for strategic cloud-native digital architecture.

The new capabilities could bring greater flexibility to Orange Egypt's customers through the digitization and personalization of the subscription process. Alongside this enhancement to the subscriber's service experience, the new technologies will give Orange Egypt additional data and insight into customer preferences that will help make competitive pricing decisions.

As part of the collaboration, Ericsson will also modernize and upgrade the

current Ericsson Charging solution at Orange Egypt to unlock the full potential of new charging capabilities in accordance with its monetization goals. By tightly integrating the full solution with Ericsson Charging, and building on catalog driven orchestration, Orange Egypt has taken crucial steps to streamline the business configuration process within this transformation. The company will also expand the current Ericsson Mediation solution to cater to expansion requirements, enabling Orange Egypt to deliver on its customer and operational experience objectives. Further future-proofing this transformation, Catalog Manager & Order Care will be implemented as cloud-native solutions using Ericsson Cloud Container Distribution.

Dr. Ayman Amiri, Chief Technology Officer at Orange Egypt, says: "Orange Egypt is committed to playing a key role in the country's digital transformation line aligned with the Sustainable Development Strategy (SDS) to support the Egypt Vision 2030. The extension of our long-standing partnership with Ericsson will fast-track our efforts to build advanced digital infrastructure across our network. The move represents a new milestone in our shared efforts to shape a connected world."

Kenya Sets a New Target for Fiber Rollout

Kenya is confident that achieving the ambitious goal of deploying 100,000 kilometers of optical fiber to underserved areas within five years is now feasible within the next two years.

This shift comes as the government moves away from the traditional method of laying cables underground and instead opts to utilize the existing infrastructure of the Kenya Power and Lighting Company (KPLC) parastatal, with fiber cables running alongside power lines.

Eliud Owalo, the Cabinet Secretary for Information, Communications, and the Digital Economy, highlighted this

strategy shift. He emphasized that leveraging the KPLC's infrastructure will expedite the fiber rollout process, potentially achieving the target ahead of schedule. Additionally, Owalo revealed that 10,000 kilometers of fiber has already been laid since the resumption of the rollout last year, with Nia Fibre contracted by the government for this purpose.

Furthermore, the government has initiated plans to deploy 25,000 WiFi hotspots nationwide, focusing initially on markets and bus terminals to transform them into digital marketplaces and enhance connectivity for traders and entrepreneurs.

Q1 Performance Positions Verizon for Growth and Profitability in 2024

Verizon Communications reported first-quarter 2024 results with strong wireless service revenue, solid cash flow, adjusted EBITDA expansion and fixed wireless subscriber base growth.

"Our strong results show that our team is delivering. Our performance in the first quarter sets us up for a successful 2024," said Verizon Chairman and CEO Hans Vestberg. "We are on track to meet our financial guidance and to deliver positive Consumer postpaid phone net adds for the year. Our fixed wireless subscriber base is continuing to grow rapidly, and our network remains the best in the industry, by far."

Positive Consolidated Results

According to the company's statement, Verizon delivers on three key metrics during Q1 2024: wireless service revenue, adjusted EBITDA and cash flow.

The consolidated net income for first-quarter 2024 slightly decreased to USD

4.7 billion, compared to the USD 5 billion in first-quarter 2023 while the total consolidated operating revenue in Q1 2024 of USD 33 billion, up 0.2% from Q1 2023. The increase can be attributed to pricing actions implemented in recent quarters, combined with improved operating results offset by a decrease in wireless equipment revenue due to lower upgrade volumes.

Moreover, Verizon's total wireless service revenue in Q1 2024 was USD 19.5 billion, up 3.3% YoY, driven primarily by pricing actions implemented in recent quarters, higher premium price plan adoption, and growth of our fixed wireless subscriber base.

The cash flow from operations also totaled USD 7.1 billion in during the first quarter of the year, down from USD 8.3 billion of the previous year. Accordingly, the first-quarter 2024 capital expenditures were at USD 4.4 billion, compared to USD 6 billion in Q1 2023.

International Girls in ICT Day: The Digital Future Needs Visionary Women Leaders

As we embrace the annual International Girls in ICT Day celebration, ITU Secretary-General, Doreen Bogdan-Martin, emphasized that "Our future is digital and we need women to lead it."

This year's theme is "Leadership," and the ITU Secretary-General shared several figures that serve as a "call to action" and highlight the importance of equal representation and women in tech in building a sustainable digital future. Notably, less than a quarter of all ICT ministers are women, while only 32 out of 165 ICT regulators are led by a woman. In the private sector, women technologists occupy less than a third of positions, while facing a 21% pay gap.

In response, "we must prepare young women and girls to become tomorrow's visionary women leaders," Bogdan-Martin stated.

Girls in ICT Movement

Over a decade ago, the ITU launched its Girls in ICT initiative to inspire young women to explore careers in the fields of science, technology, engineering, and mathematics (STEM). "It is now a global movement and a vital platform for addressing the barriers still facing women in the tech world, especially in emerging fields ranging from artificial intelligence to quantum computing," continued Bogdan-Martin.

Telecom Review Group Supports Women in ICT

This year, as a testament to Telecom Review Group's commitment to empowering women in ICT, an exclusive feature has been dedicated to distinguished women executives from NEC, Ericsson, du, Nokia, PMP Strategy, and Huawei, giving them the opportunity to share their views and insights on how to bridge the gap, break the stereotype, advocate inclusive opportunities, and ensure inclusivity.

Glo Fiber Accelerates Ohio Expansion

Glo Fiber, powered by Shentel, will deploy next-generation, fiber-optic broadband services to over 40,000 additional homes and businesses in Ohio. Engineering work is already underway to connect the communities of Zanesville, Hillsboro, Jackson, Johnstown, and Greenfield.

Ohio stands as a pivotal arena for the growth of Glo Fiber's residential and commercial services, with plans for fiber network expansion slated to unfold throughout 2024 and beyond. Further information regarding construction timelines for individual communities will be disclosed in forthcoming months.

100% Fiber-Optic Network to More Communities

Glo Fiber currently provides service in Chillicothe, Circleville, Lancaster, and Washington Courthouse, Ohio, in addition to markets in Virginia, Pennsylvania, West Virginia, and Maryland.

"Glo Fiber has expanded rapidly over the past five years, and we now pass approximately 250,000 homes and businesses with our leading-edge fiber optic networks. We focus on providing outstanding customer service and exceptional network reliability, and we are very excited to expand our 100% fiber-optic network to additional communities in Ohio," said Shentel's Chief Operating Officer, Ed McKay.

Glo Fiber delivers lightning-fast, symmetrical speeds of up to 5 Gbps, supported by a direct FTTH connection and Shentel's extensive 15,400-mile fiber network. This ensures high speeds, minimal latency, and unmatched reliability. Beyond ultra-fast internet, Glo Fiber offers streaming video, phone services, and comprehensive wall-to-wall WiFi for seamless connectivity at home or in businesses.

ZTE, China Mobile, Qualcomm Achieve Groundbreaking Peak Data Rates

ZTE Corporation, together with China Mobile's Zhejiang Branch and Qualcomm Technologies, Inc., has achieved a groundbreaking peak data rate exceeding 5.4 Gbps through the industry's first end-to-end field test of 3CC CA and 1024-QAM.

During the inaugural testing, the network showcased a maximum single user downlink speed of over 5.4 Gbps, highlighting the potential for improved network performance and user experience.

The validation process incorporated cutting-edge 5G-A features, which facilitated the efficient utilization of the spectrum potential within 5G commercial networks. This resulted in a significant enhancement of network capabilities, leading to improved user experiences. In essence, by leveraging these advanced features, the deployment of 5G networks became more effective, unlocking their full potential and delivering enhanced performance to users.

Accelerating 5G-A

The testing also emphasized the effectiveness of 5G-A technology in promoting rapid collaboration across different segments of the industrial chain, such as system products, commercial chips, and terminals, which could accelerate the commercialization of 5G-A.

China Mobile's Zhejiang Branch—one of the 5G-Advanced Dual-Chain Integration Innovation Demonstration Bases—is using its commercial 5G network to gradually integrate the 5G-A air interface upgrade technologies.

T-Mobile Completes USD 290 Million 5G Network Upgrade in Louisiana

Louisiana Governor Jeff Landry and T-Mobile announced the completion of a multi-year 5G network investment totaling more than USD 290 million across the state, including a USD 50 million network upgrade in the Greater New Orleans area.

The announcement comes on the heels of the company's expansion last month of Ultra Capacity 5G to new communities across Louisiana and the entire country.

Over the past three years, T-Mobile has improved Ultra Capacity 5G (5G UC) connectivity for more than 1.7 million Louisianans, including residents in small towns and rural areas in the state. This expansion provides access to 5G UC coverage to new geographical areas, significantly increases speeds and creates new opportunities for local businesses, schools, healthcare providers, first responders and anyone on T-Mobile's network.

"T-Mobile's investment in our state's infrastructure will pay dividends for years to come," said Louisiana Governor Jeff Landry. "By bringing high-speed 5G connectivity to more areas of Louisiana, we are making it easier for people to stay connected with their loved ones, access educational opportunities and grow their businesses. I applaud T-Mobile for their commitment to our state and for helping us get even closer to closing the digital divide."

The multi-year network enhancements include newly deployed 5G coverage and capacity enhancements, via the addition of more than 300 new cell sites and nearly 1,870 upgrades to existing ones. Statewide, T-Mobile now provides 5G service along 99% of interstate highways, US. highways, and state routes across Louisiana. Additionally, 92% of the state's residents now have access to Mid Band-Ultra Capacity 5G, up 192% in just three years.

TRAI Pushes for Open Infrastructure and Spectrum Sharing Among Telcos

The Telecom Regulatory Authority of India (TRAI) has formally suggested that all telecom companies should be allowed to share both infrastructure and spectrum, whether it be actively or passively. This move aims to improve the efficient use of resources.

Indian telecom companies have long requested authorization for inter-band spectrum sharing and spectrum leasing to third parties. Present regulations restrict active infrastructure sharing to specific components like antennas, feeder cables, Node Bs, RANs, and transmission systems. Similarly, only spectrum trading and intra-band spectrum sharing are currently permitted for spectrum sharing.

As early as 2021, the Department of Telecommunication (DoT) has suggested enabling telecom service providers across all categories to share

any telecom infrastructure they deem necessary to optimize resource usage.

Consequently, the TRAI initiated a consultation on infrastructure and spectrum sharing in January 2023. Subsequently, the Indian government enacted the updated Telecommunications Act, 2023, which includes a provision allowing the Central Government to authorize the sharing, trading, leasing, and surrendering of assigned spectrum, subject to specified terms, conditions, and fees.

Recommendation Key Aspects

Telecommunication service providers are urged to share their passive infrastructure, such as buildings, towers, and electrical equipment like batteries and power plants, as well as dark fiber, duct space, Right of Way, etc., with all types of telecommunication service providers, under their own licenses.

— 2024 —

Spotlight on Oman's Digital Journey

The successful digital journey of the Sultanate of Oman is the result of the tireless efforts deployed by the country's telecom operators, vendors, government, and all industry stakeholders.

This virtual panel by Telecom Review will allow Oman's key telecom players to showcase their digital excellence and leadership

Place: Virtual



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MAY

FutureNet MENA

FutureNet Middle East & North Africa addresses the strategic and commercial elements of the current digital landscape, with focus on the future trajectory of network development. Its key mission is the advancement of the 'Network Automation and AI' agenda, regarded as a foundational element driving the wave of growth in the telecom sector.

Place: Conrad Hotel, Dubai, UAE



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MAY

CABSAT

The premier gathering for professionals in the content, broadcast, satellite, media, and entertainment industries in the Middle East & Africa, seeks to harness cutting-edge technology and innovation in shaping the next generation of content.

Place: Dubai World Trade Center, UAE



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23
MAY

COMEX

At COMEX 2024, explore innovative business solutions presented by local and international companies, discover trends in the latest technologies revolutionizing the GCC and the world, and connect with global thought leaders, innovators, and policy and decision-makers.

Place: Oman Convention & Exhibition Centre, Muscat, Oman



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Latest updates on:
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DTW24 – Ignite

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

Place: Bella Centre, Copenhagen, Denmark



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JUNE

GITEX GLOBAL

Stay abreast of the latest in technology trends and in-depth industry insights at the largest and impactful tech event in the MENA and South Asian region.

Place: Dubai World Trade Center, UAE



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OCTOBER

Telecom Review Leaders' Summit

The Telecom Review Leaders' Summit is among the largest C-level industry gatherings, bringing together the leaders of the ICT industry and governments from around the world.

Place: Dubai, UAE



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DECEMBER



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