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MOBILY'S AI Better Networks, Better Service

Alaa Malki, CTO, Mobily

**CapEx Trends in Telecoms:
Balancing Efficiency, Innovation,
and Market Demands**

**Greening Smart
Cities and
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Transforming Earth Orbit
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Alaa Malki, CTO, Mobily

Mobily's AI: Better Networks, Better Service

Mobily, a leading telecommunications provider in Saudi Arabia, has embraced a digital transformation strategy to enhance its services and operations, driving continuous business growth. In recent years, Mobily has successfully implemented several digital practices and use cases in network experience and operations transformation. This commitment has earned the company recognition for delivering a consistent user experience in the kingdom.

Keeping pace with technological trends, particularly the rapid development of AI, Mobily has updated its strategy to emphasize AI technology. This strategic shift aims to leverage AI to further its digital transformation efforts.

In this exclusive interview with Telecom Review, Mobily's CTO, Alaa Malki, shared his insights on AI transformation in the telecom industry. He also delved into how Mobily plans to utilize AI technology to enhance customer experience, improve network efficiency, and boost business agility.



As an influential figure in the telecom industry and the CTO of Mobily, how do you see artificial intelligence impacting the telecom industry in the next three-to-five years?

AI, particular GenAI's development certainly has taken everyone by surprise. This technology has already had (and will continue to have) a profound impact across many industry sectors. I believe, in the next three-to-five years, artificial intelligence (AI) is set to fundamentally transform the telecommunications industry across the globe, with a particularly profound impact on the Middle East and Saudi markets. As one of the region's leading telecom providers, Mobily is strategically positioned to harness AI's potential to align with and drive its ambitious growth and innovation goals.

The Middle East is experiencing rapid technological advancements, with AI adoption expected to contribute significantly to economic growth. By 2030, AI is projected to contribute approximately USD 277 billion to the Middle Eastern economy, with

Saudi Arabia alone accounting for nearly USD 135 billion. This growth is fueled by the Kingdom's Vision 2030 initiative, which places a strong emphasis on digital transformation and the adoption of advanced technologies like AI across various sectors, including telecommunications.

AI will revolutionize network management by introducing sophisticated tools for real-time resource optimization. Predictive maintenance, powered by AI algorithms, will foresee and address network issues before they impact service quality, leading to more resilient and reliable telecommunications infrastructure. In a region where high-quality connectivity is essential for both businesses and consumers, this capability will be crucial in maintaining Mobily's competitive edge.

Furthermore, AI-driven anomaly detection will play a critical role in enhancing cybersecurity within the telecommunications sector. As cyber threats become increasingly



As one of the region's leading telecom providers, Mobily is strategically positioned to harness AI's potential to align with and drive its ambitious growth and innovation goals





Enhancements align perfectly with Mobily's strategic focus on ensuring that every technological advancement translates into tangible benefits for its users



sophisticated, AI's ability to identify and neutralize potential risks in real time will be a key differentiator, ensuring that Mobily's networks remain secure and trustworthy for all users.

However, the most significant impact of AI will be on customer experience, which is rapidly becoming the focal point of competition in the telecom industry. In the Middle East, where customer expectations are evolving with the rise of digital services, AI will enable Mobily to offer highly personalized services. For instance, AI can analyze customer data to provide tailored recommendations, anticipate customer needs, and deliver proactive support. This level of personalization will not only enhance customer satisfaction but also foster deeper loyalty, as customers increasingly expect seamless and intuitive service experiences.

Moreover, AI's role in automating customer service through chatbots

and virtual assistants will streamline operations and reduce response times, further enhancing the customer experience. These AI-driven enhancements align perfectly with Mobily's strategic focus on ensuring that every technological advancement translates into tangible benefits for its users.

It sounds like Mobily has explored multiple AI concepts. Can you provide examples of how you have successfully implemented AI technologies in previous roles?

I am proud to say that Mobily is one of the early adopters of AI. We have partnered with industry leaders to introduce AI into our network and marketing. For instance, back in 2020, we explored how AI could predict potential interruptions in the fiber network due to planned or unplanned construction work. By identifying these risks, we could deploy engineers to monitor the areas during construction, ensuring zero disturbances to the fiber network.

As for now, we put a lot of emphasis on data analysis and AI technologies, which can play a crucial role in our digital transformation. To stay on top, we are constantly looking for ways to improve their services and customer experience, reduce costs, and increase efficiency. We are working with our partners in developing the use cases based on the data analysis and AI technologies, which could potentially help us to achieve these goals in several ways, including the following:

- Predictive maintenance helps Mobily identify potential faults or failures in our network infrastructure before they occur. This can reduce downtime, improve network performance, and ultimately improve customer satisfaction.
- The latest successful AI project I led included the implementation of a predictive maintenance system called 'cognitive network' during the Hajj season, which reduced downtime and maintenance time.
- We have a chatbot for customer support which improved response times and customer satisfaction, and an AI-driven analytics platform which optimized network performance. These initiatives resulted in significant operational efficiencies and enhanced customer experiences.
- Network optimization, data comprehension, and AI algorithms that analyze network traffic and usage patterns were used to optimize network capacity, reduce congestion, and improve the overall user experience.
- Marketing and sales analytics help operators to better understand their customers' needs, allowing Mobily to create targeted marketing campaigns and improve their sales efforts.

One of the key concerns with AI is data sensitivity and ethics. How does Mobily ensure the ethical use of AI technologies?

I think AI ethics is a multidisciplinary field that focuses on ensuring the responsible and fair development and use of AI. It involves a set of moral principles and guidelines designed to optimize AI's beneficial impact while minimizing risks and adverse outcomes. Furthermore, data sensitivity is also paramount to ensuring security and safety compliance and long-term customer relationships.

To ensure the ethical use of AI and protect sensitive customer data, I believe it is necessary to implement several key measures across the whole industry:

- **Data Privacy and Security:** Implement robust data encryption and secure storage solutions to protect customer data from unauthorized access and breaches.
- **Transparency:** Clearly communicate how customer data is collected, used, and stored. Ensure customers are aware of their rights and how their data is being utilized.
- **Ethical AI Guidelines:** Develop and adhere to a set of ethical guidelines for AI use, ensuring that AI applications are fair, unbiased, and respect user privacy.
- **Regular Audits:** Conduct regular audits and assessments of AI systems to ensure compliance with ethical standards and data protection regulations.
- **User Consent:** Obtain explicit consent from customers before using their data for AI-driven applications, ensuring they have control over their personal information.
- **Bias Mitigation:** Implement strategies to identify and mitigate biases in AI algorithms, ensuring fair treatment of all customers.
- **Employee Training:** Train employees on data privacy, security practices, and ethical AI use to foster a culture of responsibility and awareness.



By adopting these measures, Mobily can ensure the ethical use of AI technologies while safeguarding sensitive customer data.



One of the key challenges many companies are facing is a lack of AI talents. How do you plan to build and develop an AI talent pipeline within your organization?

Saudi universities have been progressively introducing AI courses over the past decade. For example, the Saudi Data and Artificial Intelligence Authority (SDAIA) was established in 2019 to facilitate AI adoption in the Kingdom. King Abdullah University of Science and Technology (KAUST) launched its AI program in collaboration with SDAIA in 2023. Other universities, like King Fahd University of Petroleum and Minerals (KFUPM), have also developed AI-related programs in recent years. These initiatives align with Saudi Arabia's Vision 2030, emphasizing digital transformation and advanced technology adoption.

We have started to establish partnerships with universities and tech organizations to create internship programs focused on

Mobily can ensure the ethical use of AI technologies while safeguarding sensitive customer data





AI and data science. Additionally, we are developing partnership and mentorship initiatives to help current employees upskill in AI technologies. By cultivating a culture of continuous learning and innovation, we aim to attract and retain top talent in the AI domain.

Given the rapid development of AI technology, how do you stay abreast of the latest trends and advancements in AI technology?

Generally, I stay updated on technological advancements by actively participating in industry conferences, engaging with thought leaders through webinars and partner workshops, and subscribing to key journals. I also encourage our teams to attend workshops and share insights from these experiences. This collective knowledge helps us stay ahead in a rapidly evolving landscape.

Furthermore, at Mobily, we have established AI training programs with our partners and external training providers. These programs offer both online and offline courses, covering AI from basic understanding to advanced knowledge, catering to a broad range of employees. I continuously emphasize the importance of lifelong learning, especially in today's fast-paced world where technology changes rapidly. We must learn, understand,

and advance to stay relevant in our industry.

Like many new technologies, AI projects often come with challenges. Can you share your experience with handling setbacks in AI projects and how you addressed them?

Indeed, with AI projects, there are many challenges, particularly at the beginning, such as, data quality and integration, skill gaps, security concerns, scalability, cultural resistance, and clear objectives. All of these will hinder AI project implementation.

By strategically addressing these challenges, telecom operators can leverage AI to improve operations, enhance customer experience, reduce costs, and increase efficiency, ultimately driving business growth and innovation.

For Mobily, addressing challenges in AI projects involves a multifaceted approach:

Data Privacy and Security: Mobily prioritizes the protection of customer data by implementing robust data encryption and secure storage solutions. These measures ensure that customer information is safeguarded from unauthorized access and breaches. By continuously updating our security

protocols and employing advanced technologies, we maintain the highest standards of data privacy and security.

Transparency: At Mobily, we believe in clear and open communication with our customers. We transparently communicate how customer data is collected, used, and stored. This includes providing detailed information on our data practices and ensuring that customers are fully aware of their rights. By fostering transparency, we build trust and confidence among our users.

Ethical AI Guidelines: Mobily is committed to the ethical use of AI technologies. We have developed and adhere to a set of ethical guidelines that ensure our AI applications are fair, unbiased, and respect user privacy. These guidelines are integral to our AI strategy, guiding the development and deployment of AI solutions that align with our values and ethical standards.

Regular Audits: To ensure compliance with ethical standards and data protection regulations, Mobily conducts regular audits and assessments of our AI systems. These audits help us identify and address any potential issues, ensuring that our AI applications operate within the established ethical and legal frameworks. Regular assessments also enable us to continuously improve our AI systems and maintain high standards of integrity.

User Consent: Mobily places a strong emphasis on user consent. We obtain explicit consent from customers before using their data for AI-driven applications. This approach ensures that customers have control over their personal information and are fully informed about how their data will be used. By prioritizing user consent, we respect our customers' privacy and autonomy.

Bias Mitigation: To ensure fair treatment of all customers, Mobily implements strategies to identify and mitigate biases in AI algorithms.

We continuously monitor and refine our AI systems to prevent any form of discrimination or bias. This commitment to fairness is essential for providing equitable services and maintaining the trust of our diverse customer base.

Employee Training: Mobily invests in comprehensive training programs for our employees on data privacy, security practices, and ethical AI use. By fostering a culture of responsibility and awareness, we ensure that our team is well-equipped to handle the complexities of AI technologies. Continuous education and training help us stay ahead in a rapidly evolving technological landscape and uphold our commitment to ethical AI practices.

By integrating these measures, Mobily ensures the ethical use of AI technologies while safeguarding sensitive customer data. This holistic approach not only enhances our operational efficiency but also strengthens our relationship with customers, driving long-term success and innovation.

You mentioned the importance of cross-department collaboration in implementing AI projects. Could you elaborate on how you would collaborate with other departments, such as marketing or operations, to integrate AI solutions effectively across the company?

Effective collaboration is essential for the successful integration of AI solutions. I believe in fostering strong relationships between our technology teams and other departments such as marketing and operations. By conducting regular cross-departmental meetings and workshops, we can identify specific needs and align our AI initiatives accordingly. This collaborative approach helps ensure that AI solutions are not only technically sound but also strategically beneficial across the organization.

One of the key benefits of this collaborative approach is the ability to tailor AI solutions to meet the specific needs of different departments.

For example, the marketing team may require AI tools to analyze our customer data and predict trends, while the operations team might need AI for optimizing network performance and maintenance schedules. By understanding these unique requirements, our technology teams can develop customized AI solutions that address the distinct challenges faced by each department. This not only enhances the effectiveness of the AI solutions but also ensures that they deliver tangible benefits to the organization.

Moreover, regular cross-departmental meetings and workshops foster a culture of continuous learning and innovation. These interactions provide opportunities for team members to share their insights and experiences, leading to the generation of new ideas and approaches. This collaborative environment encourages creativity and experimentation, which are crucial for the successful implementation of AI technologies. It also helps in building a sense of ownership and commitment among employees, as they feel more involved in the decision-making process and the development of AI initiatives.

Another important aspect of effective collaboration is the alignment of AI initiatives with the overall strategic goals of the organization. By involving different departments in the planning and implementation of AI projects, we can ensure that these initiatives support the broader objectives of the company. This alignment is critical for maximizing the impact of AI technologies and achieving long-term business success. It also helps in securing the necessary resources and support from senior management, as they can see the direct link between AI initiatives and the company's strategic goals.

Furthermore, effective collaboration helps in addressing potential challenges and risks associated with AI projects. By bringing together diverse perspectives and expertise, we can identify potential issues early on and develop strategies to mitigate them. This proactive

approach reduces the likelihood of project delays and failures, ensuring a smoother and more successful implementation of AI solutions.

I believe that fostering strong relationships between technology teams and other departments is crucial for the successful integration of AI solutions at Mobily. Regular cross-departmental meetings and workshops help to identify specific needs, aligning AI initiatives with strategic goals, and fostering a culture of continuous learning and innovation. This collaborative approach ensures that AI solutions are technically sound, strategically beneficial, and effectively address the unique challenges faced by different departments, ultimately driving business growth and success. **TR**



Fostering strong relationships between technology teams and other departments is crucial for the successful integration of AI solutions at Mobily





H.E. Johnny Corm, Lebanon's Caretaker Minister of Telecommunications

Minister Johnny Corm: Privatization Should Occur “Under the Right Circumstances, and at the Right Time”

It goes without saying that the telecommunications industry is the beating heart of a country. In times of crisis, it is the first resort to ensure business continuity, especially for vital sectors. Lebanon, which has circumvented challenging times, has always relied on the telecoms and ICT sectors.

In light of Lebanon's current economic and geopolitical instability, Telecom Review conducted an exclusive interview with His Excellency Johnny Corm, Lebanon's Caretaker Minister of Telecommunications, to find out how

the ministry has been addressing and adapting to challenges, and identify whether the sector is fully prepared to face new crises should they arise.

Contingency Plan

Lebanon is currently experiencing multi-sectoral turmoil due to the war

in Gaza and its aftermath, raising concerns that the conflict could spread across the entire country.

Commenting on the telecommunications sector's preparedness, Mr. Corm affirmed that, "We have drafted a contingency plan in coordination with the health ministry and rescue committees to ensure communication. We're also working on an internal communication plan via an intranet to ensure that all ministries are connected. We've also elaborated on a detailed business continuity plan with the telecom operators, Alfa and touch."

He reiterated that the Ministry of Telecommunications is tirelessly striving to ensure connectivity should the situation deteriorate further.

When asked about the possibility of connecting to Starlink, he explained that he fully supports connecting Lebanon to Starlink given its technical and commercial benefits. However, he noted that it is not as straightforward as it might seem.

"Starlink has agreed to give us the logs and destination IP but only upon signing a binding agreement that provides the ministry the exclusive rights to benefit from Starlink service and guarantees judicial accountability in Switzerland. The concerned parties in Lebanon wanted for Starlink to guarantee that before signing an official agreement—that's why discussions to adopt Starlink services have failed," noted Mr. Corm.

He explained that some parties expressed concerns over data privacy and security, especially given that the regulatory authority in Lebanon is currently inactive.

"I have called upon the concerned parties to reactivate the role of the telecommunications regulatory authority ever since I took office. However, in light of the presidential vacancy, efforts were rendered void," he explained.

5G: A Far-Fetched Goal

4G is currently widely deployed across all Lebanese territories by both mobile



telecom operators, however, 5G has not been commercially deployed yet. "For now, we're working on the necessary upgrades of the systems so that they're compatible with 5G. Successfully launching 5G requires huge capital investments whereby the number of 5G stations should be at least double what we have now with 4G to be able to commercially launch it. At this stage, we're not ready to launch it. We prefer to meet all the technical and financial requirements first to be able to provide consumers with a fully reliable 5G network," expounded Mr. Corm.

He added, "The main issue here is also return on investment. We've been closely watching the experiences of other countries who have deployed 5G, and we prefer to keep our guard up and stick to a fully functioning and reliable 4G network before moving to a technologically attractive option."

Privatization of the Telecommunications Sector

Lebanon's most recent telecom law (established in 2002) calls for the restructuring and privatization of state-owned telecom assets, the establishment of an independent telecom regulator tasked with enforcing competition, and partial liberalization of the sector. However, 22 years later, most of the provisions of this law have still not been implemented.

When asked whether the privatization of the Lebanese telecoms sector will be implemented anytime soon, Minister Johnny Corm, concluded, "Privatization should meet several conditions to succeed, including a solid banking system able to attract foreign investments. I'm a firm advocate of privatization given the flexibility that it can bring to the public sector; however, under the right circumstances, and at the right time." **TR**



We prefer to keep our guard up and stick to a fully functioning and reliable 4G network before moving to a technologically attractive option





Saud Al Riyami, Chief Business and Wholesale Officer, Ooredoo Oman

Ooredoo Oman: Enhancing Operational Efficiencies, Fostering Innovation

In an exclusive interview with Telecom Review, Saud Al Riyami, Chief Business and Wholesale Officer, Ooredoo Oman, shared the company's multifaceted approach to customer experience, cybersecurity and sustainable economic growth in Oman.

Ooredoo Oman and byanat recently announced a strategic partnership to spearhead digital transformation in Oman. How will this collaboration help enterprise customers inject innovation into their offerings? Our partnership with byanat aims

to empower utility and energy businesses with advanced analytics by leveraging the technical expertise of both parties to deliver meaningful data insights.

By working together, we are solidifying our contribution to, and position within, the utilities and energy sectors, through the strategic use of cutting-edge technologies like artificial

intelligence (AI) and big data. The collaboration promises to revolutionize how these industries approach data-driven decision making.

The benefits, however, extend beyond the utility and energy companies themselves. The consumers who rely on these services will also experience a positive impact. Real-time data on usage will mean that they can

make informed decisions about their consumption habits.

Additionally, timely notifications about disruptions will minimize inconvenience and allow for better preparation. This transparency and improved communication will foster a stronger relationship between providers and their customers.

It is an exciting partnership which is ultimately all about driving efficiency, enhancing customer experiences, and fostering a culture of innovation within Omani enterprises.

How is Ooredoo Oman helping its customers integrate digital experience technologies into their services? Could you cite an example of such projects?

We are dedicated to enabling our customers to seamlessly integrate digital experience technologies into their business operations. By providing comprehensive solutions that include cloud services and IoT applications, we can help them leverage cutting edge tech to personalize customer interactions, streamline operations, and significantly boost sales, thereby enhancing the overall customer experience.

Indeed, we have been a key player in enabling the Internet of Things (IoT) in Oman since 2016. Starting out by partnering with Nama Holding to implement Automated Meter Reading (AMR) using IoT technology, leading to accurate meter readings and eliminating estimated bills for utilities. We also collaborated with the National Energy Center (NEC) and Oman Water and Wastewater Services Company (Diam Hayya) and have installed 450,000+ smart water meters to date, covering Diam's customers.

Ooredoo Group also recently joined the Internet of Things World Alliance—the world's largest mobile network operator (MNO) cooperative—to take connectivity to the next level. After all, the ever-growing world of the Internet of Things (IoT) is all about smart devices other than our phones, which are connected to the internet to add value to our daily lives. These include

the water meters mentioned above as well as smartwatches, self-driving and connected vehicles and many more technologies.

Ooredoo became the first telecommunications operator in Oman and the GCC region to join the IoT World Alliance. This follows our entrance into the LoRa Alliance in 2018; a non-profit association that believes the IoT era is now—and so do we.

How is Ooredoo Oman's B2B e-marketplace and business plan supporting impactful business interactions within the SMEs market in Oman?

Our B2B e-marketplace is a game-changer for SMEs in Oman. We have a dedicated eShop for business customers, allowing them to sign up to plans, build their own plans, order devices and more.

Furthermore, we have a dedicated B2B App, which provides a dynamic platform where businesses can conduct transactions and fully manage their accounts easily and efficiently. SMEs benefit from access to a wide range of products, enhanced visibility of their suite of services, and ever expanding functionality to help them thrive in a competitive environment. By fostering a fully connected, digital online business community, we are helping SMEs to grow, innovate, and contribute more robustly to the national economy.

Our business services provide a range of digital services and touchpoints, which helps business to adapt to (and adopt) digital channels for their own transactions, business management and processes. This, alongside our 5G infrastructure to support their connectivity, along with a strong focus on customer experience, means that we are truly ahead of the game when it comes to helping SOHOs and SMEs thrive.

As an integrated telecom provider, how does Ooredoo Oman's support of the digital transformation of business sectors in Oman fall in line with Vision 2040?

We are at the forefront of driving digital

transformation in line with Oman Vision 2040. We are investing heavily in state-of-the-art infrastructure and adopting a digital-first approach. Telecoms is the great enabler of any digitally-driven, technologically-advanced society and we are all about innovation.

We have also invested in 5G and fiber to ensure robust and reliable connectivity across the nation, which, in turn, allows us to develop and offer tailored digital solutions that help various sectors, from healthcare to education.

Our initiatives aim to enhance operational efficiencies, foster innovation, and support sustainable economic growth, aligning with the strategic goals of Vision 2040.

Please tell us about Ooredoo Oman's partnership strategy and the benefits it brings to business customers.

We believe in smart partnerships to bring real value to our B2B customers. It's not only about products, services and connectivity; we must focus on areas such as cybersecurity and data protection, while enhancing national capabilities in these areas. This is particularly pertinent for our business customers and partners.

The expansion of our cybersecurity-as-a-service (CSaaS) venture (which supports businesses) has been top of mind. We have also entered a partnership with Trend Micro, a global leader in the field, through which we offer advanced cybersecurity services, which can be seamlessly integrated into Ooredoo's core offerings, ensuring our B2B customers have access to top-tier security solutions.

We have also enhanced our ICT offerings by partnering with leading providers such as Huawei, CISCO and Dell; and, alongside these, a host of indirect sales channel partners to provide value-added services to SMEs. Such partners provide smart solutions to customers who want top-notch technology and services, and also support in digitizing and optimizing certain aspects of their own operations. 

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Tariq Al-Harbi, Vice President of Cloud & Network Services (CNS), Nokia Saudi Arabia

Nokia: Collaboratively Driving Technological Advancements

In an exclusive interview with Telecom Review, Tariq Al-Harbi, Vice President of Cloud & Network Services (CNS) at Nokia in Saudi Arabia, elaborated on how Nokia's Cloud & Network Services business unit is focusing on delivering software and services that are helping CSPs generate value from their networks.

Nokia has been active in Saudi Arabia for a long time and has built strong partnerships in the country. Can you tell us about the focus of the Cloud & Network Services business unit? What is your strategy for Saudi Arabia?

That's indeed correct. Nokia has been in Saudi Arabia since the inception of

telecom networks and has worked in close partnership with the network operators in the country to deliver mobile and broadband networks. In fact, Nokia has been an integral part of the G-journey (2G until today's 5G) of Saudi Arabia. However, the difference between the early years and now, is that today's subscribers demand more than just connectivity; they want a great experience wherever they go! This puts pressure on every service provider in the

country to provide value-added services with security, efficiency and reliability.

And this is where my team comes in! I am part of Nokia's Cloud & Network Services (CNS), which is a business unit that focuses on building software for cybersecurity, automation, customer experience through analytics, and more—all infused with AI—and this software stretches across mobile and broadband networks. If we think about some of the challenges in the industry today, it's about monetizing existing networks, securing the network against attacks, bringing automation and efficiency to network operations, reducing operating costs to be more productive, reducing energy consumption to be greener—just to name the key ones. CNS makes it all happen!

Besides the network providers, we are seeing a demand from enterprises across Saudi Arabia for a variety of services. This is being spearheaded and facilitated by the Saudi Arabia Vision 2030 that will take the country's entire infrastructure through a digital transformation that is positioned for the future. Nokia is poised to support the government in its ambitions.

One of the hottest topics in the technology industry is the use of AI. Since CNS is focused on building software for and delivering services to CSPs primarily, do you see AI being used in the solutions you provide to your customers?

You are spot on! AI is indeed one of the most exciting and talked about topics today. Almost every company is trialing and implementing various forms of AI. In fact, the buzzword now is Generative AI or GenAI. As a company, Nokia too has been trying out various use cases to see how AI can improve productivity and efficiency internally. But when it comes to utilizing GenAI in delivering solutions to our customers, we are at the forefront of the technology.

We have introduced AI into our security solution, which helps detect and mitigate threats automatically and helps provide solutions to the security engineer. AI is also used to analyze massive data to provide actionable

insights into network performance, customer behavior, and market trends. AI is being used to better plan and optimize a network, resolve any issue before they even happen based on 'predictive analysis', and give recommendations to people on where the network has gaps and can be improved. There are many more, and the possibilities are endless.

I also believe that AI should be used ethically and responsibly. Nokia has taken a strong stance, advocating that AI systems should be fair and reliable, they should be environmentally and socially sustainable, and they must protect privacy. In fact, Nokia has defined principles to guide all our AI research and development in the future. We will see more and more use cases of AI across the digital world and in telecom. I encourage all companies to embrace it, with a focus on ethics and responsibility.

You talked about infusing AI in your security solutions. There has been a lot of media attention in the past month regarding the IT outage, which has impacted many companies in many countries. Do you foresee Nokia facing a similar challenge with its security solutions that could impact Saudi Arabia or even the Middle East as a whole?

Indeed, Nokia does incorporate AI in a variety of solutions to help our customers gain deeper insights and enable them to make better, informed decisions. The same goes for our security solution—Netguard Cyberdome—an award-winning security orchestration software suite with pre-built 5G use cases for telecommunication service providers and critical infrastructure enterprises. Considering that it's built on extended detection and response (XDR) architecture, it offers visibility across various networks, cloud infrastructure and endpoints.

Furthermore, it comes equipped with a library of telco use cases to detect anomalies, from compromised phishing accounts to infected network functions in OT networks. It's this wide range of features that enabled us to be recognized (for the third year in a

row) by GigaOm for our XDR security software and, this year, we were recognized as an 'Outperformer' in the industry.

Regarding global challenges, Nokia does not foresee any challenges related to our software in Saudi Arabia or in the Middle East or elsewhere in the world. While no system can be entirely immune to disruptions, Nokia's proactive and comprehensive approach significantly reduces the risk of IT outages and cybersecurity breaches. By leveraging AI, Nokia aims to stay ahead of potential threats, ensuring that its security solutions remain robust and effective in protecting its operations and those of its customers in Saudi Arabia and the Middle East.

While you talked about CSPs being your key customers, how do you view the broader market? Do you see enterprises interested in working with CNS?

We are indeed seeing a lot of interest from outside our traditional market of CSPs for some of our solutions. And when I say outside, I mean oil and gas companies, ports, manufacturing, logistics and more. There is a fast-growing trajectory of interest in private wireless solutions (LTE and 5G) where enterprises want to have their own networks for secure and high-speed connectivity that can also incorporate the traditional WiFi. Most importantly, they want to talk to us about use cases that can address their unique ambitions and challenges, which are different from, let's say, an energy company and a manufacturing company.

There are also some enterprises that have various devices and sensors—think of smart energy meters across the country that can record energy consumption without human intervention—and these need to be connected to their IT systems. Imagine using AI to analyze the usage of energy and even predict high and low consumption for more efficient production.

There are lot of companies that want to be advised on their digital transformation strategies. They are going through their own journeys and

adopting cloud strategies, incorporating AI, securing their operations, automating the right processes, and much more. These are tough conversations and enterprises are increasingly seeking assistance from Nokia in these areas.

Last but not least, we are seeing a lot of companies wanting to collaborate. At Nokia, we believe that innovation cannot come by working alone. Today, we have a very innovative ecosystem that has come together for the greater good of society. Partnerships are important! Nokia collaborates with technology partners, system integrators, and industry-specific solution providers. We also engage with startups, research institutions, and industry forums to co-create and drive technological advancements.

What is the Nokia or CNS-centric vision for the future, and what are the ramifications in the context of Saudi Arabia?

Nokia has a Technology Vision 2030 and Saudi Arabia also has a Vision 2030. That is a coincidence but I see a lot of synergies, even though they may be from different angles. We're thinking about 5G and beyond, the types of new use cases 5G can enable, and the value they can bring to the next phase of 'G'. There is a lot of time, effort and resources being spent on R&D to get to the next step.

Saudi Arabia has been focused on diversifying away from oil and focusing more on technology and innovation. Nokia has been vocal, through its People & Planet Report, on clear metrics to reduce its carbon footprint and Saudi Arabia has goals that it wants to achieve to be a greener country. Smart city projects, like NEOM in Saudi Arabia, are important avenues for diversification and digital transformation is a key part of these projects that Nokia will support. Finally, Saudi Arabia wants to be a secure country that can protect its digital borders, and this is essential in today's world.

Both Saudi Arabia and Nokia have a long history together. Our futures will continue to be intertwined through our visions to build a sustainable country and company. **TR**



Huawei Tackles the ICT Skills Gap in the Middle East and Central Asia with Seeds for the Future 2024

The bustling city of Tashkent, Uzbekistan, recently played host to a gathering of young minds united by a shared passion for technology and a vision for a brighter future. These 150 students, representing 14 countries across the Middle East and Central Asia, weren't just attending a conference; they were participating in Huawei's Seeds for the Future program, a flagship initiative aimed at nurturing the next generation of information and communication technology (ICT) leaders and tackling the growing digital skills gap.

As Shunli Wang, Vice President of Huawei Middle East and Central Asia, eloquently stated at the program's opening ceremony, "In today's rapidly evolving technological landscape, developing ICT talent is a priority. The digital skills gap affects both businesses and national economies, affecting economic growth and technological development."

Industry reports paint a stark picture. A 2023 report published by the International Labour Organisation (ILO), the United Nations Children's Fund (UNICEF), and the European Training Foundation (ETF) issued an urgent call to countries in the Middle East and North Africa (MENA) region, encouraging them to invest in education and modernize training systems for the youth. This digital skills gap is not just a concern for businesses struggling to find qualified employees; it's a societal challenge with the potential to widen existing inequalities and limit economic opportunities.

Huawei recognizes the urgency of this issue and has made bridging the digital divide a core pillar of its corporate social responsibility (CSR) strategy. Seeds for the Future, launched in 2008, is a testament to this commitment. The program goes beyond traditional classroom learning, providing participants with immersive experiences designed to cultivate both technical expertise and essential soft skills.

"The Seeds for the Future program is built on four key pillars: Innovation, Digitalization, Sustainability, and Entrepreneurship," explained Wang. "Furthermore, the Tech4Good initiative challenges participants to apply technology for social good. Through this holistic approach, we strive to nurture well-rounded ICT professionals capable of driving digital transformation and addressing global challenges."

This year's program, held in partnership with the Ministry of Digital

Technologies of the Republic of Uzbekistan and other key stakeholders, offered a dynamic blend of workshops, lectures, and hands-on projects. Students delved into cutting-edge technologies such as 5G, AI, and cloud computing, gaining insights from industry experts and collaborating on innovative solutions to real-world problems.

The program's emphasis on collaboration extends beyond the classroom. Students had the opportunity to engage with their peers from diverse backgrounds, fostering cross-cultural understanding and building lasting connections that will serve them well in their future careers. This spirit of collaboration was highlighted by Wang, who emphasized the importance of public-private partnerships in driving the ICT ecosystem forward.

"Public-private collaboration is crucial for building the ICT ecosystem in the Middle East & Central Asia and nurturing ICT talent," he stated. Public-private partnerships will enable governments in the region to cultivate new ICT talent to empower the socio-economic growth led by digital technologies. The aforementioned partnerships are vital contributors to governments' national goals. "Creating the next generation of ICT leaders and driving socio-economic development is a shared responsibility," Wang added.

During the Huawei Seeds for the Future 2024 Regional Final, leaders in ICT from the government and private sector and media representatives gathered for a panel discussion on the future of ICT talent and its pivotal role in shaping future digital economies.

The panel discussion was themed "ICT Talent & Youth Power Driving Digital Innovation & Shaping the Sustainable Future of the ME&CA Region: Public-Private Partnership & Open Collaboration for Shared Success." It featured prominent figures from various sectors, including Karimjonov Rustam, Deputy Minister of Digital Technologies of the Republic of Uzbekistan; Professor Wathiq



Mansoor, Dean of the University of Dubai; Nuriddin Samatov, Research Assistant at the Research Institute of Environment and Nature Conservation Technologies; Bunyod Avliyokulov, Programme Analyst on Effective Governance, UNDP Uzbekistan; and Duke Zhang, Vice President of Public Affairs, Huawei Middle East & Central Asia.

The panel successfully facilitated a dialogue on the future of education and digital transformation. The discussion focused on the vital role of open collaboration in nurturing local ICT talent, driving technological innovation, and building sustainable, knowledge-based digital economies in the region.

As the Seeds for the Future program continues to grow, its impact is being felt far beyond the walls of the classroom. The program's alumni have gone on to become entrepreneurs, innovators, and leaders in their respective fields, contributing to the digital transformation of their communities and inspiring others to follow in their footsteps.

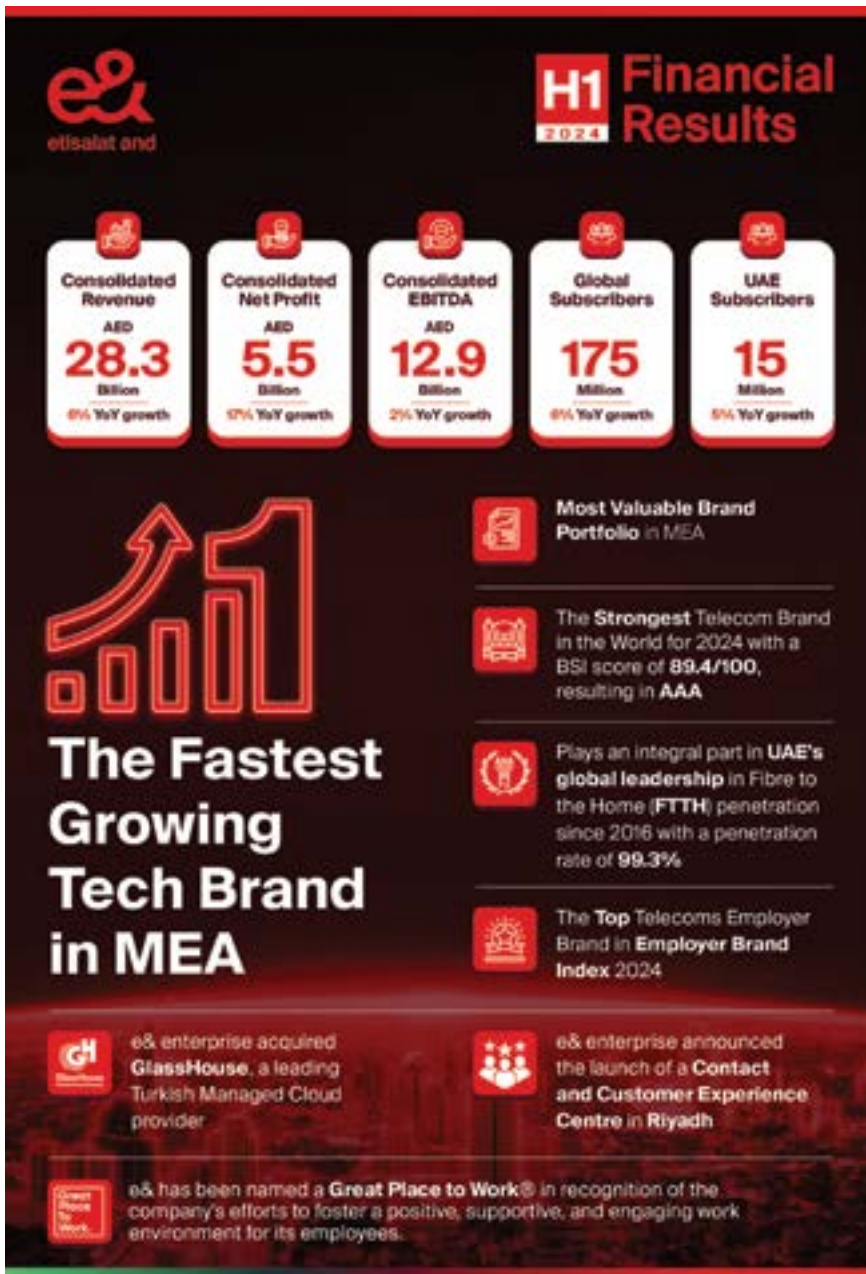
In the words of Wang, "To all our talented participants from across the Middle East and Central Asia—you represent the future of our industry. The skills you develop, the connections you make, and the ideas you generate during this program will shape not only your careers but also the technological landscape of our region. Embrace this opportunity, challenge yourselves, and let your creativity shine."

Huawei's Seeds for the Future program is not just about transferring knowledge; it's about planting seeds of hope, innovation, and collaboration that will blossom into a brighter, more connected future for the Middle East and Central Asia. **TR**



The Seeds for the Future program is built on four key pillars: Innovation, Digitalization, Sustainability, and Entrepreneurship





*Including STAROPLAK Green Everything Aest

e& enables a Digital Future Across its Business Verticals and Markets

e& maintained its growth momentum with robust financial results driven by relentless focus and a strong commitment to driving innovation while enabling a digital future for customers across its markets.

e&: Taking the Lead in Value and Strategic Partnerships
 e& was crowned the "Fastest Growing Tech Brand" and the "Most Valuable Brand Portfolio" in the Middle East and Africa (MEA), by the 2024 Brand Finance Global 500 Report. This reflects the confidence of investors and partners in e&, which has also been named the world's "Strongest Telecom Brand in the World" for 2024, was also named a "Great Place to Work®".

e& and the Abu Dhabi National Oil Company (ADNOC) joined forces to build the world's largest private 5G network across an 11,000-sq-km operation.

In a major move for the telecom industry, e& and its partners at the Global Telco AI Alliance formed a joint venture in H1 2024 to develop cutting-edge large language models (LLMs) specifically designed to revolutionize customer service through advanced AI solutions.

Championing Innovation in the UAE
 e& cemented its leading position in telecommunications and technology, shattering speed records by achieving the world's fastest data transfer rate of 30.5 Gbps on its live 5G network in the UAE.

e& continued to play an integral strategic part in the UAE's global leadership in Fibre-to-the-Home

(FTTH) penetration, cementing the country's top position with a penetration rate of 99.3%.

Demonstrating its commitment to social responsibility and digital inclusion, e& launched an AI-powered browser extension called "Wider Web" to support an autism-friendly browsing experience.

Marking an important step towards digitized education in the country, e& UAE launched its groundbreaking AI-powered platform, GoLearning.

In recognition of its efforts to provide a supportive work environment for employees, e& UAE attained the highest position in Brand Finance's inaugural Employer Brand Report 2024, ranking as the "Top Global Telecom Employer" and marking yet another important milestone in its track record.

Bringing Digital Capabilities to Life

e& life, the business pillar of e& released the updated version of the e& money app, which became the UAE's number one fintech app in terms of monthly active users. e& money 2.0 now boasts full Arabic language support, making it accessible to a wider audience.

Careem cemented its market positioning in Dubai and continued its accelerated market expansion in Abu Dhabi, achieving significant milestones in Q2-24, with a 136% increase in Total Gross Transaction Value (GTV) compared to Q2-23, and a 115% rise during the first half of this year compared to the same period last year.

In digital banking, Wio achieved profitability in less than 12 months, solidifying its position as a leading neobank platform. In the first half of 2024, Wio reached record levels in both business and personal customer acquisition and total deposits.

In the first half of 2024, evision recorded significant growth, surpassing 5.5 million subscribers. STARZ ON, its ad-supported streaming platform in the Middle East and North Africa, has been a key driver of this growth.

The STARZ ON free experience was enhanced with a diverse range of content, including sports, Arabic and Turkish programming in partnership with Noor Play, and Mandarin and Korean programming in partnership with iQIYI.

To cater to the sub-continent's audience, evision secured exclusive rights to the ICC Cricket World Cup and acquired exclusive rights to exciting Hotstar (Disney Star), Zee, and Viacom18 content.

evision further solidified its entertainment offerings by signing multi-year deals with major studios including Sony Pictures Television and Amazon MGM. These deals bring the latest blockbusters, renowned classics, and family favorites from both cinema and television to STARZPLAY, eLife and Switch TV.

In addition, evision strengthened its sports portfolio by acquiring exclusive rights to UFC for the MENA region.

Empowering the Digital Journey for the Private and Public Sector

e& enterprise has marked a significant step towards regional digital transformation leadership. It expanded its global footprint by acquiring GlassHouse, a leading Turkish provider of managed cloud, business continuity, and SAP infrastructure services..

e& enterprise signed an agreement with the Dubai Public Prosecution (DPP) to develop the world's first central digital system for remote investigation and litigation, streamlining the justice system and enhancing its efficiency and speed.

In an effort to create jobs and boost customer experience, e& enterprise opened a new state-of-the-art Contact and Customer Experience Centre in Riyadh to support Saudization. It is expected to create over 1,500 new local job opportunities across administrative, technical, and specialist roles.

In the blockchain trade finance sector, e& enterprise unveiled haifin, the

new brand identity for its leading blockchain-based trade finance platform, which welcomed three new members to its consortium.

Growth Across Operating Markets

Uzbekistan's Perfectum joined e& international's Partner Market Programme in a strategic move designed to accelerate digital transformation within the country's telecommunications sector, offering access to e& international's extensive expertise and cutting-edge solutions.

PTCL launched a new combined first-of-its-kind UPTCL app that covers PTCL, Ufone, and Flash Fibre in one app.

e& Egypt launched e& Neo in conjunction with Mashreq Bank, making this the first digital banking service in Egypt.

Onic, e&'s digital brand in Pakistan, secured a double victory at the Pakistan Digital Awards, clinching "Best Mobile App" and "Digital Ambassador of the Year."

Etisalat Afghanistan acquired 15 MHz of spectrum in the 1800 and 2600 bands, holding the largest spectrum in the market.

Forging the Path for Tomorrow's Technology

e& capital, the investment arm of e&, has invested nearly USD 150 million in startups that are shaping the future of technology in the MENA region and the world.

e& capital's investments cut across various exciting technology-led industries, including AI, SaaS, edtech, healthtech, telecommunications, and entertainment, strategically complementing the group's wide range of services. Key investments include Ikigai, an AI platform developed from MIT research that delivers highly accurate forecasts and time series predictions; Airalo, the global leader in travel eSIMs; and Traydstream, a platform digitising and automating the trade finance industry globally. 



Telecom Review Virtual Panel: Decoding 5G-Advanced Dynamics

On August 22, 2024, Telecom Review organized a virtual panel entitled “Technology Chiefs Delve into 5G-Advanced,” where a panel of industry experts shed light on the current trends in 5G-A adoption and digital transformation outcomes at length.

Issam Eid, Chief Operating Officer, Telecom Review Group, delivered the welcome note along with a brief outline of the 5G-A talking points set to be uncovered throughout the discourse. The discussion was moderated by Dr. Ray Mota, CEO, ACG Research.

The esteemed panelists included:

- Saif Al-Shukri, Department Head - Radio Network Planning (Mobile & Fixed) at Ooredoo Oman
- Noman Waheed, CTO, Middle East, Mobile Networks, Nokia
- Ayush Sharma, CTO, StarHub
- Dr. Mohamed Madkour, Vice President, ICT Strategy & Marketing, Huawei Middle East and Central Asia
- Abdullah Abu Chaer, Director Data Management and Cognitive Services, du

After a quick round of introduction of the prestigious speakers, Dr. Ray Mota, CEO, ACG Research, set the stage for the discussion and expounded upon the ‘Gs’ in the telecom industry—2G, related to mobile voice; 3G, related to mobile data; 4G, related to mobile internet; 5G, related to internet of things and 5.5G or 5G-Advanced or 6G, related to mobile intelligence.

He explained that the transition to 5G primarily encompasses achieving ultra-low latency, which is crucial for real-time applications that require instant responses. He also highlighted other key aspects of 5G, such as the improved user experience for real-time streaming, cloud computing, gaming, and other rich applications.

Additionally, 5G can support over a million connected devices, a significant increase from the

100,000 devices supported by 4G. He mentioned the concept of 5G network slicing, which allows operators to create multiple virtual networks within a single physical 5G network, optimizing it for specific use cases. Finally, he emphasized the benefits of spectrum efficiency and energy-efficient green networks with 5G.

Analyzing the enormous potential of 5G, the discussion sought to explore the transition to 5G-Advanced through 3 distinct aspects: infrastructure, implementation and monetization.

Enhancing Infrastructure for 5G-Advanced Deployment

When asked about the developments in the 5G-Advanced adoption across geographies, Dr. Mohamed Madkour, Vice President, ICT Strategy & Marketing, Huawei Middle East and Central Asia, stated that 5G-Advanced is positioned to bridge this gap,

enhancing the capabilities of the existing 5G infrastructure.

He explained that 5G has seen significant adoption over the past five years globally, with 1.8 billion users and over 3,000+ terminals covering 40% of the world's population. "Notably, China leads the charge with half of these users and millions of base stations in operation. Despite only 20% of global connectivity being through 5G, this technology accounts for 30% of traffic and 40% of revenue, showcasing its growing importance in the telecom ecosystem."

Dr. Madkour pointed out that out of six million 5G base stations globally, China accounts for four million of them. He also mentioned that there are currently 0.5 million global RedCap base stations, a key component of 5G-Advanced technology.

In terms of regional advancements, Dr. Madkour highlighted that the GCC countries are on track to lead the way in achieving 10 Gbps speeds, which represents a significant leap forward in network performance. Meanwhile, Latin America and the European Union are making strides in pioneering 3CC carrier aggregation, mmWave technology, and innovations associated with Horizon and Release 18.

Dr. Madkour also emphasized the critical importance of mobile phones supporting 3CC carrier aggregation, which allows devices to combine multiple frequency bands for faster and more reliable connections. Mota strongly agreed with this perspective, recognizing it as essential for the future of 5G-A adoption and commercialization.

The Implementation of 5G-Advanced

When asked about the key technical challenges in deploying 5G-A three carrier component (3CC) aggregation networks, Saif Al-Shukri, Department Head - Radio Network Planning (Mobile & Fixed) at Ooredoo Oman, stated that its implementation requires the availability of spectrum, which often necessitates rearranging

the current spectrum to free up space for 5G. Securing adequate spectrum is crucial, as it determines the network's ability to support multiple carriers and deliver enhanced performance.

Another major challenge is the need for robust backhauling solutions to handle the increased data throughput that comes with 3CC aggregation. Al-Shukri emphasized the importance of integrating mmWave technology to boost network capacity and throughput. To further enhance connectivity, he suggested embracing an e-link option as a complement to fiber, ensuring that both e-link and micro-link technologies work seamlessly together to provide reliable transmission.

Device compatibility also poses a significant hurdle, as 3CC aggregation demands support from a wide range of devices. Al-Shukri pointed out that market cost and distribution considerations must be factored in to ensure that devices are both affordable and widely available. He also noted that in regions like Oman, there has been progress in integrating Sub-6 GHz and mmWave technologies to manage site load effectively, a critical aspect of maintaining network performance under heavy traffic conditions.

Finally, Al-Shukri highlighted traffic balancing as another key component of the deployment process. Proper traffic management is essential to ensure that the network can handle the increased data demands without compromising on speed or reliability.

Commenting on the implementation of 5G-Advanced, Noman Waheed, CTO, Middle East, Mobile Networks, Nokia, noted that the availability of spectrum has been one of the key factors contributing to the highest speeds globally. The country has already started rolling out 3CC indoor networks with speeds up to 4.5 Gbps.

He noted that the GCC is "blessed with spectrum," highlighting the availability of 300 MHz in the Sub-6 GHz range. This ample spectrum has

been a key factor in the region's ability to advance rapidly in 5G technologies. He pointed out that Qualcomm's achievement of 4.5 Gbps speeds using three-component carrier (3CC) aggregation in 2023 is a testament to the potential of 5G-Advanced in the region.

Waheed also mentioned that the UAE has been recognized for its leadership in 5G, with Ookla rating it as the number one country globally for 5G download speeds. This recognition underscores the efficiency of the equipment and infrastructure in place, but Waheed cautioned that maintaining this efficiency requires careful management of site volume. He stressed that the site volume needs to remain consistent to ensure that network performance does not degrade as more users and devices come online.

Furthermore, Waheed highlighted that the 3 GHz spectrum is available in the GCC, which is crucial for supporting 5G-Advanced networks. The availability of this spectrum for commercial users is another key advantage that positions the region at the forefront of 5G adoption. Finally, he noted that the UAE is also pioneering the use of mmWave technology, with ongoing site learning and optimization efforts.

When asked about the challenges du faced in achieving the targeted 5 Gbit/s downlink rates, Abdullah Abou Chaer, Director Data Management and Cognitive Services, du, explained that one of the main obstacles was site loading. Initially, the site loading for 2G, 3G, 4G, and early 5G deployments was adequate. However, with the introduction of newer technologies, especially in densely populated areas with high traffic, the demand for site loading increased significantly.

Chaer also mentioned that their goal is to achieve 25 Gbps for backhauling, which presents additional challenges, particularly with microwave sites that struggle to meet these higher demands. To address this, most of du's sites are connected by fiber and are currently being upgraded from 10

Gbps to handle the increased speeds required for these expansions.

How Operators Can Prepare for 5G-Advanced Integration

Discussing how operators can prepare for 5G-Advanced integration, Madkour emphasized that operators preparing for 5G-Advanced integration should focus on several key areas: implementing autonomous networks, establishing robust IT systems for B2B enterprises, and developing edge computing networks. He also highlighted the importance of building data centers, addressing latency issues, constructing privacy architecture, and recognizing the critical role of transport infrastructure. Additionally, considering the interests of all stakeholders is essential for successful integration.

Waheed expanded on Madkour's points by describing 5G-Advanced as "an evolution, not a revolution," and elaborated on Nokia's four 'E' approach to this progression. He outlined the first 'E', Experience, focusing on enhancing customer experience beyond just broadband, with improvements in XR mobility, reduced latency, doubling throughput, and increasing uplink capacity. The second 'E', Extension, involves exploring new segments and use cases, including device-to-device communication, highlighted by Nokia's partnership with AST SpaceMobile for device-to-device satellite connectivity. The third 'E', Expansion, addresses the need for reliable synchronization beyond GPS, which is critical for industries like banking and for achieving precise 5cm positioning in environments such as AGVs, warehouses, and malls. Finally, Excellence emphasizes the role of AI and machine learning in boosting operational and energy efficiency within the 5G-Advanced framework.

Al-Shukri added that network and AI integration is important, as is bandwidth for transmission, and vendor support. He noted that operators need to "break down their thinking," automate solutions and

networks, introduce multi-carrier handling, collaborate with other operators and content creators, enlist government support and focus on customer calibration.

3GPP From a 5G-Advanced Perspective

Discussing the importance of adhering to third-generation partnership project (3GPP) specifications before marketing 5G-Advanced (5G-A) solutions to telecom operators and vendors, Chaer emphasized interoperability as the first point of standardization. He noted that interoperability among equipment vendors such as Huawei, Nokia, and other industry players, enables operators to avoid being locked into one equipment only.

Chaer highlighted that tracing or tapping points in 5G-Advanced and 5G standalone (SA) networks can present limitations in terms of monitoring and security. He pointed out that these challenges are often addressed by equipment vendors through their solutions, which are integrated into their ecosystem to provide enhanced monitoring capabilities and ensure robust network security.

Additionally, the director highlighted the issue of handset compatibility, noting that varying interpretations of standards among manufacturers create challenges. He emphasized the need for consistent standardization to address these issues and ensure uniformity across devices.

Recalling the early days of 5G, he mentioned that some operators hesitated to invest due to the immaturity of the standards. He stressed that standardization is essential for ensuring the longevity of investments, allowing for upgrades to future releases that can accommodate multiple use cases and integrations.

Waheed acknowledged the finalization of Release 18 by 3GPP, defining it through experience, extension, expansion, and operational excellence from a 5G-A perspective.

Nokia has had an active role in 3GPP standardization, focusing on extended reality (XR) functionality, uplink improvements for performance, enhancements, and new use cases such as unmanned aerial vehicles (UAVs) and the Future Railway Mobile Communication System (FRMCS).

With the shutdown of 2G and 3G network technologies by most operators, additional spectrum is being allocated for 5G deployment. Waheed noted that utilizing low-band frequencies will enable Sub-6 GHz, enabling the extension of uplink coverage. He also promulgated Nokia's partnerships with Qualcomm, MediaTek, Samsung, and Apple to ensure seamless deployment, illustrating the company's successful demonstration of reduced capability (RedCap) use cases to operators as an example.

In this regard, Waheed rereferred to the old African proverb, "If you want to go fast, go alone. If you want to go far, go together."

An Operator's Perspective on Commercialization, AI and ML in 5G-A

Highlighting roll-out plans related to AI, ML, and 5G-A, Ayush Sharma, CTO, StarHub, discussed the company's recent accomplishment in facilitating the first data call over open radio access network (RAN) and standalone networks.

As one of the early deployers of 5G SA, this milestone represents one of the incremental innovations that StarHub is developing. Sharing StarHub's journey in integrating AI and ML within the 5G network, Sharma mentioned that they are close to launching a hybrid integrated cloud with 5G access, alongside 10 Gbps home broadband and over-the-top (OTT) services, delivering low latency to the region.

Addressing the use of large language models (LLMs) for power efficiency, Sharma pointed out the fundamental challenge of utilizing AI and ML in isolated sectors, emphasizing the need for observability, automation,

and centralization for network-wide applications.

Sharma emphasized the significance of machine learning operations (ML Ops) in enhancing the user experience by focusing on the intent expressed through devices. He explained that the quality and relevance of data are crucial, as they directly influence how users perceive their interactions with the system. Sharma stressed that the ultimate goal of ML Ops is to develop meaningful and clean data that can be effectively utilized for machine learning applications. This involves ensuring that the data is not only accurate and relevant but also handled in a way that aligns with user expectations and privacy concerns, thereby enhancing the overall customer experience.

Furthermore, he discussed StarHub's implementation of network slicing, which has facilitated exposure to the CAMARA Application Programming Interfaces (API) gateway and Independent Software Vendors (ISV) ecosystem. He accentuated observability and automation as StarHub's network demark points, particularly at key connectivity endpoints such as home broadband and mobile services.

Monetization of 5G-Advanced

Dr. Madkour discussed the monetization opportunities presented by 5G-Advanced, noting that innovations in services and the ability of operators to deliver a multi-dimensional experience across various telecom customer segments are significantly enhanced with this technology.

He emphasized that the improved uplink speeds of 5G-Advanced could present new revenue streams by allowing operators to bundle high-speed throughput with different user categories, thereby creating fresh opportunities for generating income and offering tailored services.

He cited examples of telecom operators, such as China Mobile in China, doubling ARPU by providing innovative B2B services by

incorporating AI and cloud computing capabilities into the different segments of the user experience. China Mobile achieved 5G-Advanced monetization goals through a three-tier approach, offering services at 3 Gbit/s, 10 Mbit/s, and featuring a mobile icon for 5G-Advanced. It also introduced specialized packages for live streamers, traders, and gamers, tailored to their specific requirements. These packages include various options based on data packets, upload speeds, and low latency to meet the unique needs of these user groups.

In terms of 5G-Advanced monetization, Madkour highlighted that IPE intelligence optimization and closed-loop customer experience are crucial for successful implementation and profitability. He cited Thailand's "hotspot on the go" initiative as an example of leveraging 5G-Advanced to enhance service offerings. Additionally, in China, various monetization strategies have been implemented, including new calling features, cloud calling, IT servers for storage and cloud services, and AI tools for influencers, all aimed at maximizing the benefits and revenue potential of 5G-Advanced technology.

Adding to the conversation, Waheed said, for CSPs, from a 5G-A perspective, non-terrestrial network, direct-to-device, and enhanced RedCap technologies can present a plethora of new use cases in sectors such as smart cities, oil and gas, and public safety by providing higher data rates compared to LTE Cat 4 devices. He noted that operators can tap into new revenue streams through models such as Timing as a Service (TaaS) and Synchronization as a Service (SynaaS) as part of Release 18.

Audience Contribution

Addressing a question from the audience on how developing countries with limited resources can move to 5G ecosystems, Waheed stressed the importance of understanding the percentage of devices that are capable of supporting 5G as it is the indicator of the level of preparedness for the services in the network.

At the end of the discussion, four poll questions were posed to the audience, revealing the following results: For the timeframe to fully-fledged 5G-Advanced commercial networks, 28% expect it to occur within 2 to 3 years, 61% within 5 years, and 11% within 10 years. Regarding the ideal segment for new 5G-Advanced services, 35% chose consumers, 12% homes, and 53% enterprises. The industry most likely to be transformed by 5G-Advanced was seen as automotive (35%), followed by healthcare (29%), entertainment (24%), and manufacturing (12%). The biggest challenge in rolling out 5G-Advanced technology was identified as high infrastructure costs (47%), with regulatory and spectrum allocation issues (35%) also noted, while security and privacy concerns were seen as less significant (0%), and compatibility with existing devices and networks regarded as minimal (3%). 



Analyzing the enormous potential of 5G, the discussion sought to explore the transition to 5G-Advanced through 3 distinct aspects – infrastructure, implementation and monetization.



TDRA, MoEc Tighten Telemarketing Regulations to Protect Consumers



The Ministry of Economy (MoEc) held a media briefing to explain the UAE's efforts in regulating the telephone marketing (telemarketing) of products and services in the country. In tandem with this, the Telecommunications and Digital Government Regulatory Authority (TDRA) is in charge of managing the 'Do Not Call Register' (DNCR) and will work closely with relevant organizations to set guidelines, share data, raise public awareness, and regulate individuals.

H.E. Safeya Hashem Al Safi, Acting Assistant Undersecretary for the

Commercial Control and Governance Sector at the Ministry of Economy, confirmed that the UAE remains committed to establishing a business environment that boasts economic and social stability. These include fostering sound business practices, safeguarding consumer rights, and promoting a marketing culture in line with best practices within the corporate sector.

'Do Not Call Register' Initiative "Cabinet Resolutions have been issued to establish clear boundaries and regulations for companies engaged in telemarketing," said H.E. Eng. Mohammed Al Ramsi, TDRA's Deputy Director General (DDG) of the Telecommunications Sector. "At TDRA, we have launched the 'Do Not Call Register' initiative, introduced as 'DNCR', which empowers recipients with the right to opt out of receiving

marketing calls from specific sectors or all sectors."

Under Cabinet Resolution No. 57 of 2024, the TDRA can impose penalties and fines on individuals who make marketing calls using their own or their client's licensed phone numbers. The penalties are as follows:

For a first offense, there is a fine of AED 5,000, and all phone numbers registered under the individual's name will be suspended until the fine is paid.

If the violation is repeated within 30 days, the fine increases to AED 20,000, and all registered numbers will be cut off for three months.

A third offense within the next 30 days results in a fine of AED 50,000, and the individual will be denied telecom services for 12 months.

Cyber Risks Escalate: Middle East Businesses See 10% Jump in Breach Costs



Cyber risks are now considered to be a critical business risk, requiring organizations to demonstrate clear oversight, processes and procedures to prevent, detect and respond to cyberthreats.

A recent industry report found that the average cost of a data breach for businesses in the Middle East reached SAR 32.80 million in 2024, a nearly 10% increase from the recorded SAR 29.90 million in 2023.

According to recent cyberthreats reports, the UAE is facing a growing cybersecurity challenge. Notably,

Infoblox's 2023 Global State of Cybersecurity Report found that UAE respondents are most concerned about data leakage (48%), cloud attacks (40%) and attacks through networked IoT (29%).

Three Factors Causing Higher Breach Costs

In particular, the top three factors that amplified breach costs for local businesses were security skills shortages, non-compliance with regulations and security system complexity.

When analyzing the costs for local organizations, it was identified that a shortage of security skills contributes to the average increase in data breach costs by SAR 1.62 million. Aiming to mitigate talent shortages as well as demonstrate a readiness to embrace innovative solutions, 95% of UAE-based organizations plan to

leverage AI technologies to fill at least 10% of vacant cybersecurity roles.

Another factor identified was non-compliance with regulations, which added an average of SAR 1.25 million to the cost of data breaches for businesses. Additionally, the complexity of security systems contributed an average of SAR 975,000 to these costs.

Costly Breaches

In 2024, business losses resulting from breaches in the Middle East, including operational downtime and reputation damage, averaged SAR 12.84 million per breach, up from SAR 10.02 million in 2023. Apart from that, post-breach customer response costs rose to SAR 9.01 million. Detection and escalation costs were recorded at SAR 8.42 million while notification costs amounted to SAR 2.53 million.



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Borderless Exploration: The Evolution of Space Robotics

In the realm of space exploration, space robotics is emerging as a critical technology, transforming how missions are conducted beyond Earth's atmosphere. These sophisticated machines are designed to operate in the harsh conditions of space, performing tasks that are either too dangerous or impractical for human astronauts.

The development and deployment of these space robots are supported by substantial investments from venture capital and major private organizations. Leading countries in this field, such as China, the US, and Japan, are at the forefront of

patent applications, indicating a robust growth in innovation.

What is Space Robotics?

Space robotics involves the design and manufacturing of robots tailored to operate in the demanding environment of outer space and play crucial roles across various space exploration missions.

According to insights from GlobalData's Technology Foresights, companies in this rapidly evolving sector are developing groundbreaking applications. These include detailed spacecraft inspection, efficient satellite servicing, precise component assembly, reliable spacecraft refueling, and the critical task of space debris collection. Each application represents significant progress in enhancing the sustainability and advancement of space missions.

Leading the Charge in Space Robotics

Over the past year, space robotics has shown one of the highest rates of innovation activity. GlobalData highlighted Canada-based MDA Ltd. as a standout leader which boasts over 450 space missions and has introduced Skymaker, a modular robotic solution adaptable for lunar surface landings and orbital exploration missions.

Similarly, Airbus has made significant strides by integrating robotic arms into its OneSat satellites in collaboration with the European Space Agency (ESA), enhancing satellite servicing and assembly in space.

Moreover, space agencies are increasingly embracing robotics for diverse missions. NASA, for instance, is developing fully autonomous robots for constructing shelters and solar arrays on the Moon and Mars.

Space robotics is expanding the horizons of space exploration and operations through advancements in IoT and robotics technology, among others.

Space Robotics Drives ICT Innovation

The evolution of space robotics promises to revolutionize space exploration capabilities and expand our understanding of the universe. As these technologies continue to advance, they are poised to bring about transformative changes in the ICT sector and beyond, shaping the future of both space exploration and technology innovation on Earth.

Satellite Maintenance and Repair: Space robotics can enhance the

capabilities required to service and repair satellites in orbit. This can prolong the lifespan of satellites, reduce replacement costs and ensure more reliable communication services.

NASA envisions that humanoid robots will play a crucial role in space missions. Backing up this claim, the entity has tested its very own Valkyrie at the Johnson Space Center in Houston. Allowing astronauts to concentrate on exploration and discovery, this robot can undertake time-inducing responsibilities such as cleaning solar panels and inspecting malfunctioning spacecraft equipment.

Infrastructure Deployment: Space robots can be employed to deploy and maintain satellite constellations, which are increasingly used for global internet coverage (e.g., Starlink). This can expedite the expansion of broadband services to underserved regions.

Data Collection and Analysis: Space robotics can assist in collecting data from space-based assets more efficiently. This data can include environmental monitoring, weather forecasting, and geospatial imaging, all of which are critical for ICT applications such as disaster responses, urban planning, and agriculture.

Space-Based Internet: Implementations such as SpaceX's Starlink are using robotics to deploy and manage large constellations of satellites that provide global internet coverage. This could revolutionize internet access in remote areas and improve connectivity worldwide.

Advancements in AI and Automation: Space robotics often leverage advanced AI and automation technologies, significantly reducing costs and performing repetitive tasks with precision. These advancements can spill over into terrestrial applications, enhancing ICT systems' efficiency, security, and autonomy.

For example, MYCOM OSI has integrated AI and automation into its new service assurance solutions,

significantly improving the monitoring and management of network performance. This integration allows for proactive issue detection and resolution, reducing downtime and optimizing service delivery, which in turn boosts overall efficiency.

Similarly, the Dubai Ministry of Finance has demonstrated the tangible benefits of robotic automation by saving 39,000 hours of work through its implementation.

Moreover, Reailize is actively advocating for the transition to much higher levels of automation in operations, emphasizing that increased automation is crucial for maintaining competitiveness and efficiency in the rapidly evolving ICT sector.

Innovation in SatCom: The development of space robotics fosters innovation in telecommunications technologies. For example, improved satellite designs and deployment strategies can lead to faster, more reliable satellite communications.

Futuristic Scenarios

As robotics in space technology continues to advance, many futuristic scenarios envisioned in science fiction are becoming tangible realities. These developments will not only revolutionize space exploration and industries but also have profound implications for life on Earth, enhancing global communications, resource management, and technological innovation.

Here's an outlook of how this transformation is expected to unfold:

Satellite Servicing and Longevity: Maintenance and repair robots for satellites are on the verge of becoming commonplace. These robots will prolong satellite operational lifespans, minimizing the necessity for frequent replacements and maintaining reliable communication and observation capabilities. Northrop Grumman, among others, is leading the way with innovations like their Mission Extension Vehicles (MEVs).

Mining and Resource Utilization: The concept of asteroid mining, often

depicted in sci-fi, is approaching feasibility with advances in robotics. Robots will prospect and extract valuable resources from asteroids and the Moon, providing materials that are rare on Earth and crucial for further space exploration and industry. Asteroid mining company, AstroForge, is heavily investing in R&D to accomplish this feat.

Advanced Space Exploration: Robotic explorers will continue to play a crucial role in exploring distant planets and moons. Missions like NASA's Perseverance rover on Mars demonstrate the capabilities of autonomous robots to conduct scientific research and pave the way for future human missions.

NASA's free-flying robotic system, Astrobee, assists astronauts on the ISS with tasks and tests new technologies. It communicates with computer systems, grapples spacecraft, and identifies hazards like leaks. These robotic helpers will be integral to future space exploration, handling everyday tasks and maintenance to allow crews to focus on research.

Space Tourism and Colonization: Robotics will enable the construction and upkeep of space habitats, enhancing the feasibility of space tourism and potential colonization efforts on the Moon and Mars. Later on, space robots will be more proactive in preparing landing sites, constructing habitats, and offering continuous assistance to humans.

Demonstrating the capabilities of ARMADAS (Automated Reconfigurable Mission Adaptive Digital Assembly Systems), three space robots assembled a shelter roughly the size of a shed in just 100 hours, utilizing 256 voxels. While NASA provided the bots with the shelter's blueprints, the robots autonomously determined the optimal construction methods using advanced software algorithms.

With this in mind, the coming decades promise to be an exciting era where the boundaries between science fiction and reality blur, driven by the relentless progress of space robotics. **TR**



Seamless Journeys Ahead: How 5G and eSIMs are Redefining Travel and Roaming

The dynamic realm of travel is being reshaped by the emergence of 5G networks. Promising ultra-fast connectivity and minimal latency, 5G technology is poised to revolutionize travelers' interactions and experiences worldwide.

Imagine embarking on a journey where seamless connectivity is not just a luxury but a fundamental aspect of the travel experience. From real-time navigation assistance and instant language translation to immersive virtual tours and augmented reality travel guides, 5G empowers travelers with unprecedented access to information and services.

5G opens up many opportunities for innovation and revenue generation. Airlines, for instance, are already leveraging 5G to deliver enhanced in-flight entertainment, seamlessly streaming content to passengers' devices. Moreover, 5G-enabled eSIMs (embedded SIM cards) provide immediate connectivity across various destinations without the need for physical SIM cards. This advancement simplifies logistics for travelers and boosts customer satisfaction.

eSIMs and 5G

5G is a revolutionary technology that is enabling fast, rich, real-time and reliable connectivity, taking the customer experience and journey to a whole new level.

Juniper Research forecasts that the travel SIM and eSIM market will grow from USD 1.7 billion in 2024, to more than USD 8.7 billion by 2028 due to the rise in the number of international travelers (1.6 billion in 2028).

As travel eSIMs become more popular and the number of travel eSIM vendors offering similar services also increases, vendors must explore new distribution channels to differentiate themselves from their competitors. The two ways in which travel eSIM vendors distribute eSIMs are via a mobile app or through a web portal.

Staying connected while traveling has become essential for leisure and business

travellers alike. The convergence of eSIM technology and the revolutionary power of 5G networks is set to transform the travel industry, offering unparalleled connectivity and a host of benefits for globetrotters. As telecom companies embrace the sunset of 2G and 3G networks, they are optimizing their infrastructure, reducing costs, and repurposing spectrum to promote the adoption of eSIM technology.

eSIM and 5G technologies have converged, offering a myriad of benefits, including, but not limited to:

- **Enhanced Security through Advanced Technologies:** The convergence of eSIM and 5G technologies represents a significant leap in security protocols. eSIM facilitates the seamless integration of cryptographic profiles into devices without requiring physical alterations, while 5G networks employ sophisticated encryption methods. Together, these technologies provide robust data security assurances.
- **Rapid and Reliable Connectivity:** 5G's high-speed connections, coupled with eSIM's seamless transitions, accelerate data transfers while ensuring robust security measures. This combination enables the swift and secure transmission of large data volumes, enhancing the user experience.
- **Better Trust and Reduced Risks:** By embedding eSIM directly into devices, the vulnerability associated with physical SIM card loss or theft is mitigated. Moreover, the advanced security features of 5G adds layers of protection against potential data breaches.

Vendors must try to understand more about their customers' requirements to offer more tailored eSIM packages as data varies between different age groups. For example, 18–34-year-olds consume more data due to the bandwidth needed to run data-heavy applications, games and streaming services. Data consumption might also differ depending on where the consumer is based, with certain apps being more popular in some countries than others.

As the need for more data, travel SIMs and eSIMs arises, 5G and future 6G networks are most suitable to deliver a seamless mobile experience. The integration of eSIM and 5G technology is poised to

revolutionize travel experiences for both travelers and service providers alike.

Citing a recent example, in July 2024, Ooredoo Kuwait launched innovative roaming solutions to support travelers from Kuwait, whether they be Ooredoo customers or not. A key feature is the Ooredoo Roaming eSIM, designed to enhance connectivity and convenience during their travels.

Roaming and 5G Monetization

As mobile communications advance to 5G and beyond, the industry is set to integrate these networks with cloud and AI capabilities. This evolution aims to stimulate both new and existing demand among users, driving industry upgrades and fostering robust, high-speed growth.

A McKinsey survey revealed that 14% of 18-to-24-year-olds are willing to pay for 5G boosters to enhance gaming or video streaming temporarily, using them an average of seven times a month if priced at USD 1. Additionally, 15-20% of customers are open to paying 7.5-15% more for "business class" 5G plans.

With this in mind, travelers tend to prefer greater downlink speeds, whereas live-streamers and gamers might care more about uplink and network latency.

Network APIs enable the creation of subscriptions, services, and applications that shift the 5G value proposition from abstract enhanced connectivity to tangible, desired customer experiences. A prominent example of a successful telco integration is international mobile roaming, which now allows seamless calling across borders and networks—a feat requiring extensive orchestration through bilateral contracts and operator consortia.

With the advent of 5G and IoT, new opportunities for monetizing roaming have begun to emerge. Network slicing under 5G allows Mobile Network Operators (MNOs) to offer differentiated services and premium benefits across expanded use cases. IoT devices, in particular, are poised to heavily depend on roaming services, creating a burgeoning market segment for MNOs.

Roaming agreements are pivotal in ensuring uninterrupted 5G connectivity

and interoperability across operators and international borders. This capability supports ultra-high speeds, low latency, and extensive device connectivity, facilitating a wide array of innovative applications and services.

Notably, before COVID-19 and the rollout of 5G, most roaming agreements were already established and technology-neutral. Managing a high-quality roaming experience involved handling commercial agreements, partnerships, testing and launching services, maintaining thousands of test SIM cards, complying with regulations, mitigating roaming fraud, ensuring revenue assurance, providing value-added services like welcome messages, supporting retail, and managing charging, billing, and settlements with roaming partners.

Recent studies show that travelers from Qatar and the UAE enjoy the best 5G roaming performance in the Gulf region, with Qatar being the fastest destination for 5G roamers. Conversely, roamers from Kuwait and the UAE faced notable declines in 5G network performance while roaming.

Telcos Taking Travel to New Heights

In an exclusive interview with Tamara Al Bakri, Head of Roaming and Carrier Services, Vodafone Qatar, Telecom Review delved into how Vodafone Qatar is differentiating its offering by launching the GigaNET VoLTE (Voice Over Long Term Evolution) technology, which provides superior voice and video calling and a fast internet connection simultaneously with no interruptions.

From a roaming perspective, this represents an extraordinary evolution in mobile telecommunications. As of December 2023, Al Bakri confirmed that 85% of Vodafone Qatar's data roaming is carried out on 5G.

In the Gulf region, travelers generally favor using 5G roaming services, often due to local operators offering affordable data plans. Migrant workers have also opted for local SIM cards to avoid roaming charges. Recognizing this trend, Gulf operators are leading the way in adopting 5G Standalone (SA) and enhancing roaming capabilities.

As the demand for roaming services continues to grow, the roaming clearing

market is experiencing significant expansion. The integration of 5G networks with roaming services necessitates efficient and reliable roaming clearing solutions capable of managing the increased volume of data and transactions.

In 2019, Etisalat Carrier & Wholesale (C&WS) and Sparkle announced the establishment of a 5G data roaming interconnection between Etisalat and TIM, facilitating 5G roaming between the Middle East and global destinations. This strategic partnership sets a precedent for 5G in the global mobile and carrier community. Expo 2020 became the first major commercial customer in the MEASA region to partner with Etisalat on 5G.

In early 2020, Batelco became Bahrain's first operator to introduce 5G international roaming services in the UAE, in collaboration with du. In 2021, Omantel became Oman's first mobile network operator to provide 5G international roaming, ensuring customers enjoy seamless access to high-speed data services while abroad.

Moreover, in mid-2023, du and Zain Omantel International (ZOI) formed a strategic wholesale international agreement that guarantees exceptional voice, messaging and data roaming services powered by advanced 5G technology connectivity.

Conclusion

The impact of 5G on travel is profound and multifaceted, offering enhanced connectivity, innovative services, and new revenue streams for service providers. As 5G continues to roll out globally, its potential to reshape the travel industry remains limitless, promising a future where connectivity is as essential to the journey as the destination itself.

Monetizing 5G, roaming, and eSIM technologies are essential development sectors that telcos must actively address to become future-ready. Success in the competitive telco landscape depends on leveraging these advancements to offer enhanced connectivity, streamlined roaming experiences, and new applications. **TR**



The Motivation Behind ITU's CitiVerse Initiative

Developing regional economies is a crucial strategic move with far-reaching economic implications. Unlocking the potential of regional growth demands a multifaceted approach encompassing strategic vision, robust governance, human capital development, infrastructure enhancement, and investment attraction.

Interestingly, the COVID-19 experience permanently changed the global outlook towards technological potential. It was well proven that in times such as the infamous viral pandemic, technology, ICT in particular, provided important solutions that had never been implemented. For example, conducting business meetings remotely in the wake of movement restrictions, contactless transactions to keep businesses running, telemedicine, disaster management and the proliferation of e-commerce.

As such, with these experiences, the inclination towards the possibility of transitioning into a virtualized environment for economic growth is increasingly being considered within the realm of reality. The rise of the digital marketplace, encompassing the metaverse and the concept of an AI-enabled Economy of Things are being seen as the pillars of the digital economy. Moreover, addressing the two-pronged dilemma of balancing economic growth and sustainability hinges on technological solutions that promise to turbocharge operational efficiency and lower energy consumption.

The Advent of 5G-Advanced, Artificial Intelligence and Smart Cities

It is safe to say that this push toward digitalization has been accelerated by the evolution of 5G to 5G-Advanced connectivity, which is expected to catalyze innovative digital solutions across sectors, transforming traditional modes of communication and connectivity. The ultra-low latency, high bandwidth capacity of this technology accelerates the integration of emerging technologies such as artificial intelligence and cloud computing and improves network flexibility, enabling more complex and varied use cases, ranging from smart cities to advanced industrial applications.

Interestingly, Huawei proposes distinct capabilities for 5.5G, including 10 Gbps downlink and 1 Gbps uplink support for 100 billion connections and native intelligence. Moreover, it is urging industry players to standardize

frameworks in accordance with 3GPP, ETSI and ITU regulations. Huawei believes that incubation projects piloting new use cases will lead to the advancement of a prosperous industry ecosystem that will speed up digital and intelligent transformation.

Similarly, world-leading equipment manufacturers, Ericsson and Nokia, are setting up 5G networks along with network providers in new markets in the MENA region and globally.

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

Similarly, the concept of smart cities has evolved as a result of countries' need to keep pace with global advancements. The smart city model incorporates the use of digital technology to provide solutions to monitor, manage and enhance key infrastructure and public services to improve the experience of its citizens. With this potential explosion of the population in cities, governments are under pressure to look for ways they can reduce energy usage, lower carbon emissions and save costs.

As such, there is an urgent need to integrate the technological potential of the virtual world into key tangible industries, such as urban planning, tourism and education, and others, to improve decision-making and enrich urban living for all. Understanding the interplay between technology, societal trends, and economic factors becomes extremely important in benefiting from these technological advancements.

Seeking Solutions

The Global Initiative on Virtual Worlds, Discovering the CitiVerse, was launched by the International Telecommunication Union (ITU), the United Nations International Computing Centre (UNICC) and Digital Dubai on 14 June 2024 during the first UN Virtual Worlds Day.

The CitiVerse Initiative serves as a global platform that aims to foster open, interoperable and innovative virtual worlds that can be used safely, and with confidence, by people, businesses and public services.

The initiative will develop guiding frameworks addressing principles, enablers and governance for applying metaverse solutions in cities. It will provide training and host events to disseminate knowledge, raise awareness and share best practices and solutions among cities worldwide.

In addition, it will deliver a sandbox environment for testing and experimenting metaverse scenarios in cities around the world.

How will the CitiVerse Empower Citizens?

As per the UN Economic and Social Affairs Department, 70% of the global population is expected to live in cities by 2050. Cities will account for 70 percent of GHG emissions and will contribute more than 80% of the global GDP. Notably, the agency reports that 99% of the global urban population breathe polluted air.

Considering the state of affairs in our cities today, the CitiVerse Initiative is seen as the integration of cities with metaverse solutions, enabling technology to redefine the way that we live in cities, create economic opportunities and solve economic challenges.

For instance, the Dubai Metaverse Strategy, launched in 2023, aims to place Dubai in the top position in the region and the top 10 globally in terms of a metaverse economy. The main objectives of the strategy include: a five times increase in the number of blockchain and metaverse companies in 5 years, 40K metaverse-

supported virtual jobs added by 2030 and USD 4 billion added to the economy in Dubai in a five-year timeframe.

These objectives will be achieved by leveraging technologies such as Web 3.0, AR/VR and XR as well as digital twin technologies. The five pillars of the CitiVerse initiative encompass fostering innovation, cultivating talent, developing use cases, adopting and scaling safe platforms and redefining regulations and infrastructure.

Investment in Computing Power, Sustainability and Regulations

To ensure the successful widespread implementation and adoption of these new solutions, investments in data management and digital infrastructure will be vital. Major global companies are investing in their cloud and data storage capacities to meet the growing demands of their customers. Standard data centers are not designed to process the volume of data exchange that is expected to take place as a result of the hyper-interconnected environment. Global data center investments are expected to increase from USD 321 billion in 2022 to USD 410 billion in 2025 to support the growth of generative AI (GenAI), mobile connectivity, smart grids, and other forms of tech-based infrastructure. Moreover, major technology companies are trying to balance the growing carbon footprint of AI deployments.

In recent news, Google reported an increase in its greenhouse gas (GHG) emissions for 2023, attributing this rise to powering data centers that support AI operations. Similarly, Microsoft’s latest sustainability report showed a 29% increase in GHG emissions last year compared to 2020. Companies like Microsoft, Amazon, Airbus, and even Lego are willing to pay upwards of USD 1,000 per tonne of CO2 captured—stored in the form of carbon credits—to offset their emissions.

Currently, energy storage solutions are not yet capable of responding to contemporary demand cycles, and innovative business solutions and technology models. Traditional power



grids suffer from significant energy losses during transmission and distribution, affecting overall efficiency and increasing operational costs. As such, OEMs like Huawei are also supporting the energy management domain with innovative solutions.

For example, Huawei’s Intelligent Distribution Solution (IDS) offers several advantages, including meeting growing energy demands, renewable energy integration and building a sustainable future. It also helps utility providers meet these demands efficiently and sustainably, balancing supply and demand, managing fluctuations, and optimizing energy storage solutions. Initial tests across multiple countries in the Middle East, Asia, and Africa have already shown promising results.

Furthermore, numerous challenges need to be overcome to capture the metaverse opportunity in our cities. The ITU has established a metaverse-centric focus group and is continuously collaborating with industry players to develop the interoperability, standards and guidelines, data privacy, infrastructure, legal regulations, security and safety, economic value and competition that is crucial to facilitate the integration of a secure and reliable digitalized economy into the fabric of the cities of the future. **ITU**



There is an urgent need to integrate the technological potential of the virtual world into key tangible industries, such as urban planning, tourism and education, and others





Education Technology Day: Reflecting on EdTech's Global Influence and Innovation

Worth over USD 340 billion, the EdTech market is making waves as digital learning tops corporate skill-building trends. With interactive whiteboards and online platforms, technology is revolutionizing education and work, unlocking limitless potential.

September 23 is celebrated annually as the 'Education Technology Day.' Given that telecommunications contributes to the vital

success and operation of EdTech tools, Telecom Review conducted an analysis of the industry's mutualistic relationship, appreciating how far educational technology has come and how it continues to shape societies and businesses.

EdTech's Continued Impact and Evolution

During the COVID-19 pandemic, digital learning tools and platforms played a crucial role in ensuring that education remained accessible as schools worldwide closed. To mitigate the

pandemic's impact, UNESCO launched the Global Education Coalition, engaging international organizations, civil society, and enterprises like Huawei to ensure that "Learning Never Stops."

Today, colleges and universities increasingly rely on technology for online and remote education. Computers and mobile devices have taken a central role, with fast broadband connectivity becoming essential.

From virtual labs to augmented reality, the adoption of educational technologies has accelerated in recent years, transforming lesson planning, communication, access to resources, research, and teaching practices. Alongside this, educators have had to adapt to keep pace with technological advancements since technology evolves faster than educational environments.

To meet the demands of diverse industries, the success of current and future generations hinges on educational technology.

EdTech Redefines Learning

EdTech encompasses the integration of technology with education to enhance learning and teaching experiences. It includes the use of hardware, software, and digital resources designed to facilitate educational processes and improve educational outcomes.

In 2021, Etisalat launched its first-ever virtual 'Digital Summer Camp' which was designed to equip the children of Etisalat employees with necessary skills in science, technology, engineering, and math (STEM) disciplines.

Moreover, technology has made education accessible globally via online courses and virtual classrooms. This accessibility benefits individuals in remote areas or with disabilities, offering quality education from home, or anywhere, and presenting opportunities that were previously unavailable.

A 2023 UNESCO report highlighted the digital learning gap between wealthy and developing nations. Users

in wealthy countries consumed 35 times more mobile data on average than those in developing countries, highlighting the disparities in EdTech experiences among students worldwide.

Bearing this in mind, quality digital content often incorporates data-heavy features like videos, graphics, interactive lessons, live sessions, and games. That is why universal meaningful connectivity (UMC) and affordable data usage would help unlock EdTech's full potential to deliver interactive, engaging education for all.

To achieve this, Zain partnered with Baims, a leading Kuwait-based e-learning platform to empower the digitalization of the local education sector, expand the youth's digital upskilling and literacy and provide students with the academic content and competencies needed to thrive in today's market.

Digital Literacy in Today's Tech-Driven World

Educational technology not only familiarizes students, and even employees, with diverse tech tools but also readies them for careers that heavily depend upon technological skills. Therefore, integrating technology into education ensures that the essential skills vital for future success are gained.

PLAYBOOK is a professional network and an EdTech solution for women in business. CEO, Wafa Al Obaidat, noted that their aim is to develop "accomplished women who have successfully navigated fundraising, ascended to CEO positions, served as ministers, or ventured into space, to reverse engineer the soft skills they acquired."

EdTech is a phenomenal industry that has proven to be effective for people to upskill at the workplace, at their own pace, with entertaining content that is practical and relatable.

Quoting Fatima Sultan Al-Kuwari, Group Chief Human Resources Officer, Ooredoo Group, "Staying ahead demands a commitment to continuous

learning and upskilling. As technology becomes increasingly integrated into every aspect of our lives, digital literacy is no longer an option but a necessity."

Impact on Society

From a social perspective, EdTech has removed geographical barriers in education. This newfound access extends to lifelong learning, empowering individuals to continually enhance their skills and knowledge regardless of their age or location.

iQ Iraq continues to support the education sector by creating an informed and capable generation. They believe that education is an important pillar that influences the progress of people and societies.

Huawei and the Institute for Lifelong Learning (UIL) have agreed to jointly promote the use of technology to raise literacy statistics and enhance educators' use of technology in developing countries.

Oman has also made significant investments in educational platforms such as the Oman Educational Portal (OEP), which offers accessible digital resources and tools to students, teachers, and parents.

As per a Kaspersky survey, more than half of the surveyed employees in the Middle East, Turkey, and Africa (META) region expressed a deficiency in digital skills when working with computers and other digital devices. The respondents believe that by enhancing their digital skills, they could potentially increase their earnings by an average of 41%.

Personalized learning has become a reality, thanks to adaptive learning systems that cater to individual needs by strengthening their weaknesses while nurturing their strengths. This flexibility allows learners to progress at their own pace, ensuring a more effective educational journey.

The UAE's Minister of State for Artificial Intelligence, Digital Economy, and Remote Work Applications, Omar bin Sultan Al Olama, emphasized that as generative artificial intelligence

continues to evolve, the significance of cultivating digital skills has grown. There is a need to ensure the agility of talents to adapt to new technologies and keep pace with global changes.

He also highlighted the success the UAE has demonstrated following the introduction of AI into educational curricula. This encompasses teaching students programming methods and the ethics regarding artificial intelligence.

Interestingly, engagement in learning has reached new heights following the introduction of interactive content. Students are no longer passive recipients of information but active participants, making learning both enjoyable and effective. Multimedia resources, such as videos and podcasts, cater to diverse learning styles, ensuring that every student finds a method that resonates with them.

Without a doubt, the digital era demands new skills, making digital literacy a fundamental skill in navigating modern life.

Impact on B2B

In the B2B realm, EdTech is revolutionizing workforce training and development. Companies are leveraging digital platforms for continuous professional development, ensuring their employees remain at the cutting edge of their fields.

Despite COVID-19 related challenges and social distancing requirements, stc Kuwait has continued to implement its sustainable learning environment, elevating the level of knowledge and expertise possessed by its existing skilled workforce through advanced digital platforms such as LinkedIn Learning.

du also plays an important role in engaging and equipping the future workforce with dynamic skill sets that are valuable when working at various companies, organizations and within communities. In July 2024, the telco launched its Future X graduate program, which is designed to facilitate the creation of Emirati talent through

digital-focused trainings and tailored programs that reflect the innovative world and the market's demands.

Promoting knowledge sharing and collaboration is crucial in today's dynamic business landscape. The 'du Business Entrepreneurship Programme' aims to enhance digital literacy among SMEs by offering practical training in communication, marketing, and cybersecurity, thereby boosting productivity and fostering innovation.

Furthermore, employees can keep abreast of industry trends through online courses and certifications, bringing new ideas and perspectives to their roles. Providing IT professionals with adequate resources and learning platforms is essential in the quest to address the tech talent shortage and prevent outdated ICT skills due to limited educational resources.

Customer education is another area in which EdTech is making a substantial impact. Companies are educating their customers about their products and services through online training modules, webinars, and workshops, thus, enhancing customer satisfaction and loyalty.

Overall Digital Transformation Impact

Forming one of the pillars of digital transformation, for any organization to digitally transform, education should be the first priority. Without this, companies can't successfully implement digital transformation and digital culture initiatives.

Having said that, a cultural shift towards a digital mindset is becoming evident as EdTech fosters a culture of continuous learning and adaptation. This cultural change promotes collaboration and innovation—essential components of a successful digital transformation.

Scalability is another significant benefit. Digital platforms can expand education and training programs globally, reaching a larger audience without the constraints of physical infrastructure. This scalability ensures that the benefits of EdTech are

accessible to a broad and diverse population.

Finally, EdTech contributes to sustainability efforts by reducing the physical footprint associated with traditional education and training. Digital resources minimize the need for physical materials, supporting environmentally friendly practices.

Conclusion

EdTech is a powerful catalyst for digital transformation. It enhances access to education, personalizes learning experiences, improves workforce skills, fosters innovation, and promotes a digital-first mindset across society and businesses. As we navigate the digital era, EdTech will continue to play a crucial role in shaping a more connected, informed, and innovative world. **TR**



To meet the demands of diverse industries, the success of current and future generations hinges on educational technology



du's 'Envision' 2024: Elevating AI-Driven Digital Transformation in the UAE



du has proudly announced the second edition of 'Envision,' its annual tech event platform, under the patronage of the Digital Dubai Authority. Set to be held in September 2024, the event will explore the theme, "Gathering Nation's Leaders for Progress with AI-Driven Digitalization," and will host government dignitaries, industry leaders and decision-makers, serving as a space for notable discourse in an effort to forge a pathway towards an AI-enabled future.

H.E. Hamad Obaid Al Mansoori, a proud du partner for this significant global event, stated, "This vision aligns with Dubai's Digital Strategy, focused on crafting a future powered by artificial intelligence, digital transformation, and sustainable technologies. Envision 2024 stands as a vital global platform for shaping the future, particularly in areas like cloud computing, AI-driven data centers, and smart cities, all contributing to the city's societal well-being and economic growth."

Adding his perspective, Fahad Al Hassawi, CEO of du, said, "The second edition of our exclusive yearly tech event platform, Envision, is poised to mark a transformative period in the UAE's journey towards a future crafted by the hands of AI-driven digitalization. Transcending technological advancement, it is about scripting a new narrative where digital infrastructure and platforms become the backbone of a thriving society that can enable advanced technologies to come to life for a better tomorrow."

Exclusive Tech Event on AI

Envision 2024 aligns with the UAE's visionary goals, where the attendees will have the unique opportunity to engage with and experience the innovative use cases of the advanced technologies driving significant changes across various industries.

Expert-led keynotes and panels will feature thought leaders such as H.E. Hamad Obaid Al Mansoori, Director General, Dubai Digital Authority and Fahad Al Hassawi, Chief Executive Officer, du, who will share their vision and future forecasts in key areas of AI, smart cities, cloud, data centers and sustainability.

"Here, every leap in innovation is a step towards ecological stewardship, economic vitality, and societal well-being. We aren't just

envisioning a smarter nation; we are actively constructing an ecosystem that resonates with our ethos of shared prosperity, happiness, and sustainable living for all who call the UAE home," continued the du CEO.

The second edition of Envision aims to elevate the government, manufacturing, healthcare, education, smart cities, banking, transportation, agricultural and other industries through the integration of advanced technologies such as 5G, cloud, AI, IoT, data analytics and data centers.

"We extend our gratitude to du for their unwavering commitment to fostering public-private partnerships that drive digital transformation and harness the power of advanced technologies, especially artificial intelligence," concluded H.E. Al Mansoori.

The exclusive tech event is designed to foster discussions that propel the UAE's technology transformation towards achieving a happier, greener, and more efficient world.

Telecom Review was invited to attend du's inaugural exclusive tech event last year, which was endorsed by the Ministry of Industry and Advanced Technology (MoIAT) and focused on technological innovation and sustainable development.

stc Group's Annual Dividend Distributions Increase from SAR 1.6 to SAR 2.2



The stc Group's Board of Directors has recommended increasing the annual cash dividends by 37.5%, from SAR 1.6 to SAR 2.2 per share annually, raising the total amount from SAR 8 billion to SAR 11 billion over the next three years.

The dividend distribution policy will be presented to stc's General Assembly at

its next meeting, the date of which will be announced later.

This recommendation is based on the group's solid financial position and exceptional operational performance, supported by stc's strategy focused on continued expansion and growth.

Unlocking Fintech Innovation



E-KYC

E-Wallet

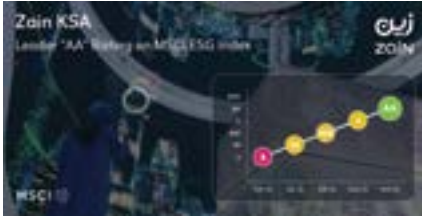
Money Transfer



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Zain KSA Recognized as Leader in ESG Practices in the ICT Sector



For the fourth consecutive year, Zain KSA, the leading telecom and digital services provider, has advanced its position in the Morgan Stanley Capital International (MSCI) ESG Index, upgrading its rating to 'AA' from the previous year's 'A'. This achievement places Zain KSA in the 'Leader' category among 179 global telecom companies assessed by this index—a leading benchmark for evaluating environmental, social, and governance (ESG) performance.

Zain KSA's upgraded rating highlights its instrumental efforts and significant achievements over the past year. This progress underscores the company's transformation into a model that integrates sustainability practices across all departments, operational processes, and throughout its value and supply chains. The company's

commitment has driven national-level sustainability initiatives that address environmental, social, compliance, and governance issues, further enhancing its contribution to achieving Saudi Vision 2030's goals for sustainable development.

Leading ESG Practices

Reflecting on this significant milestone, Eng. Saad bin Abdulrahman Al-Sadhan, Acting CEO of Zain KSA, remarked, "We are grateful for the significant impact Zain KSA has made in adopting leading ESG practices within the global telecom and digital services sector. Achieving an AA rating in the MSCI ESG Index highlights the success of our strategic direction, which focuses on leveraging unique investments to benefit society, the economy, and the nation."

"This milestone not only reflects our contribution to Saudi Vision 2030 but also supports our astute leadership's aspirations for human well-being and environmental prosperity, aligning with international efforts in these crucial areas. We address this comprehensively by embedding sustainability into our business

strategy through an environmentally friendly framework based on three core pillars: profitability, people, and the planet.

"Our commitment reflects our dedication to advancing digital progress while upholding our societal responsibilities through our ESG strategy. Grounded in responsible practices, this strategy not only creates value for all stakeholders but also fosters a sustainable future for the planet. This milestone is a testament to the collective efforts and dedication of the Zain KSA family. It also stands as a lasting tribute to our former CEO, Eng. Sultan Bin Abdulaziz Al-Deghaither, who was a trailblazer in promoting sustainability within the telecom and digital sector at the national level."

Extensive Recognition

Zain KSA has achieved a notable 'A-' rating in climate change management from the Carbon Disclosure Project (CDP), a classification awarded to companies that meet CDP standards by disclosing information on the environmental impact of their initiatives and operations.

Ooredoo Oman's Latest Achievement: 5.5G Sets New Fastest Network Speed



Ooredoo has successfully tested groundbreaking 5.5G technology, raising the bar for connectivity in Oman. This isn't just an upgrade; it's a whole new level of speed, capacity, and reliability that is set to redefine connectivity in Oman.

With this success, Ooredoo is once again proving it's at the cutting edge of telco innovation and setting new

standards in speed, capacity, and reliability.

5.5G is the cornerstone of Ooredoo's vision for an intelligent future, bridging the gap between 5G and the future 6G landscape. It's the backbone of network evolution, fueling service innovation and enabling seamless digital experiences across all scenarios. Utilizing 5.5G, consumers will experience lightning-fast downloads and uploads, which bode favorably in the gaming, streaming and corporate sectors.

In line with this, Ooredoo Oman participated in Telecom Review's recent virtual panel entitled "Technology Chiefs Delve into 5G-Advanced," which shed

light on the current trends in 5G-A adoption and digital transformation outcomes at length.

Dr Ahmed Al Abri, Chief Technology and Information Officer at Ooredoo, said, "We are all about pushing boundaries, and 5.5G is our latest achievement. We're bringing our customers something that's not just faster, but smarter as part of digital Vision Oman 2040. During the test, 5.5G technology achieved a single-user peak rate of over 4.6 Gbps, setting a new record for the fastest network speed in Oman, bringing an unprecedented network experience to users. We extend our sincere thanks to the Telecommunications Regulatory Authority (TRA), for facilitating this test."



CapEx Trends in Telecoms: Balancing Efficiency, Innovation, and Market Demands

Reduced CapEx in the telecom industry signifies a strategic shift towards more efficient and flexible investment approaches, potentially leading to innovation and new growth opportunities while balancing the risks of underinvestment.

While decreasing CapEx may prove to be challenging for vendors and civil engineering firms with contracts, it also presents operators with opportunities to enhance cash flow and explore strategic alternatives.

Analysys Mason forecasts predict that capital intensity (CapEx/revenue) will decrease from approximately 20% to 12–14% by the decade's end. This decline reflects diminishing customer demand for speeds beyond 1 Gbit/s fiber and unlimited 5G, as current networks adequately meet these requirements, slowing measurable demand growth annually.

The CapEx Reduction Trope

Telecom Review previously shared that a more stable CapEx trend relative to previous generations is anticipated as operators try to keep their CapEx-to-revenue ratios below a certain threshold. And to achieve that, operators must ensure that investments are made at the right time and place, and in the right way, which is continuously being seen across the industry.

These approaches help operators maintain competitiveness and profitability while managing capital expenditures more effectively:

Enhanced Profitability: Lower CapEx can lead to improved profitability and cash flow. For example, in Q1 2024, du's CapEx amounted to AED 359 million, while operating free cash flow for the year increased by 28.2% to AED 1.2 billion. These CapEx investments are being directed towards continuous 5G coverage and fiber deployment as well as the ongoing transformation of du's IT and network infrastructure.

Operational Efficiency: Telecom companies might focus on optimizing existing assets and enhancing operational efficiency, ensuring they get the most out of their current investments. In parallel to 5G deployments, cloud BSS would help

CSPs on multiple fronts, such as reduced costs due to shared resources, improved operational efficiency, and increased monetization capabilities.

New data from Dell'Oro Group indicates that the global mobile core network market will decline at a CAGR of 10% from 2023 to 2028. As of the end of 2023 until the time of writing, the number of commercially deployed 5G Standalone (5G SA) networks remains around 50. This slow growth means vendors face reduced spending on core network equipment. However, if operators currently evaluating, planning, and piloting 5G SA networks proceed with commercial launches, the number of deployed networks could increase significantly.

Shift to OpEx Models: There may be a shift from CapEx to operational expenditure (OpEx) models, such as adopting cloud-based services and outsourcing certain operations. This can provide more flexibility and scalability while reducing upfront costs.

NEC noted that in system integration, inefficient activities such as siloed approaches and excessive customizations without following industry standards can lead to increased costs and time required to complete the work.

Increased Focus on Digital

Transformation: Reduced CapEx could lead telecom companies to invest more in digital transformation initiatives, such as automation, AI, and software-defined networking (SDN), which often requires less physical infrastructure investment.

Netcracker suggested that modern networks must be cloud-native, react in real-time and support intent-based orchestration. Thus, CSPs can leverage automation technology and best practices, including AIOps and E2E service orchestration, to monetize cutting-edge services and maintain the highest levels of customer experience.

From a server perspective, Dell'Oro Group tipped that data center CapEx is set to surge 11% in 2024, as new AI

applications such as generative AI will be a key investment driver in the cloud and enterprise. AI data center spending alone could nearly triple today's overall CapEx figure, but only time will tell if this will materialize in a healthy and sustainable way.

Investors are growing increasingly concerned that hyperscalers, including Amazon, Meta, Microsoft, and Alphabet, are spending too much on artificial intelligence, according to Goldman Sachs Group Inc. strategists, upon utilizing about USD 357 billion for capital expenditure as well as R&D in the past year.

PMP Strategy believes that by leveraging AI in thoughtful and strategic ways, ICT companies can navigate the challenges of the current market landscape, ensuring sustainable growth and competitive advantage.

Partnerships and Collaborations:

Telecom companies might seek more partnerships and collaborations with technology providers, infrastructure companies, and other stakeholders to share the burden of large capital investments.

According to Netcracker, telcos have historically allocated substantial CapEx for infrastructure, which often doesn't generate the same revenue as services and other areas. Consequently, they have depended heavily on technology partners for development.

e&'s expansion into Europe aims to achieve significant OpEx and CapEx savings through their collaboration with PPF Group, while also creating opportunities to introduce e&'s advanced B2B and B2C digital products in Central and Eastern Europe (CEE).

Network Sharing and Co-Investment:

Companies may increasingly adopt network-sharing agreements and co-investment models to reduce individual CapEx while still expanding and upgrading their networks.

In Vodafone Oman's case, the telco leveraged the government's

infrastructure investments by adopting a different approach to its own assets. Instead of constructing its own telecom towers, Vodafone Oman leased tower capacity from local entities, maximized site sharing, and formed partnerships with state-owned companies.

Network Virtualization: Network virtualization significantly reduces CapEx by shifting from hardware-centric to software-centric solutions. INTEGRASYS CEO, Alvaro Sanchez, previously expounded that updating software applications is more cost-effective and easier than upgrading physical hardware. This approach enhances network security, providing a competitive edge in customer success.

Moreover, virtualization extends the life of network infrastructure, yielding better returns on investment. For example, upgrading a 4G cell tower to 5G through virtualization avoids the high costs of new hardware, supporting scalable and adaptable business models while ensuring long-term financial and operational benefits.

Intelligent IT Integration: Addressing the role of IT integration in reducing CapEx at MWC24, Bruce Xun, President of Huawei's Global Technical Service Department, highlighted the importance of intelligent IT integration in creating diversified computing centers for the AI era, citing an example for reference. He explained that Huawei's intelligent IT solutions, particularly the innovative prefabricated Fusion Block data center, significantly enhances efficiency in general data center scenarios. These solutions shorten time-to-market (TTM) by 29%, improve space usage effectiveness by 10%, and reduce initial CapEx by 30% compared to traditional data center solutions.

Innovation and New Business Models: With lower CapEx, telecom companies might explore new business models and revenue streams, such as offering more value-added services, digital services, and solutions tailored to specific industries.

Shifting from being a telco to techco, the "e& partners network" program will support operators in customer



engagement and value management, sales channels and customer experience, pricing and proposition support, AI/ML modeling, international carrier and wholesale channels, network procurement and overall CapEx and OpEx optimization and digital and mobile finance services.

Focus on Asset Monetization: Telecom companies might look to monetize their existing assets more effectively, such as through leasing infrastructure or selling off non-core assets. In January 2023, Zain Group announced a 15-year agreement with TASC Towers Iraq to sell and lease back its 4,968 tower portfolio in Iraq for USD 180 million, including management rights. This move allows Zain to focus on its core business and enhance mobile and data services for customers by freeing up resources.

Similarly, in June 2024, Nokia's divestment of Alcatel Submarine Networks (ASN), identified as a non-core standalone business, enables the company to focus on growth opportunities in its core Network Infrastructure markets and enhance profitability within its Network Infrastructure Business Group.

Potential Risks: Reduced CapEx could also imply potential risks, such as underinvestment in network infrastructure, which might affect service quality and competitiveness in the long term. During events beyond control, such as Russia's invasion of Ukraine, CapEx for new broadband network infrastructure rollout in the country decreased. Network deployments were slowed or suspended to prioritize the health and safety of engineers.

Outlook

In the long term, the ICT market is likely to see a rebalancing, where the focus shifts from sheer volume of investments to the strategic quality of those investments. This could result in a more resilient and adaptable industry that is better prepared to navigate economic fluctuations and technological disruptions.

Ultimately, while the reduced CapEx trend might pose challenges, it also opens avenues for a more thoughtful and sustainable growth trajectory in the ICT sector. The industry's ability to adapt and innovate in response to these constraints will be crucial in defining its future landscape. **TE**



Chasing the Hybrid Cloud: Telecom's Path to Agility and Efficiency

Hybrid cloud deployment can be likened to having the best of both worlds in today's digital landscape. It's a strategic approach where businesses blend private and public cloud environments to achieve flexibility, seamless operations, enhanced collaboration, top-notch security, and cost efficiency; it's all about balancing resources effectively, ensuring that IT infrastructure can adapt and scale as needed without breaking the bank.

Since the start of modern cloud computing in 2006, the cloud industry has erupted into a billion-dollar market, and the hybrid cloud has already been developed as one of the leading infrastructures to support digital transformation.

Today, adopting hybrid or multi-cloud strategies goes beyond just avoiding vendor lock-in because hybrid cloud automation in the telecom sector is reshaping business outcomes significantly. Data from Fortinet reveals that a majority of organizations opt for hybrid cloud (39%) or multi-cloud (33%) approaches to harness diverse services, scale operations seamlessly, and bolster business continuity efforts.

By allowing businesses to optimize resources by seamlessly integrating public cloud services, like AWS or Azure, with existing private cloud or on-premises infrastructure, hybrid cloud's flexibility empowers organizations. They can scale computing resources up or down based on fluctuating demands, ensuring optimal performance without over-provisioning.

Hybrid Cloud Industry Trends in 2024

The evolution of the hybrid cloud in 2024 is characterized by its adaptability to diverse workload requirements, enhanced security measures, integration with emerging technologies like AI and edge computing, and a focus on sustainability and operational efficiency.

Multi-Cloud Strategies: Organizations are increasingly adopting multi-cloud approaches, leveraging multiple public cloud providers alongside private cloud environments. This strategy helps mitigate vendor lock-in, optimize performance, and enhance resilience by spreading workloads across diverse cloud platforms.

Edge Computing and AI/ML Integration: The integration of a hybrid cloud with edge computing brings computing resources closer to the point of data generation, reducing latency and enhancing real-time processing capabilities. Hybrid cloud environments

are being extended to the edge to support applications that require rapid data analysis and response times.

Moreover, hybrid cloud environments are becoming more adept at integrating artificial intelligence (AI) and machine learning (ML) capabilities. This integration enables organizations to leverage AI/ML algorithms across hybrid infrastructures for tasks such as data analytics, predictive maintenance, and customer insights, enhancing decision-making and operational efficiency.

Enhanced Security Measures: With growing cybersecurity concerns, hybrid cloud solutions are focusing more on enhancing security measures. This includes adopting advanced encryption protocols, implementing identity and access management (IAM) solutions, and integrating automated threat detection and response mechanisms across both public and private cloud environments.

Containerization and Kubernetes Adoption: Containerization technologies, such as Docker and Kubernetes, are increasingly being integrated into hybrid cloud architectures. Containers provide a lightweight, portable method for deploying applications across different cloud environments, enhancing flexibility and scalability. Kubernetes, in particular, help orchestrate containerized workloads across hybrid infrastructures, simplifying management and optimizing resource utilization.

Hybrid Cloud Management Platforms: The demand for comprehensive hybrid cloud management platforms is rising. These platforms provide centralized visibility and control over hybrid cloud resources, facilitating workload migration, performance monitoring, cost management, and compliance across diverse cloud environments. Integration with DevOps tools and automation capabilities further streamlines operations and accelerates application development cycles.

Green Cloud Initiatives: Sustainability is becoming a significant factor in cloud computing decisions. Hybrid cloud

solutions are increasingly integrating green cloud initiatives, such as using renewable energy sources for data centers, optimizing energy efficiency, and reducing carbon footprints. This aligns with corporate social responsibility goals and regulatory requirements related to environmental impact.

Hybrid Cloud Adoption for Telecom and AI

Telecom operators globally adopt private, public, and hybrid cloud computing differently. This variation depends on existing technology complexity, adherence to performance and regulatory standards, and economic factors between public, private, and hybrid clouds.

In 2017, VIVA Bahrain set a milestone by launching the world's first Hybrid Cloud Core Network. This innovative network architecture enabled VIVA Bahrain to deliver enhanced connectivity services with improved flexibility and scalability, meeting the growing demands of both consumers and businesses.

Following VIVA Bahrain's lead, in 2019, PCCW Global made a strategic commitment to become the digital platform of choice for hybrid cloud utilization. This pledge underscored the telecom industry's recognition of the hybrid cloud's potential to drive innovation and agility while maintaining stringent security standards.

The market has since developed further and, in May 2024, the Commercial Bank of Dubai (CBD), a leading national bank in the UAE, chose HPE GreenLake, hosted in du's advanced Tier III Certified data centers, to enhance CBD's hybrid cloud journey and improve customer and team member experiences. In supporting CBD's hybrid cloud transformation, du will provide connectivity, hosting, network security services and 24/7 support, as their trusted turn-key solution partner.

An open hybrid cloud strategy is ideal for designing, developing, and operating applications across bare metal, virtual machines, private cloud, public cloud, or edge devices. This approach provides

a highly flexible cloud experience, ensuring the speed, stability, and scalability needed for successful digital business transformation.

Red Hat is setting the standard for what hybrid clouds can be and do, with a flexible portfolio to help companies take the next defining step in their industry. “Only an open approach to hybrid cloud infrastructure can give companies the flexibility and freedom they need to unlock the full potential of edge computing,” stated Darrell Jordan to Telecom Review.

Interest in generative AI is driving more enterprises towards hybrid clouds. Companies often need to utilize their data for training, which is typically housed in their own data centers, colocation facilities, or managed service providers. While using generative AI from public cloud providers is convenient, it often involves sharing training data with them, creating a hybrid cloud setup.

Saudi Arabia’s telecom sector has been proactive in adopting hybrid multi-cloud deployments, aiming to expand significantly over the next three years. This adoption is being driven by partnerships—such as the collaboration between Red Hat and Nutanix—which aim to provide robust hybrid multi-cloud solutions tailored to Saudi enterprises.

Cisco has also contributed to this ecosystem by unveiling an advanced cloud platform designed specifically for hybrid operations. This platform empowers telecom companies in Saudi Arabia to manage their network resources efficiently across multiple cloud environments, ensuring optimal performance and resilience.

Generally, hybrid clouds can be beneficial in various scenarios where flexibility, scalability, and security are paramount. Here are some examples:

Scalable Customer Relationship Management (CRM): Telecom companies often manage large volumes of customer data. A hybrid cloud approach allows them to scale CRM systems dynamically. Customer

data can reside in a private cloud for security compliance while utilizing public cloud resources during peak demand.

IoT Data Management: For IoT deployments in telecom, a hybrid cloud enables efficient data collection, storage, and analysis. Local data processing can be handled through private cloud infrastructure, while insights and analytics are conducted in the public cloud, optimizing both latency and costs.

Disaster Recovery and Business Continuity: Telecom networks require robust disaster recovery solutions. Hybrid cloud setups ensure minimal downtime and data loss in case of a disaster by storing critical data and applications across both private and public cloud environments.

Edge Computing Applications: Edge computing is crucial in telecom for reducing latency and improving service delivery. Hybrid cloud models allow telecom operators to process sensitive data locally (edge devices) while leveraging the public cloud for heavy computational tasks and analytics.

Testing and Development Environments: Telecom companies frequently develop and test new services and applications. A Hybrid cloud facilitates cost-effective testing environments by using public cloud resources for temporary development needs, while sensitive or proprietary data remains secured in the private cloud.

Compliance and Regulatory Requirements: Hybrid cloud architectures enable telecom providers to meet stringent regulatory and compliance standards. They can store sensitive data in a private cloud environment to adhere to specific regulations while utilizing the public cloud for less sensitive operations.

Content Delivery Networks (CDNs): CDNs in telecom require a scalable infrastructure to deliver content efficiently. Hybrid cloud models allow telecom operators to cache content close to end-users using local servers

(private cloud) while leveraging the elasticity of public cloud resources during traffic spikes.

These examples illustrate how telecom companies can strategically leverage hybrid cloud environments to enhance performance, scalability, and security across various operational aspects.

Outlook

A hybrid cloud supports the rising deployment of AI applications globally and in the Middle East by providing scalable computing power and flexibility. It allows AI workloads to run efficiently across private and public cloud environments, accommodating varying data sensitivities and regulatory requirements.

Moving forward, this setup will facilitate quicker innovation, cost-effectiveness in resource allocation, and robust data management capabilities, crucial for AI-driven advancements in telecom and beyond. **TR**



Hybrid cloud environments are being extended to the edge to support applications that require rapid data analysis and response times



ICT Leaders Discuss Future of Tech Talent and Digital Transformation in ME&CA



During the Huawei Seeds for the Future 2024 Regional Final, leaders, government officials, private sector experts, and media representatives from the ICT niche came together for an insightful panel discussion on the future of ICT talent and the pivotal role it will play in shaping the future of digital economies.

The event brought together high-ranking officials from the Ministry of Digital Technologies of the Republic of Uzbekistan, UNDP, the University of Dubai, the Research Institute of Environment and Nature Conservation Technologies, and Huawei.

The panel, themed "ICT Talent & Youth Power Driving Digital Innovation & Shaping the Sustainable Future of the ME&CA Region: Public-Private Partnership & Open Collaboration for Shared Success," sparked an engaging discussion on the future of education and digital transformation. The discourse focused on the importance of open collaboration in developing local ICT talent, fostering technological innovation, and creating sustainable, knowledge-based digital economies in the region.

The panel featured prominent figures from various sectors, including Karimjonov Rustam, Deputy Minister of Digital Technologies of the Republic of Uzbekistan; Professor Wathiq Mansoor, Dean of the University of Dubai; Nuriddin Samatov, Research Assistant at the Research Institute of Environment and Nature Conservation Technologies; Bunyod Avliyokulov, Programme Analyst on Effective Governance, UNDP Uzbekistan; and Duke Zhang, Vice

President of Public Affairs, Huawei Middle East & Central Asia.

Dr. Mohamed Madkour, Huawei ME&CA ICT Strategy, delivered the opening remarks, moderated the panel, and facilitated the discussions between the distinguished guests.

To summarize, nurturing local ICT talent fosters an environment of innovation and growth in the digital economy. This is driven by collaborative efforts aligned for smart education and digital inclusion.

The panel discussion facilitated engagement between media representatives and students from the ME&CA region, who convened in Tashkent for a series of activities and training workshops as part of the 2024 edition of Huawei's global initiative, Seeds for the Future. This initiative, which Huawei launched in 2008, has positively impacted over 18,000 students from 141 countries, is endorsed by more than 360 senior officials and heads of state, and has facilitated collaboration with over 500 universities and colleges.

Es'hailSat and Algérie Télécom Satellite Discuss Collaboration to Support Telecom Initiatives



Es'hailSat, the Qatar satellite company, and Algérie Télécom Satellite (ATS) have discussed areas for potential collaboration for supporting telecommunications networks in the country utilizing Es'hailSat's premier satellite services.

Es'hailSat provides satellite, broadcast, teleport and managed services from Doha, Qatar, and powers this relationship with more than 12 years of experience in catering to governments, broadcasters, telecommunication companies, enterprises, and mobility applications across the Middle East and North Africa. Es'hailSat's infrastructure includes two satellites at 25.5°E/26°E, together with a 50,000 sqm teleport facility and provides reliable and robust connectivity services.

Established on July 29, 2006, Algérie Télécom Satellite (ATS) is a subsidiary that aims at to promote and advance satellite telecommunications. This initiative is a crucial aspect of Télécom Algeria GTA Group's comprehensive

development strategy. The group also aims to modernize and expand Algeria's communication infrastructure to support economic development and social progress.

"Es'hailSat is delighted to collaborate with Algérie Télécom Satellite to support various telecom initiatives via our satellite infrastructure," said Ali Ahmed Al-Kuwari, President and CEO, Es'hailSat. "We believe that the experience in providing satellite services to the premier broadcasters, governments and enterprises across Middle East and North Africa aligns Es'hailSat perfectly with ATS' approach of continuous improvement of the telecommunication technology sectors of Algeria."

Telecom Egypt Selects Mada Communications as its Preferred Partner for International SMS Services



Telecom Egypt, Egypt's market-leading telecom operator, announced that it has signed a multi-year agreement with Mada@ Communications (Mada@), a leading telecoms solutions provider, to be its preferred strategic international SMS service provider.

After a rigorous selection process, Telecom Egypt has proudly selected Mada@ as its strategic partner. This decision was driven by Mada@'s extensive expertise, solid partnerships with both local and international institutions, and robust security and protection measures. Additionally,

Mada@'s exceptional platform adaptability and seamless compatibility with Telecom Egypt's existing systems were pivotal factors in this selection.

Mada@ will spearhead the management for all international Application-to-Person (A2P) messaging services including (but not limited to) functionalities such as two-factor authentication and automated notifications. The partnership enables Telecom Egypt to leverage Mada@'s capabilities to deliver a superior experience to its growing customer base while simultaneously maximizing A2P messaging revenues.

Mohamed Nasr, Managing Director and Chief Executive Officer of Telecom Egypt, commented, "This strategic partnership is a natural extension of our long-term successful business relationship with Mada@, the global leader in voice services. In addition, given Mada@'s extensive expertise as the leading A2P

provider in the MENA region, this joint cooperation reinforces our commitment to promoting unorthodox business practices and expanding our business scope, which will contribute to achieving sustainable revenue growth and delivering added value to our customers through integrated, secure and effective communication solutions."

Charles Hage, Chief Executive Officer of Mada@, commented, "We are thrilled and honored to be selected as the preferred carrier for Telecom Egypt's A2P messages. Being chosen by such a major player in the industry is a testament to our commitment to excellence and innovation. A special thanks to both the Telecom Egypt and Mada@ teams for their hard work and dedication in making this partnership possible. We look forward to furthering our cooperation with Telecom Egypt across multiple fronts and bringing exceptional value to their messaging services."

Securing AI-Driven Enterprises: Cisco to Acquire Robust Intelligence



To empower organizations as they embrace AI's full potential while safeguarding their critical assets, Cisco is finalizing a deal which involves integrating Robust Intelligence's technology into the Cisco Security Cloud.

Tom Gillis, Senior Vice President and General Manager, Cisco Security Business Group, noted that traditional security tools often fall short in addressing the unique challenges posed by AI. Hence, there is a pressing need for specialized solutions.

"Our vision for the Cisco Security Cloud centers on leveraging the power of AI to simplify security, enhance user experiences, and proactively defend against emerging threats. With unparalleled expertise in all things where the network meets security, we're committed to empowering customers on their AI journey, wherever they happen to be," explained Gillis.

Acquisition to Fortify AI Security

Following the acquisition of Splunk, Cisco has taken another significant step in securing the AI-driven enterprise with its intention to acquire Robust Intelligence, a trailblazing company at the forefront of AI security solutions and a valued member of the Cisco Investments portfolio.

"Security leaders need purpose-built solutions they can trust to keep up with the new paradigm of AI risk," said

Robust Intelligence Co-founder and CEO, Yaron Singer. "Our team is excited about the integral role our platform will play in shaping the future of the Cisco Security Cloud, providing end-to-end AI security and leading the AI revolution with Cisco."

From development to production, Robust Intelligence's purpose-built platform offers robust protection for AI models throughout its lifecycle. Moreover, through advanced automation and risk mitigation, Robust Intelligence empowers organizations to securely deploy AI applications while adhering to industry and regulatory standards.

Gillis emphasized that Robust Intelligence is a "natural fit for Cisco," as the company's focus and deep expertise in AI model security and governance perfectly complements Cisco's existing capabilities and accelerates Cisco Security Cloud's roadmap.

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Greening Smart Cities and Industries

The abundance of human capital in cities presents many commercial opportunities, leading to wealth generation, employment and ultimately increased per-capita spending capacity. Similarly, industries produce products that can be exported to earn revenue while efficient manufacturing capacity can save significant import costs, adding to national reserves.

However, this hub of activity comes with its own set of obligations. Cities currently account for around three-quarters of global energy consumption and 70 percent of greenhouse gas (GHG) emissions, and their contribution is set to rise. Existing data shows that only one in five cities have set a target to reach net zero emissions—the overall balance between GHG emissions produced and GHG emissions taken out of the atmosphere.

Meanwhile, cities are expanding, and by 2050, urban areas are projected to increase by a combined land area equivalent to Germany, Italy, and Japan, which totals approximately 1,020,419 square kilometers.

Rapid Digitalization

The pace of digitalization is accelerating at an unprecedented speed. A recent example of digital adoption can be gleaned from the shipment of personal computers (PCs). Worldwide PC shipments totaled 60.6 million units in the second quarter (Q2) of 2024, a 1.9% increase from the second quarter of 2023, according to Gartner.

Moreover, the industry is promoting the sales of AI PCs, which are equipped

with a Neural Processing Unit (NPU). The first Arm-based Windows AI PC is set to be introduced in the second quarter of 2024. This release is expected to increase competition in the PC market, although it is still too early to predict widespread adoption due to the current nascent AI ecosystem.

Similarly, the adoption of mobile phones has grown exponentially. By now, most of us are already getting used to the digital services offered by the government and businesses through their portals and mobile applications made possible by the virtualization of networks along with the deployment of advanced technologies. Our interconnected ecosystem is already building momentum in the metaverse environment where the physical and the virtual worlds will converge to function as one whole digitalized world.

But this will mean a lot of data exchanges taking place between endpoints at tremendous scale, putting pressure on the computing capacity and energy consumption across industrial sectors. Hence the need for sustainable operations, especially in the cities and industries is becoming inevitable.

Sustainable Projects

As countries and companies compete to stay relevant in the global context

concerning sustainability and energy efficiency, ICT's role in supporting these key metrics will only become more significant.

The Red Sea Project in Saudi Arabia is a pioneering example of green smart city development, in the form of a tourism destination. Expected to host 1 million visitors annually, it already has an operational airport and multiple hotels. This zero-carbon city will be the world's first fully clean, energy-powered destination. To ensure sustainable connectivity at the site, Zain KSA has introduced a revolutionary 5G network that boasts the highest data transfer speeds for 5G connectivity powered by 100% renewable energy.

In tandem with this massive sustainability initiative, Huawei has constructed the largest photovoltaic-energy storage microgrid station in the world to power community connectivity. Featuring an impressive 400 MW solar PV system, coupled with a 1.3 GWh energy storage system, the project is divided into 6 sites and utilizes Huawei Digital Power's all-scenario FusionSolar Smart PV+ESS solutions. FusionSolar provides a grid-forming solution based on smart string architecture, enhancing the power grid's capability of renewable energy integration in terms of voltage, frequency, and power angle to address

the grid challenges presented by the high penetration of renewable energy.

Designed to address the energy efficiency and cost-saving sectors, telecom vendor, Nokia, has introduced AirScale baseband solutions to address peak-hour power consumption using the latest hardware technology, software features and Self Optimizing Network (SON) optimizations. Nokia's Digital Design approach considers each cell in the network including interference, load, and beam-set configuration. Optimized cell configuration enables overall lower transmission power, helping to reduce both CO2 footprints and energy bills, without compromising network performance and end-user experience.

Nokia has set its sights on using green electricity by 2025 while UAE telecommunications provider, du, is playing a crucial role in the development of Dubai's smart city vision. Notably, Jihad Tayara, Vice President of Business Development and Partnerships at du, stated that the Dubai Pulse Platform by Smart Dubai serves as the digital backbone and 'beating heart' of the city. Additionally, du has been selected as the main systems integrator for all smart services in the new Dubai Silicon Park development within the Dubai Silicon Oasis area.

As global temperatures rise and energy consumption increases, liquid cooling technology is emerging as a 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.

Vodafone Oman is pioneering the nation's green-field future with its 5G Next Network, while Nokia MEA's Rural Connect offers an innovative, full turn-key green solution.

ZTE's green scenario solution leverages green ICT, using 5G terminals as probes to penetrate the industry and abstract basic capabilities such as machine vision, AI, big data,

and industrial interconnection into components.

Furthermore, in 2023, Zain Bahrain deployed Ericsson's new 5G hardware, which is lighter than previous generations and is expected to save up to 18% more energy, contributing to greater sustainability.

Commenting on the future of green smart cities and industries, Chafic Chay from RIPE NCC, expounded that IPv6 is the only sustainable strategy for future growth.

The Entrance of Sustainable Policies and Collective Adoption

Various policies and initiatives are actively contributing to the future development of green smart cities and industries. The annual World Telecommunication and Information Society Day (WTISD), themed 'Digital Innovation for Sustainable Development' in 2024, served as a rallying point for visionaries, innovators, and policymakers. This event underscores the importance of digital innovation in fostering sustainable development, which is essential for the growth of green smart cities and industries.

In Qatar, the Communications Regulatory Authority (CRA) has adopted a policy on 5G private mobile networks, which is a significant step towards enhancing green digital infrastructure. This move is crucial for developing smart cities that rely on robust and efficient communication networks to support green initiatives.

The 2023 Global Symposium for Regulators (GSR-23), held under the theme "Regulation for a Sustainable Digital Future," focused on purposeful and collaborative regulation. This approach aims to establish universal standards that promote sustainable digital environments, which are vital for the future of green smart cities and industries.

The SAMENA Council Leaders' Summit 2023, themed 'Sustainable Connectivity and Emerging Ecosystems in the Digital Economy,' highlighted the importance of sustainable connectivity.

The discussions and outcomes of this summit are instrumental in shaping policies that support the development of green smart cities and industries.

The Telecommunications and Digital Government Regulatory Authority (TDRA) also explored real-world digital innovation scenarios on World Telecommunication and Information Society Day (WTISD). These scenarios are essential in demonstrating practical applications of digital technologies that drive the sustainability of urban environments.

Final Thoughts

The contribution of cities to national economic growth is very significant in developing countries. The economic future of developing countries depends on the kind of cities they can manage to operate. Cities and industries are vital resources to generate wealth. However, cities face many challenges, from accelerating growth; to the influx of migrants; to the deterioration of infrastructure; to environmental degradation.

In the GCC region, the most recent development in green smart city enhancement is the Abu Dhabi government's recent resolution to establish a Smart and Autonomous System Council. This council will oversee the comprehensive strategy for operating and using smart and autonomous systems and manage related activities.

Collectively, these policies and initiatives are paving the way for a future where smart cities and industries are not only technologically advanced but also environmentally sustainable. By promoting digital innovation, robust 5G networks, purposeful regulation, and sustainable connectivity, these efforts are laying the groundwork for the next generation of green smart cities and industries.

Aligned with the evolving digital landscape of the region, organizations and the telecom industry must adopt advanced, productive, technology-backed, policy-driven endeavors to ensure the continuous development of greener smart cities and industries. **TR**



From Low to Very Low: Transforming Earth Orbit Satellite Networks with 6G

By 2027, global investments for very low Earth orbit (VLEO) satellites, operating at an altitude of around 300 kilometers, will reach USD 220 billion, according to Juniper Research.

The next-generation network technology, 6G, will bring innovation to new heights, revolutionizing connectivity and bridging the digital divide.

Explorations for advancements in telecommunications are poised to go far beyond the planet's terrain, catapulting industries to adopt innovations the world has never seen before.

As the telecommunications industry faces the growing demand for high-speed transmission across the globe, operators and service providers are exploring space-based solutions, such as the integration of VLEO, to drive digitalization to its peak.

Driving the Future of Internet Connectivity

The sixth generation of network technology, expected to hit the market by 2030, will usher us into a more connected and intelligent world, bridging the physical, cyber, and biological gaps.

Compared to 5G, 6G will deliver greater improvements in spectral efficiency and capacity in VLEO satellite networks, enhancing the abilities of terrestrial and non-terrestrial networks. VLEO satellites will be deployed, establishing a mega satellite constellation.

Integrating non-terrestrial and terrestrial communications will deliver global communications with broadband and Internet of Things (IoT) services, even extending to remote locations.

Non-terrestrial networks, amplified by 6G, will provide wider connectivity coverage, particularly in remote areas that lack internet access. These will deliver cost-effective connections while ensuring reliable network connectivity and broadband services.

VLEO satellites will provide reduced latency solutions compared to traditional satellite systems. This is

critical for real-time data transmission. 6G will also drive universal high-performance wireless connections and seamless connectivity, signifying a substantial increase in the speed provided by 5G.

Furthermore, VLEO and 6G will drive the future of internet connectivity through higher-resolution imagery and active sensing. Remote sensing technology will be utilized in real-time at high resolution, enhancing Earth observation and introducing new advancements such as 3D Earth coverage, real-time traffic dispatch, remote sensing maps, and rapid disaster response.

Due to the reduced distance between the satellite and base stations, communication will be more proficient and will achieve higher data transfer rates.

VLEO Risks and Challenges

The future of VLEO promises an enhanced network that will revolutionize communication in various industries. However, this technological advancement presents multifaceted risks and challenges, particularly in integrating future communication systems like 6G.

Satellites operating in VLEO may potentially experience issues with platform stability, affecting missions that require immovability. VLEO satellites face atmospheric drag, which leads to rapid orbital decay and results in higher operational costs due to the frequent adjustments required to maintain operational orbits.

The risk of collisions is also inevitable, potentially leading to debris that could complicate operations and cause significant damage. This marks a significant concern due to the increasing number of satellites deployed in orbit.

As orbits draw closer, fuel consumption increases, driven by the atmospheric drag due to its proximity to the Earth's atmosphere. The satellites are also exposed to very high levels of a highly reactive form of oxygen, known as atomic oxygen (AO),

with some VLEO bands containing up to 96% AO in the atmosphere.

Chinese technology conglomerate, Huawei, emphasized the complexity of developing a unified architecture that integrates terrestrial networks (TN) and non-terrestrial networks (NTN). Ensuring seamless communication across the layers of the integrated network architecture poses a significant challenge to operators and deployers.

Maintaining service quality while managing resource allocation is an added burden as the integrated network needs to support a wide range of services. The need for reliable control and end-to-end management can cause delays due to limited inter-satellite link (ISL) communications, which can be challenging.

In terms of capacity, VLEO constellations offer less bandwidth compared to terrestrial networks, which impacts their overall service capability. Inefficient spectrum utilization due to the limited throughput of individual satellites is also inevitable. However, innovative solutions such as beam-hopping and multi-satellite cooperative transmission can be integrated for enhanced service delivery.

In pursuit of the establishment of VLEO-based satellites, regulatory frameworks should be established to ensure compliance with international standards.

LEO/VLEO Advancements for Broadband Connectivity

The need to improve imaging and communication services has led to the advent of VLEO systems. According to Huawei, LEO/VLEO constellations will form important aspects of the 6G network technology.

The development of low Earth orbit (LEO) and VLEO systems is poised to increase access capabilities and reduce time delays in satellite connections.

Starlink, a subsidiary of aerospace company, SpaceX, deployed its Gen 2

constellation which includes around 30,000 satellites, with the intention of providing high-speed and low-latency internet connections.

This year, however, Starlink's plan to deploy internet satellites in VLEO ranging from 340 to 360 kilometers, has been rejected again by the Federal Communications Commission (FCC). In an order published by the FCC, SpaceX may not deploy any satellites designed for operational altitudes below the International Space Station.

Project Kuiper, Amazon's 3,232 satellite-strong initiative, is poised to provide faster and more affordable broadband connectivity by deploying thousands of satellites in LEO linked to a network of antennas, fiber, and internet connection points in the terrain. The technology company's project will provide high-speed broadband access via satellite to areas with little to no broadband connection.

Its satellite constellation deployment is expected to take off in the fourth quarter of 2024, with a commercial rollout expected by 2025. Amazon's satellite deployment is tied to an FCC deadline requiring the launch of a 3,232-satellite constellation by 2026.

OneWeb, launched by French satellite operator, Eutelsat, facilitated the first ground station in the Middle East and North Africa (MENA) region earlier this year for commercial operation along with Saudi Arabian telecommunications provider, stc Group.

Bridging the digital divide in the region, the first Eutelsat OneWeb Satellite Network Portal (SNP) in the MENA region will base its ground station in Tabuk, Saudi Arabia, consequently enabling extended communication service for LEO connectivity across the Middle East.

Furthermore, satellite service provider, Arab Satellite Communications Organization (Arabsat), and satellite communications company, Telesat, collaborated to establish advanced LEO services in the MENA region.



Together, the entities are set to launch Telesat Lightspeed, a project designed to deliver global broadband services and solutions.

Moreover, Eutelsat and digital infrastructure services provider, Bayobab, established a partnership to deploy LEO satellites with the aim of boosting connectivity across the African continent. Slated for completion by December 2024, Bayobab will utilize the LEO capacity from Eutelsat's OneWeb constellation, providing fixed connectivity services, particularly in rural and underserved areas.

The information, communications, and technology (ICT) industry believes that satellites will forge a direct connection with mobiles in the future, offering a glimpse into a transformational connection available on-demand.

Final Thoughts

The existence of 6G and VLEO satellites highlights the potential of connected intelligence among individuals, communities, and IoT, transforming lives in every way possible.

The unique contributions of next-generation technology will revolutionize all industries and bridge the digital divide, ultimately leaving

no one behind in the pursuit for global digitalization. VLEO's development through 6G is a significant leap in internet connectivity and satellite communications, amplifying internet connectivity for all users globally. **III**



The existence of 6G and VLEO satellites highlights the potential of connected intelligence among individuals, communities, and IoT, transforming lives in every way possible



Indosat Launches Indonesia's First AI Experience Center in Solo

Indosat Ooredoo Hutchison (Indosat or IOH) has taken a significant step forward in its larger purpose to empower Indonesia by launching the country's first AI Experience Center at Solo Technopark in Solo, Central Java. This state-of-the-art facility, backed by advanced 5G connectivity, stands as a testament to Indosat's commitment to shaping Indonesia's future as an AI Nation and positioning the country as a key player in the global AI community.

The facility, supported by advanced 5G connectivity, highlights Indosat's dedication to establishing Indonesia as a leader in artificial intelligence (AI) and integrating it into the global AI arena.

Empowering Indonesia Through AI Wijaya Kusumawardhana, Expert Staff to the Minister for Social, Economic, and Cultural Affairs, who represented the Minister of Communication and Informatics of the Republic of Indonesia, praised Indosat Ooredoo Hutchison for launching Indonesia's first AI Experience Center. He noted that this initiative represents a significant advancement in the country's telecommunications industry and is confident that the center will

spur further innovation across various sectors. Kusumawardhana also affirmed the government's readiness to support the center's success.

President Director and CEO of Indosat Ooredoo Hutchison, Vikram Sinha, said, "This AI Experience Center marks a cornerstone in our journey to empower Indonesia through AI. It is a clear demonstration of our commitment to transforming Indonesia's digital and telecommunications landscape. We deeply appreciate the support from the Indonesian government and our strategic partners who share our vision of propelling Indonesia onto the global stage."

Mayor of Surakarta, Teguh Prakosa, emphasized, "This facility will not only enhance Solo Technopark but also trigger a multiplier effect on the local economy and digitalization, benefiting education, tourism, and job creation."

In collaboration with global tech giant, Huawei, the Indosat AI Experience Center highlights state-of-the-art AI technologies relevant to a range of fields, such as smart city management enhanced by 5G, arts, food and beverages, and other creative sectors.

Kenyans Embrace AI: Surge in Google Searches Signals Growing Interest

Google's research reveals that Kenyans are increasingly eager to enhance their Artificial Intelligence (AI) skills. In 2024, AI-related Google searches in Kenya surged by 150% compared to the same period last year. Searches for "what is AI" rose by 60%, and "how to use AI" by 90%, making Kenya the fourth highest in Africa for AI search interest and 13th globally.

Agnes Gathaiya, Google East Africa's Country Director, highlighted AI's potential to drive innovation and progress in Kenya. She noted a significant rise in searches for AI-generated images, AI logo makers, and

AI text chat generators, with interest growing over 5,000%.

The research, conducted from January 1st to July 15th, 2024, also showed a 230% increase in searches for AI jobs, a 120% rise in AI courses, and a notable interest in AI's role in business, startups, and healthcare. Google, committed to leveraging AI for positive societal impact, offers free AI training through its Hustle Academy, which has empowered over 10,000 African businesses since 2022. Additionally, the Google for Startups Africa program supports AI-driven ventures, with 10 startups selected for its 2024 cohort.

Zambia Nears First Satellite Launch with Completion of Ground Station

Zambia has completed a ground receiving station, paving the way for the launch of the country's first satellite, according to Technology and Science Minister Felix Chipota Mutati. The government invested over \$14 million in the station, located in Chibombo district, Central Province. Currently undergoing testing, the station is part of the preparations for the satellite launch, although no specific date has been given.

The earth-observation satellite, aimed at addressing climate change challenges in agriculture, land use, health, and energy, has been in the planning stages for years. Climate change has severely impacted Zambia's electricity grid, leading to extended power blackouts that have strained mobile operators.

While the satellite launch was initially targeted for 2023, economic challenges, including a debt crisis exacerbated by the COVID-19 pandemic, delayed progress. Despite these setbacks, the Zambian government remains committed to the project, seeing the satellite as crucial for managing resources affected by climate change.

Zambia joins a growing number of African nations investing in satellite technology for climate management. Recently, Senegal launched its own satellite, contributing to the 61 satellites from 17 African countries currently in orbit. South Africa and Egypt lead with 13 satellites each, followed by Nigeria with seven.

US and Canada Strengthen Information-Sharing and Enforcement Cooperation

FCC Chairwoman Jessica Rosenworcel has signed a Memorandum of Understanding with Privacy Commissioner of Canada Philippe Dufresne to strengthen information sharing and enforcement cooperation between the two regulators.

The agreement establishes the parameters for the regulators to exchange information, enforce compliance with laws in both countries, and share knowledge and expertise on regulatory policies and technical efforts.

"In a world where information flows transcend borders and jurisdictions, information sharing and enforcement cooperation with international partners is essential to protecting individuals' fundamental right to privacy," said Privacy Commissioner Philippe Dufresne.

In today's digital age, carriers have access to vast amounts of personal information. Hence, cross-border enforcement cooperation helps to protect consumer privacy, data, and cybersecurity.

"A top priority for the Commission is ensuring protection of consumer privacy, data protection and cybersecurity. This is especially important in today's world, where access to consumers' personal information is not limited by devices, or borders," said Chairwoman Jessica Rosenworcel. "It is through strategic partnerships like these that our efforts to protect consumers and their personal information are strengthened even more."

Nokia and TIM to Provide the Fastest and Most Reliable 5G in Brazil From 2025

Nokia has been selected by TIM Brasil (TIM) to expand its 5G RAN coverage across 15 Brazilian states from January 2025. This partnership will increase the number of municipalities with 5G access, bringing the benefits of secure, ultra-high-speed connectivity to a wider population. The expansion will also enable enterprises in these regions to digitalize their operations, fostering innovation and driving economic growth.

Under the deal, Nokia will supply a range of equipment from its industry-leading 5G AirScale portfolio, including baseband, Massive MIMO radios, and Remote Radio Head products. TIM will utilize Nokia's intelligent MantaRay Networks Management system, which incorporates AI functionalities, for

improved network monitoring and management. Nokia will also provide services, including digital deployment, optimization, and technical support services.

Marco Di Costanzo, CTO at TIM Brasil, said, "This agreement is a significant milestone in our long-standing partnership with Nokia, highlighting our mutual dedication to technological innovation. As 5G continues revolutionizing connectivity, we are committed to extending these advancements to more Brazilians."

Tommi Uitto, President of Mobile Networks at Nokia, said, "This collaboration demonstrates our dedication to providing cutting-edge technology that empowers TIM to deliver the fastest and most reliable 5G connectivity to their customers."

Vodafone to Pilot Private 5G Network at Temelin Nuclear Power Plant

Vodafone's latest pilot project will test a private 5G mobile network at the Temelin nuclear power plant. This initiative marks the first deployment of a private 5G network within a European nuclear power plant.

The network, designed to operate independently from the public mobile network, ensures secure communication within the facility. In the pilot phase, Vodafone successfully connected the outdoor areas of the Temelin plant and selected zones of unit 1 with 5G.

AR Implementation

The introduction of 5G technology at Temelin paves the way for advanced communication by connecting a more comprehensive array of devices, with a key innovation being the use of augmented reality (AR) glasses for video calls.

The AR glasses will allow technicians to view detailed plans during pipeline inspections, enabling them to follow instructions in real time or even practice

the inspection process through virtual simulations, significantly improving efficiency.

Additionally, the new 5G network is expected to replace traditional radio communications and extend coverage to previously hard-to-reach areas of the site.

A European Nuclear Power Plant First

Bohdan Zronek, head of the nuclear division at CEZ, the semi-state energy company that operates Temelin, stated, "We are proud to be the first nuclear power plant in Europe to test a private 5G network, while most other European operators are still focused on 4G technology. This achievement is significant on a global scale as well."

According to Violeta Luca, CEO of Vodafone Czech, the primary goal of this pilot is to ensure that the 5G mobile private network meets the rigorous security and operational standards necessary in a nuclear power plant environment.

North America Leading the Open RAN Movement: Study Group

According to a recently published Dell'Oro Group's Open RAN Advanced Research Report, covering market information about the telecommunications, security, networks, and data center industries, the broader Open RAN movement has come a long way in just a few years, but the results have been mixed.

Open radio access network – Open RAN in short – is an ongoing shift in mobile network architectures that enables service providers the use of non-proprietary subcomponents from a variety of vendors.

"Open RAN is happening, but this vision that Open RAN will significantly change the vendor dynamics is fading," said Stefan Pongratz, Vice President of RAN market research at the Dell'Oro Group. "With most of the leading RAN suppliers now committed to the latest O-RAN fronthaul interfaces,

the question now is more about the timing and the adoption curve for the various RAN segments," added Pongratz.

Additional highlights from the August 2024 Open RAN Report:

- The long-term position remains favorable and mostly unchanged. Despite ongoing challenges, most operators will gradually incorporate more openness, virtualization, intelligence, and automation into their RAN roadmaps. The pace will differ slightly between the radios and the baseband, while the multi-vendor RAN business case is less compelling.
- The estimates for open RAN, Cloud RAN, and Multi-vendor RAN are mostly unchanged relative to the February update. By 2028, they are expected to account for >25 percent, 20 to 25 percent, and <10 percent of the total RAN market, respectively.

Ofcom Faces Urgent Calls to Extend Automatic Compensation to Businesses

Ofcom, the UK's communications regulator, is under pressure from several influential business groups advocating for an automatic compensation scheme for connectivity services that includes business customers.

Three influential business groups are spearheading this push: the British Chamber of Commerce, the Federation of Small Businesses, and the Institute of Directors. These organizations have joined forces to support an earlier plea initiated by business fiber provider, Vorboss, which has advocated expanding consumer protection to include UK businesses.

Automatic Compensation: Input from Stakeholders

In a joint letter addressed to Ofcom, the business groups underscored the severe economic impact of

connectivity outages on the UK economy.

"We are writing to you to express our collective support for an automatic compensation scheme for fixed business connectivity," the letter stated. "We all want to play a part in helping the UK economy to grow, but connectivity outages are significantly hampering this ambition."

The letter draws on recent research commissioned by Vorboss, which revealed that more than half of UK businesses with fixed connectivity services experienced at least one outage in the past year. The economic cost of these disruptions was estimated to be around GBP 17.6 billion in lost output. Despite this significant impact, most affected businesses reportedly received no compensation, highlighting a gap in consumer protection for businesses, particularly smaller ones.

India's DoT Rejects Telcos' Request for Telecom Regulations on OTT Services

India's Department of Telecommunications (DoT) has reportedly dismissed telcos' requests to impose telecom regulations on OTT services such as WhatsApp and Telegram. However, these platforms might still face regulation under other legal frameworks.

This decision follows a July 2023 consultation paper published by the Telecom Regulatory Authority of India (TRAI), which was requested by the DoT to reevaluate the regulation of OTT services. The TRAI had previously determined in 2020 that such regulation was unnecessary.

The Cellular Operators Association of India (COAI) has consistently argued that OTT players, such as WhatsApp and Telegram, unfairly compete with telcos by consuming bandwidth without contributing to infrastructure costs. The COAI has called for these services to either share revenues or pay for telecom infrastructure.

In its latest submission to the TRAI, the COAI asserted that OTT communication services fall under the new Telecommunications Bill 2023 as an access service. Therefore, they should be regulated according to the "same-service, same-rules" principle, the COAI argued.

However, according to other media reports, DoT officials have stated that they disagree with the COAI's interpretation of the new telecom law. They clarified that, despite a broader definition of "telecommunications," the law remains focused on licensed telecom operators who manage the networks for voice and data traffic and does not extend to OTT communications.

— 2024 —

Connectivity Ride from the Sea to the Sky

In this Telecom Review webinar, we will discuss the the vital role of connectivity, understand the key factors in building strong wholesale telecommunications networks, and explore the opportunities and challenges presented by emerging technologies.

Place: Virtual



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GITEX GLOBAL

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