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**Shifts in Traffic Trend:** Nokia Leading MEA's Sustainable Future and Network Evolution

Mikko Lavanti, Head of Mobile Networks, Nokia MEA

**Saudi Arabia:** A Tech-Powered Economy and Digital Hub **Cloud Migration:** An Important Digital Enabler Fighting **Telecom Fraud** with **AI** 



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- Harnessing the Power of 5G to Change Lives and Businesses
- 20 Verizon Enhances Its Digital Journey with Diversity and Inclusion
- 22 Saudi Arabia: A Tech-Powered Economy and Digital Hub
- 26 CommScope Mosaic Fixes 5G Rollout Issues, Now and in the Future
- 28 Why mmWave Network Deployment is Crucial for 5G?
- 30 Fighting Telecom Fraud with AI
- 32 Cloud Migration: An Important Digital Enabler



- Ooredoo Oman Thinks Beyond Digital to Empower Customer Experience
- 34 Future-Ready Networks for Connectivity beyond 5G
- 36 Connectivity: Pushing Modern Transformation to Happen
- **42** The 3rd Middle East IPv6 Enhanced Online Summit Wraps Up with Great Success
- 48 AI Engineering: Creating Value for Enterprises
- 50 Telecom Customer Experience: A Crucial Success Factor

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# The End of Giants

mart technologies are taking over day after day, gradually replacing what was known as hi-tech devices which are on the verge of disappearing.

Smartphones wiped off the role of many tech giants including camera manufacturers, video players and content storage tools.

The sales of watches, alarm clock, photographic films, copy machines, among others, are decreasing sharply.

Latest statistics show that over 34 brands were on the brink of disappearing, going bankrupt, restructuring, or selling some assets or patents.

Kodak or Eastman Kodak, a brand we all remember, has gone incognito. Blockbusters was our movie night companion, which offered us a wide variety of films to rent. Polaroid, Minolta, and many other brands were dominating our daily life. Now they are from the past even if they still exist.

Smartphones are now our camera, with enhanced features upgraded with every generation. They have also replaced traditional alarms and hotel wake-up calls.

Calendars, notebooks, paper maps, and GPS have all been replaced and the list goes on.

Some of us are lucky for having witnessed this transition and tried both the traditional technology and its upgraded version.



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- Digital transformation: Progress, results, prevision
- Rethinking wholesale and capacity growth strategy in the digital age
- The challenge of **cybersecurity** in a more connected world
- **Network automation:** The key to success

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# **Shifts in Traffic Trend:** Nokia Leading MEA's Sustainable Future and Network Evolution

Nokia is a global technology leader that is focusing on addressing the Middle East and African (MEA) region's requirement and challenges. From responding to the surge of traffic up to fulfilling the needs of the enterprises and operators, Nokia's state-of-theart solutions are deployed with high level of quality, efficiency, and sustainability in mind. R

or a collaborative piece, Telecom Review has connected with Mikko Lavanti, Head of Mobile Networks, Nokia MEA; and his

team Ali Jitawi, Head of Sales and Business Management (SBM), Saudi Arabia; Hani Dib, Head of SBM, ME; Mounir El Aichaoui. Head of SBM. North Africa and Orange; Markus Braun, Head of SBM, South Africa and Vodafone: and Mohamed Samir. Head of SBM, CEWA and Head of Mobile Networks Delivery. These top executives based in the MEA region have shared the unique position of each of their own markets, as well as the existing barriers and growth opportunities affecting the adoption of 5G and other emerging technologies.

# Major Observations in Middle East and Africa

Following the Covid-19 pandemic outbreak, the telecom industry witnessed a huge surge in data consumption for various applications for work collaboration and entertainments. Over just a couple of weeks after the outbreak, Nokia saw approximately 30% traffic growth in MEA networks - the same kind of growth that would usually be expected in a year. Now two years into the pandemic, Nokia wanted to analyze current trends in network traffic at consolidated level in MEA and studied data obtained from various primary and secondary sources. Mikko, Lavanti, Head of Mobile Networks, Nokia MEA, says, "The study report, called MEA Broadband Index Report, will soon be launched. As per the report, the data traffic trends clearly indicate that there is a pressing need for adoption and expansion of 4G and 5G networks across the region, as the report finds 40% YoY growth between 2020 and 2021 in 4G data traffic and a whopping 350% YoY growth in 5G data traffic. Total data traffic is expected to increase significantly in the next four years with a CAGR of 35%: 4G and 5G are expected to drive more than 90% of data traffic by 2026."

"And if we observe the trend between 4G and 5G, even in its early stages, the pace of the rollout of 5G networks has surpassed 4G/LTE networks. Two years after the first LTE launch, there were 25 million subscriptions across 60 networks. By contrast, two years after the first 5G launch. 340 million subscriptions were registered across 155 networks, GSMA Intelligence has forecast that 5G connections will reach 692 million subscribers globally by the end of 2022. It's also important to note that both 2G and 3G data traffic have declined 10% throughout MEA networks. As for voice traffic, 2G voice service is losing share toward 3G and VoLTE," adds Mikko.

All of this shows that end users demand mobile networks that can ensure higher network efficiency, capacity and data rates. Nokia is a global leader in this space and helps operators address all this with appropriate solutions leveraging its comprehensive Mobile Networks products and services.

These include the Nokia industrialgrade private wireless solution that is enabling Industry 4.0 digital transformation. 4.9G/LTE and 5G are providing the next generation of private wireless networks for our connected world, supporting automation, safety, security and new levels of quality, efficiency and productivity. "Private networks are the untapped market in MEA and Nokia is providing technology and services such as the Nokia Digital Automation Cloud (DAC) to build those networks for industry 4.0, as well as network slicing technology that helps operator customers in building campus networks," Mikko rationalized.

#### Spectrum Re-Farming

Declining traffic in 2G and 3G drives spectrum re-farming toward advanced technologies of 4G and 5G. Governments in the MEA region are releasing more spectrum for expansion of mobile broadband services. Mikko says, "Nokia successfully implemented carrier aggregation projects for our operator customers in the past for 4G, and now for 5G, Nokia successfully verified 3 Component Carrier Aggregation (3CC-CA) in stc's



Nokia MEA Broadband Index Report

5G standalone (SA) network for the first time in the Middle East and Africa to deliver leading 5G services and enhance the 5G user experience. We continue to do this for other customers as well."

#### **Sustainable Solution**

Sustainability is at the centre of Nokia's new products. The Design for Environment approach ensures creating solutions and products that incorporate environmentally sustainable principles. This programme helps product development teams by setting targets and evaluating energysaving features with each new product introduction.

"Our recent product introductions highlight our commitment to building energy-efficient and sustainable products. A case in point is Quillion chipsets which reduce energy consumption by up to 50% compared to previous line card generation. Furthermore, our AirScale 5G portfolio powered by ReefShark chipset technology enables up to 75% energy savings. Our new FP5 network process silicon sets a new benchmark for power efficiency in IP routing with a 75% reduction in power consumption over previous generations," Mikko explained.

With each new generation of Nokia chipset, further 15-20% reduction of energy consumption by minimum is targeted, contributing towards the vendor's commitment to climate change and zero emissions.

#### Nokia's Solutions Addressing Trends and Challenges in MEA Market

Saudi Arabia



Ali Jitawi, Head of SBM, Saudi Arabia

In line with global market trends, the data traffic explosion has been evident in Saudi Arabia since the outset of 5G in early 2019. This is supported by the increase of 5G capable devices in the Saudi market. In only one year, 5G's share of data traffic has increased by over 140% marking major growth in data traffic.

# Proactive Saudi Regulator and New Spectrum Bands

To cater to these increasing data traffic demands and improve telecommunications services in the Kingdom, CITC, the Saudi telecom regulator, is proactively sparing no effort. The forward-looking regulator has made enormous changes to the spectrum outlook in Saudi Arabia. It was one of the first regulators to auction C-band 3.5GHz for 5G along with other mid bands to allow CSPs in the country to provide distinctive 5G services to their subscribers. Not to mention its vast role in freeing up 1.8GHz band, 2.1GHz, 800MHz and 700MHz. CITC also is planning to auction more spectrum and open wide doors of opportunities for operators. The plan is for more C-band (200 MHz), low band 600MHz (2x35MHz) as well as 700MHz (2x10MHz) and 700MHz SDL (1x20MHz). The millimeter wave spectrum is also on CITC's radar. whichwill allow more 5G capacity in hotspots, fixed-wireless access, and industrial applications. CITC is further studying how to afford more spectrum to CSPs and others to empower more services and use cases and pave the way for future technologies such as 5G-advanced and 6G.

#### Ensuring Superior Network Performance During Hajj

Hajj is a very unique and special event, and the season represents the highest traffic density event worldwide for roughly 3 million pilgrims in a limited area of 10 square km. That is in addition to the governmental entities that are present in the area and serving the season. From a mobile networks point of view, it is the ultimate challenge where the serving telecom operators need to provide high availability, high quality voice and data services using all available technologies from 2G to 5G.

"To address such a huge challenge, we at Nokia have covered the Hajj area and the whole city of Makkah including the Holy Mosque networks with two out of three operators in the kingdom for almost 20 years now. Nokia has successfully managed to prepare and support the event delivering outstanding performance levels unmatched anywhere else globally and improving year after year. This undisputed success despite all the environmental and situational challenges as well as continuously exploding traffic volumes, has been repeatedly acknowledged by our customers in Saudi Arabia and has earned us a solid dependable partner status that we are profoundly proud of," said Ali Jitawi, Head of Sales and Business Management (SBM), Saudi Arabia, Nokia.

#### Saudi Enterprise Sector's Massive Growth Opportunities

Saudi has huge size companies in various businesses such as healthcare, automotive, energy, oil & gas and transportation. Digital transformation is vital for these enterprises to re-shape the infrastructure and transform operations to remain competitive in the Fourth Industrial Revolution era.

"Nokia, as a global technology leader with its wide and deep portfolio of products and services along with its focused approach in this domain, has solutions in different areas such as industrial-grade private wireless networks. Certainly, a connected digital enterprise will drive massive productivity, efficiency, safety and sustainability gains across industries," Ali Jitawi concluded.

#### **Other Middle Eastern Markets**



Hani Dib, Head of SBM, ME

The Middle East (ME) smartphone subscriptions are expected to be more than 450m by 2026 and the combined data traffic would grow by 300% by 2026 according to Nokia report. This market has the most challenging environment in the world, with countries ranging from developed and technologically advanced to developing and some even under-developed. Then, there are some countries that face political instability, or global financial and technology sanctions. With this diverse business environment, customer services, network quality, technology evolution and CAPEX budgets become critical factors for the CSPs.

In addition, the race for effective and extended coverage, and faster and more reliable networks, has been evident in recent years, creating visible gaps between technology leaders and late adopters. Nevertheless, many opportunities, especially in the enterprise domain, remain largely untapped. Though the 5G technology is a reality in the Gulf countries, many prospects still exist to serve the hot demand in the anticipated 4G/5G technology space and to further accelerate the digitalization process.

#### **Solutions for Complex Demands**

Nokia is equipped with a comprehensive and strong product portfolio to address this complex demand and enable primary coverage to far remote areas in various countries. At the same time, "we in Nokia, continue to deliver enhanced 4G functionality to CSPs along with its latest 5G solutions, supported by advanced capacity analysis solutions based on machine learning algorithms and artificial intelligence that are already embedded in our Nokia products," said Hani Dib, Head of SBM, ME, Nokia.

A trend in the most advanced countries shows that CSPs are now ready to monetize their infrastructure investments and boost revenue. Customers are now going beyond the classic broadband connectivity propositions and are looking at 5G use cases for enterprise and offerings for a new generation of consumers such as fixed wireless access, gaming, eSports, augmented and virtual reality.

"These future growth areas are powered by Nokia's state-of-the-art solutions like mMIMO, mobile private wireless and 4G/5G slicing. We are always thrilled to work with the CSPs to bring to their customers the latest advancements in 5G technologies, thus addressing operators' needs for sustainable and future-proof networks," added Hani.

#### **Expert Consultation on Spectrum**

One of the challenges that remain for CSPs is to secure additional spectrum in 4G and more so procuring new spectrum for 5G to build flexible, cutting-edge and far-reaching networks that are low in energy consumption. Few countries are already having ongoing spectrum discussions where Nokia is contributing by providing consultation to network providers to strategize long-term network evolution, as well as steps to fully monetize 4G and develop plans for a future roadmap with 5G post spectrum auctions.

Nokia's approach plays a pivotal role in helping ME CSPs and their customers reach their goals. "With its advanced ReefShark portfolio, Nokia is well positioned and proud to support its CSP partners in building a sustainable future, with smooth network evolution along with strategic and proactive capacity analysis to identify unserved demands to boost revenue and achieve end users' aggressive technology goals," explained Hani.

#### North Africa and Orange Countries



*Mounir El Aichaoui,* Head of SBM, North Africa and Orange

Following the COVID-19 outbreak, North Africa operators and Orange have seen a high demand for mobile broadband. According to the Nokia Broadband Index report, North Africa is expected to have a 20% increase in total subscriber base by 2026 compared to 2022.

#### New Spectrum Addresses Traffic Growth

Spectrum allocation of TD LTE as well as legacy U900, G900 and eGSM bands in Morocco, Egypt, Algeria, Tunisia, Senegal, and Cameroun have enabled operators to capitalize on their existing 4G infrastructure while adding additional layers to their network, providing a significant increase in throughput and quality of service. In North Africa, data traffic is expected to increase significantly in the next four years with a CAGR of 42%, out of which 4G is expected to carry 83% of total data traffic by 2026, as per Nokia study.

"Nokia has positioned itself as a major partner and technology enabler for its customers by offering its state-of-the-art Airscale 5G ready portfolio and associated services. Customer testimonies and CXO congratulatory notes about additional traffic absorption and network KPI improvements following network upgrades, new layer activations, network optimization and expansions using Nokia solutions are a testament to our success in addressing their challenges and requirements," said Mounir El Aichaoui, Head of SBM, North Africa and Orange, Nokia.

#### From 4G to 5G

While 4G will likely remain the bread and butter in terms of technology deployed for the coming years, North Africa and Orange in particular, are setting sight on 5G. In addition to currently deployed 5G in Togo, more countries are expected to line up in terms on 5G auctions and license awards. "Here, we are talking Tunisia and Jordan in 2022, followed by Senegal, Mali, Ivory Coast, Cameroun, Morocco, Algeria, Egypt in 2023," Mounir pointed out.

In North Africa, 5G subscribers are expected to reach 10% of total



Nokia has positioned itself as a major partner and technology enabler for its customers by offering its state-ofthe-art Airscale 5G ready portfolio



subscribers by 2026. This will also be greatly driven by penetration and adoption of 5G-enabled devices, which remains a challenge in this part of the world. Having said that, Nokia has been actively supporting customers on their 5G journey by offering 5G-ready equipment as well as the successful completion of numerous 5G trials, receiving overwhelmingly positive feedback.

#### **Huge Traffic During Major Events**

Nokia has also been a trusted partner for years in providing support to its customers for special events, where the traffic surges and KPI challenges pose a major test to networks' resilience and subscriber satisfaction. Annual religious events in Senegal, the African Cup of Nations football competition in Cameroun, and the Mediterranean Games in Algeria are just a few examples. "With our professional services of network planning and optimization in tandem with our rich feature and equipment offering, we help our customers address these challenges while capitalizing on their investment," Mounir explained.

In summary, by using Nokia's industryrecognized portfolio, customers are provided with best-in-class technology and solutions, helping them secure their ROI, embrace new technologies and become leaders in their respective markets. In doing so, "we, together with our customers, help millions gain access to fast, reliable, mobile internet and voice as well as help industries run more efficient and secure operations, creating new use cases and revenue streams," Mounir concluded.

South Africa and Vodafone MEA Countries



Markus Braun, Head of SBM, South Africa and Vodafone

In the past two years, COVID-19 has impacted various industries across Southern Africa and Vodafone MEA countries, serving as a catalyst to accelerated digitalization, and creating new operating models. As enterprises and industries embrace this new way of doing business, traditional operating models need to continue to evolve into what has been deemed the new normal.

The Fourth Industrial Revolution (4IR) is also no longer a dream as organizations digitalize in all shapes and forms. It has become a reality overnight, forcing CSPs to re-evaluate their operating models to support the increased demand driven by a sharp growth for reliable connectivity that will enable technologies such as video conferencing, remote working capabilities, and offer access to remote education and telemedicine. In addition to those needs, the markets still have the traditional needs to further develop and accelerate rural connectivity across the region while looking at efficient and lean solutions.

"As per Nokia's study, 4G subscribers in Southern Africa region are projected to reach 105m (58% of total subscribers) by 2026 while 5G adoption is increasing steadily. Operators across Southern Africa region are stepping up efforts to migrate existing 2G and 3G customers to 4G networks," said Markus Braun, Head of SBM, South Africa and Vodafone, Nokia.

Nokia continues to address all these requirements by migrating existing networks to 4G, enhancing 4G capabilities of existing 4G networks, and evolving existing networks into 5G as well as reshaping markets like Ethiopia with new greenfield deployments to support further growth. For this, "we at Nokia are committed to bringing our comprehensive mobile networks solutions to our customers across the market," Markus highlighted.

#### Unlocking Spectrum

Spectrum availability is a fundamental ingredient for CSPs to keep their network performance up and keep the deployed technology at a stateof-the-art level to achieve efficiency. The market has recently seen the final unlocking of spectrum in South Africa during March 2022, followed by Kenya releasing specific additional spectrum to be used to enhance the 5G networks. Tanzania is also looking into releasing spectrum. While the spectrum becomes more widely available, we can already see larger scale 5G rollouts across the region, which in turn will take the benefits of mobile broadband and the Internet of Things (IoT) to end customers. One of the immediate use cases would be fixed wireless access as an alternative to fibre, to connect under-developed areas as well as SME industry players.

#### Power-Efficient, Sustainable, Rural Connectivity

"While Nokia is delivering the technology that makes the world act together, we

are also focused on addressing today's African requirements and challenges," Markus remarked.

One of the biggest obstacles is cost, and specifically the expense associated with deploying infrastructure. Telecommunication service providers and tower companies have struggled in the past to justify the investment in rural areas, citing slow ROI as a major problem, which should be addressed with a sustainable solution.

"Promoting sustainability is one of Nokia's key policies. In the context of Africa and rural connectivity, there are several layers of technology to consider. Firstly, there is a need for baseline radio network product/ solution that can work across several technologies and provide the required coverage. Secondly, power supply and consumption is another area where costs can be brought down and Nokia is actively innovating in that direction - from off-grid power solutions into reducing the total power consumption by using batteries paired with solar energy.A comprehensive power solution in conjunction with a highly competitive product for 2G, 3G and 4G is key to unlock the rural connectivity challenge," Markus concluded.

#### **Central East West Africa Market**



**Mohamed Samir,** Head of Sales and Business Management, CEWA & Head of MN Delivery, MEA

In Central East West Africa (CEWA), 70% of the voice traffic is still carried by 2G. The primary goal of the CSP is to get more subscribers to switch from 2G to 4G. Currently, 3G layer is being used to offload 2G voice. A gradual shift towards 4G layer for the voice is also observed. VoLTE services are coming up in many countries and this shall evolve as the device ecosystem matures.

"Today, more than 60% of the total data traffic is carried by 4G in CEWA. Furthermore, this traffic is expected to grow four times in the next four years. 5G adoption is also expected to accelerate over the next four years, accounting for nearly a tenth of total mobile subscribers by 2026," said Mohamed Samir, Head of SBM, CEWA, Nokia.

#### Leveraging New Spectrum

In addition to managing this growing traffic, challenges faced by CSPs in the region vary from a declining ARPU, increased network complexity, and need of wider network availability. To address these challenges, Nokia is engaged with operators to leverage acquisition of new spectrum and re-farming from legacy technology of 2G/3G toward 4G and 5G.

Countries such as Nigeria, Kenya, Zambia and DRC have got new spectrum allocated. These new spectrums will pave the way for 4G/5G expansions for existing CSPs and bring new players into the market. For example, a new player like Africell Angola acquired over 2 million subscribers in the first month after the launch with Nokia as its trusted partner to manage its greenfield endto-end network. Apart from increasing the mobility coverage to the unserved population, these new players are also focusing on new customer segments like enterprises and fixed wireless access - which enables new technologies and use cases in the market

"Apart from that, we are addressing network complexity through digitalization and selforganizing networks for several CSPs," added Mohamed. In fact, Nokia signed a memorandum of understanding (MoU) with the African Telecommunications Union (ATU) to drive digital transformation and the knowledge economy across the African continent. The two parties will leverage the power of telecommunications, including 5G networks, to connect the unconnected and identify innovative use cases, as well as business models.

Big CSPs like Airtel and Africell have already started investing in 5G-ready baseband platforms as a preparation for next phase of digital transformation. Further, enhanced software features like state-of-theart dynamic spectrum sharing (for all technologies) helps CSPs efficiently manage their spectrum and prepare for early adoption of 5G.

#### **Developing Local Talent**

On the other hand, Nokia's human capital vision aims to build and develop local competence through skills transfer in their operating countries, with a constant focus on diversity and inclusion to bring together innovative minds from diverse backgrounds to address the challenges.

"With Nokia's commitment to community services, the children's right for education and support of the human capital remains a priority," Mohamed stated. In this context, as one of the examples across the continent, Nokia teamed up with UNICEF and the Government of Kenya in a multi-partner collaboration to bring internet connectivity and digital learning to disadvantaged Kenyan schools.

#### **Solutions Delivery**

Delivery of solutions is as important as devising appropriate solutions for operator customers across MEA. Nokia has been catering to its customers' demands across the region, on the promise of operational excellence. To efficiently achieve this, Nokia subjects its delivery organization to a constant transformation via standardization, digitalization, and automation, with the adoption and implementation of the various Nokia digital platforms.

"In fact, our digital evolution is key to addressing customer's needs for operational efficiency, services speed, and time to market, flexibility and adaptability, as well as further transparency and visibility. Fast and efficient deployment enables CSPs to maximize their return on capital invested and improve their competitive position," Mohamed expounded.

Nokia Digital Deployment Services Nokia's digital deployment services achieve faster, more flexible, and efficient rollouts, a cornerstone for rolling out the networks of tomorrow, with automated workflow orchestration, drone-led site visits, site digital database, real-time project dashboards and automated analysis.

According to Mohamed Samir, "The company's digital design engines and embedded machine learning algorithms help in building high performance and efficient networks. Driveless analysis based on crowdsourcing data, energy-saving features deployment and coverage optimization address environmental sustainability."

#### **Smart CAPEX Analysis**

Nokia's smart CAPEX analysis that includes hotspot detection and unserved demand estimation, guides operators to focus on those areas that will speed up and maximize return on investment. On the other hand, unified troubleshooting platforms help the operations and maintenance team to leverage bots to collect logs for faster resolution, and free high-skilled engineers to focus on priority tasks through AI-based digital assistants that can present the right information at the right time in a dynamic manner.

"The health and safety of every engineer involved remains a top priority for Nokia, and the quality of deployment, with ethical behavior and doing things right in the first go, is another big priority in the quest for delivery excellence," Mohamed asserted.

### Future Space: First Technology Experience Center in KSA Launched



Future Space, the first technology experience center in Saudi Arabia, has been launched by Huawei, in collaboration with the Saudi Space Commission. The partnership aligns with Huawei's commitment to corporate social responsibility, developing local talent and actively contributing to the Kingdom's digital transformation journey.

Future Space, the largest exhibition center outside of China, will include advanced technologies including autonomous driving, 3D printing, and brainwave robot control, among other innovations. The first exhibition of its kind in Saudi Arabia, Future Space, covers 1,500 square meters and will offer speaking opportunities for young innovators. The center will be open to the public and would host an estimated 200,000 visitors over the next five years.

During the launch, Eric Yang, CEO of Huawei Saudi Arabia, said, "We are honored to launch Future Space in Saudi Arabia and support the Kingdom achieve its digital ambitions as part of Saudi Arabia's vision 2030. Imagination will determine how far we can go in the future; action will determine how quickly we get there. We believe here at Huawei that the best way to predict the future is to create it."

HE Weiqing Chen, Ambassador of China to Saudi Arabia, said, "The firm relations between China and Saudi Arabia have brought immense benefits to both countries. As Saudi Arabia pursues digital transformation as part of its strategic national goals, public/ private partnerships between technology companies such as Huawei and public agencies adds new value to the local tech ecosystem. We, therefore, congratulate the Saudi Space Commission on the launch of Future Space and look forward to more success."

HE Dr. Mohammed Altamimi, Saudi Space Commission CEO, said, "Future Space is one of the most advanced technology experience centers in the world. We want to expose young people to the most cutting-edge technologies and inspire them to imagine technology in new ways. Partnering with a global technology leader such as Huawei enables us to bring real-world and proven technology solutions that can positively impact society."

Adnan Alsharqi, Deputy Minister, Ministry of Investment, said, "Building a knowledge-based economy is a key pillar of Vision 2030. Initiatives such as Future Space help enrich our digital ecosystem and attract investment from other digital companies. As a ministry, we are keen to support public and private partnerships that have proven highly successful in accelerating innovation and boosting our talent pipeline."

# 5G Market in Strong Position, 1 Billion Connections in 2022



The 5G market seems to be in a stronger position as we enter the second half of 2022. In the Middle East alone, 5G network rollouts and technology advancements have been underway to provide a seamless experience for customers.

As per CCS Insight, the transition of mobile subscribers to 5G networks is

set to make good progress, with 5G connections to nearly double by end of 2022 to 1.2 billion connections. This is in line with a GSA report which stated that 5G subscriptions grew by 19.1% in the fourth quarter of 2021, reaching nearly 521 million globally — representing 5.1% of the entire global mobile market.

By 2026, 4 billion 5G mobile broadband connections are anticipated to be established, and by 2023, the LTE market is forecasted to decline slowly, as customers migrate to 5G.

In the first half of 2022, Middle Eastbased CSPs have continued their efforts on 5G market innovation. Some examples include Zain KSA announcing the rollout of the Kingdom's first 5G standalone (SA) network in February; Nokia and Etisalat UAE partnering to deploy 5G private wireless networks for enterprises in March; and stc enabling Bahrain's first 5G standalone network in May.

Accordingly, a GSMA report found that GCC Arab States are slightly ahead of the global average by 2025, with over 16% adoption in 5G connections.

In parallel, fixed wireless access (FWA) is one of the thriving areas expected to gain a boost as more operators worldwide are considering 5G to provide high-speed home broadband.

# MENA Governments to Increase Spending on Digitalization in 2022



MENA governments are anticipated to spend a total of \$13.3 billion in 2022 on information technology (IT) sector, with most budgets going to telecom services (\$3.9 billion), IT services (\$3.13 billion), and software (\$2.56 billion).

They are are set to increase their spending towards digitalization efforts in 2022, enforcing policies on various sectors like telecommunications, healthcare, transportation, smart cities, and sustainability. All of these contribute in moving towards the next phase of the fourth industrial revolution and more growth opportunities of cloud in the region.

Gartner forecasts that the worldwide government IT spending will reach \$565.7 billion in 2022, an increase of 5% from 2021. In line with this, global segments are expected to increase except for telecom services as well as internal services. Continuing the trend from 2021, the software is forecasted to record the strongest growth across all segments in 2022.

Must read: CAPEX spotlight: Are telecom investments efficient?

Relatively, MENA CIOs are expected to spend the most on cloud application services (SaaS) this year. These include business intelligence applications; content services; customer experience and relationship management; and supply chain.

A testimony to MENA governments' ongoing efforts, the UAE adopts its digital economy strategy, while Bahrain continues to develop its telecoms sector to drive digitization in the Kingdom. Also recently, Egypt's NTRA and Saudi's CITC have signed an MoU to cooperate and exchange expertise in several areas, including smart cities, radio spectrum management, and capacity building in digital transformation.

### 5G Private Mobile Networks' Consultation Opens in Qatar



5G private mobile networks' implementation in the state of Qatar is now subject to public consultation.

With the emerging market needs of businesses and government entities in the GCC country, the Communication Regulatory Authority (CRA) now consults with stakeholders on how to facilitate the best use of 5G technology in private mobile networks. This will support the development of digital government and the growth of the national economy.

As per the consultation document, there are a number of different alternative options for the implementation of 5G private mobile networks, which are also being considered by regulators and policymakers in other countries.

The first option considers having the 5G private mobile network

provisioned entirely by a public mobile operator. Through network slicing, this option could also support a hybrid arrangement, making it less demanding for enterprises.

In parallel, CRA also presented the possibility of having entirely selfprovisioned 5G private mobile networks. These will be configured to align with the enterprise's specific requirements, in terms of performance and coverage. If this will prevail, CRA would issue spectrum licenses to the eligible enterprises that wish to establish and operate their own 5G private mobile networks.

Lastly, a dedicated 5G private mobile network service provider could also be licensed. Stakeholders and interested parties are invited to provide their views and comments within a month's time, as the deadline to respond to this consultation is on July 21, 2022.



# Huawei's New Inventions Will Put Middle East at the Forefront of Innovation

Huawei recently announced its latest inventions that will revolutionize AI, 5G, and user experience. The announcement was made as part of Huawei's biennial "Top Ten Inventions" Awards at the "Broadening the Innovation Landscape 2022" forum held at its Shenzhen headquarters.

hese inventions or patented technologies have the potential to create new product series, become important commercial features of existing products, and generate considerable value for the company and the industry.

Below are some of the inventions announced during the event:

- The all-new Adder Neural Network that significantly reduces computing power consumption and circuit area by 70% while ensuring accuracy.
- The "optical iris" that provides a unique identifier for optical fibers, designed to help carriers manage their network resources, cutting time and costs associated with broadband deployment.
- The Massive MIMO In-N-Out addresses the major challenges for indoor and outdoor 5G deployment. In outdoor scenarios, BladeAAUs help customers simplify 5G network deployment and ensure optimal 2G, 3G, 4G, and 5G network performance. While indoors, Distributed MIMO greatly improves 5G network capacity and user experience.
- The LinkTurbo and Hyperhold, a device acceleration bundle. With this invention, Huawei's smartphones can deliver smooth user experience under all network and memory usage conditions. LinkTurbo significantly improves the concurrent download rate, and reduces

game delays and video buffering time, while Hyperhold greatly expands the available memory, improves basic readwrite performance.

 The 'Kite' for Core Networks - this invention allows carriers to deploy remote core networks, or 'kite networks', for their business clients from different industries, meeting their stringent reliability and security requirements.

The announcement came in the context of intellectual property rights, the protection and sharing of which Huawei believes is critical to the tech ecosystem.

Speaking at the event, Huawei's Chief Legal Officer, Song Liuping, said: "Protecting IP is key to protecting innovation."

"We are eager to license our patents and technologies to share our innovations with the world. This will help broaden the innovation landscape, drive our industry forward, and advance technology for everyone," he added.

By the end of 2021, Huawei held more than 110,000 active patents across over 45,000 patent families. It has more granted patents than any other Chinese company has filed with the EU Patent Office, and ranked fifth in terms of new patents granted in the United States. For five straight years, Huawei has ranked No. 1 worldwide in terms of Patent Cooperation Treaty applications. Alan Fan, Head of Huawei's IPR Department, said the value of Huawei patents has seen wide recognition in the industry, especially in mainstream standards such as cellular technology, Wi-Fi, and audio/video codecs.

He further added that in the past five years, more than two billion smartphones have been licensed to Huawei's 4G/5G patents. For cars, about eight million connected vehicles licensed to Huawei patents are being delivered to the consumers every year.

Huawei is also working actively with patent license administration companies in offering "one-stop" licenses for mainstream standards.

"Over 260 companies—accounting for one billion devices—have obtained Huawei's HEVC patent licenses through a patent pool," Fan said. He added that the company is in discussions to establish a new patent pool to give the industry "quick access" to Huawei's patents for Wi-Fi devices worldwide.

This marked the third innovation and IPthemed event Huawei has hosted on its innovation practices. Every year, Huawei invests over 10% of its sales revenue into R&D.

In terms of R&D expenditure, Huawei ranked second in the 2021 EU Industrial R&D Investment Scoreboard.



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# Harnessing the Power of 5G to Change Lives and Businesses

When we thought about bringing 5G to the people, we had our heart set on being the difference and leading the way in the era of 'connectivity renaissance.' Staying future-focused, we brainstormed how we could revolutionise people's lives by implementing innovative technologies that serve them in the best way possible.

> hese past four decades, the essence of 'connectivity' has undergone several iterations in the UAE. The UAE

leadership has always recognised the importance of driving innovation and establishing a world-class digital infrastructure to boost the country's socio-economic growth for the benefit of its citizens and residents. As the country's first telecommunications service provider founded in 1976, we were guided by similar principles to pave the way for a better tomorrow: deploying technologies that are connecting people and bringing them closer to what is important to them.

From launching voice connectivity to introducing the Middle East's first broadband internet service, followed by the region's first 3G network and 4G in the UAE, we've come a long way. Since the beginning of the international 5G development journey, Etisalat UAE has led the regional and international standardisation activities working in close coordination with UAE's Telecommunications and Digital Government Regulatory Authority (TDRA). This has included putting the necessary technical specifications and regulatory environment in place, while ensuring timely availability of unique spectrum resources. By 2019, we'd enabled key sites across the UAE with 5G. In hindsight, the implementation of the 5G network in the UAE before 2019 was so important for the economy, especially as the pandemic hit soon after, disrupting the way organisations did business and forever impacting people's lives as well as industries and economies.

Today, we can see that 5G deployment is accelerating the UAE's digital transformation boosting the country's reputation as the Middle East technology and digitalisation hub. We are proud to have been instrumental in maintaining the UAE's network leadership with one of the fastest and most advanced networks in the world as well as its global FTTH penetration leadership.

#### 5G Makes Phenomenal Visitor Experiences Possible at Expo 2020 Dubai, the Fastest 5G Event on Earth

5G is not about bringing yet another piece of technology to the table. The core reason for implementing 5G revolves around changing lives, and we have already seen how 5G has revolutionised industries and sectors, offering enterprises the opportunity to hyperscale and expand to new geographies.

With the unprecedented level of 5G speed, we were able to harness the power of next-generation technology and networks to provide excellent coverage with optimal performance to Expo 2020 Dubai.

Implementing cutting edge digital services across a 483-hectare site required a highly resilient 5G, WiFi and fixed network with cutting edge digital services. To ensure that visitors could enjoy spectacular experiences at Expo 2020 Dubai, it was imperative to implement the 5G network that allowed us to run flawless digital and telecom operations, host superior data connections, as well as provide robust security and pavilion infrastructure. We did this by deploying 8,500 mobile access points, 700km of fibre optic cable, 800km of cabling for indoor mobile and Wi-Fi network requirements, two data centres within the site, and redundancy delivered as a dedicated fallback Wi-Fi network.

Through 5G, international participants at the 192 country pavilions were able to tap seamlessly into e&'s cloud technologies, Big Data, Al and Machine Learning solutions as well as our digital applications such as targeted marketing, Cloud Talk, end-to-end managed digital signage solutions, pavilion analytics and more.

With the unprecedented level of 5G speed using mid-band spectrum – a median download speed of 1.1 Gbps over six months – we were able to harness the power of next-generation technology and networks. We are proud that we provided Expo 2020 Dubai with the fastest speed on record anywhere in the world and were instrumental in powering the expo's ranking as the fastest event on earth.

In fact, the 5G network performance at Expo 2020 Dubai has far superseded all mega global events from the 2022 Super Bowl to MWC Barcelona 2022 and the Summer Games in Tokyo, 2021.

#### 5G as the Ultimate Enabler for Digital Transformation

5G networks can deliver the level of performance needed for an increasingly connected society. Let's think back to when we used 4G mobile networking. We were faced with the limitations of watching top-quality videos through our smartphones whenever we so desired. 5G has eradicated the buffering times that were previously experienced with 4G, as well as eliminated the need for telephones. In addition to providing low latency, higher speeds, increased bandwidth, and more efficiency, 5G has the capacity to interconnect a range of devices at the same time.

5G is already offering endless innovative possibilities to springboard from. It has opened the doors for us to deploy end-to-end Internet of Things (IoT) technologies to enterprises as we work towards a smarter, safer and more sustainable world. 5G will evolve to become the fulcrum which delicately holds the possibilities to drive optimal operations of various sectors and industries such as smart and sustainable cities, retail, fintech, Industry 4.0, oil and gas, utilities, manufacturing, logistics, healthcare, eGovernment and defence.

Building on our 5G advanced capabilities, I foresee that we will continue to enable emerging usecases and applications over secured 5G slices spanning from interactive cloud gaming for entertainment to mission-critical communications across the country. Such an expansive 5G portfolio will focus on the strengthening of immersive customer experiences and will include Augmented Reality (AR) and Mixed Reality (MR), as well as supporting massive communications for broadband IoT applications. We will also see the rapid development of fully automated industries equipped with 5G robotics, leading to autonomous driving both on the ground and in the air. I have no doubt that 5G along with ever-evolving AI, Big Data and blockchain technologies, will drive our transformation towards achieving the country's objectives for a digital economy across all domains of our smart cities.

Expo 2020 is not our first 5G megaproject, and it certainly won't be our last. We will continue to bring pride to the UAE and encapsulate the spirit of new-age technology that will benefit individuals, enterprises and governments. We will achieve this by delivering premium connectivity enabled by a strong infrastructure through our 5G and fibre optic capabilities at Etisalat UAE.

By Khalid Murshed, CTIO, Etisalat UAE



Ahmed Diwan, Chief Commercial Officer, Ooredoo Oman

o elaborate on how this success has happened, Telecom Review spoke with Ahmed Diwan, Chief Commercial Officer, Ooredoo Oman and learned about the telco's commercial

strategy, key partners, and actions being taken to keep up with the trends of the modern era.

#### As an international leader in the telecoms sector, what are the challenges and opportunities in making Ooredoo Oman's commercial strategy stand out, consistent, and lucrative?

Telecommunications and digital communications are key drivers in the ongoing digital transformation of Oman, and, in our industry, there is often an overlap between opportunities and challenges. In a competitive market, customer experience is our main differentiator and our digitalization of the customer experience is what sets us apart. Digital is an important component of our seamless omni-channel customer experience, providing touchpoints to our customers through our app, our online chatbots and social media, as well as our first rate contact centre. immersive stores, franchises and dealers.

# Ooredoo Oman Thinks Beyond Digital to Empower Customer Experience

Ooredoo Oman had the highest score in terms of customer satisfaction, customer care, store experience, customer journey, and network. Aligning with the Ooredoo Group's digital-first strategy into 2022, the company is digital from A-Z, shifting from 'brick to click'.

But we want to provide more than just a channel for contact; it's about taking our customers on a journey – an end-to-end experience. We also have embedded a customer experience culture within Ooredoo, thus becoming a customer-centric organization, where each and every member of the team is directly and indirectly responsible for the customer journey.

We are also leveraging all of our resources – partnerships, people, network, the latest tech and tools to "indulge" our customers and provide a world class service that connects communities across Oman, especially those in isolated regions who depend on access to a strong and stable network for education, business and trade.

We have won several digital and customer experience awards which highlight our world class, leading digital CX and recognize our efforts to continue moving forward. Indeed, our drive to innovate sees us as the "fast and furious" in our approach to new technology – and to be the first to market.

#### What is the recipe for commercial success and how could this be reflected on Ooredoo Oman's position in the telecom market?

There is no one definitive recipe, but the

key ingredients are to inspire customers, capture their imagination, and allow them to do more. Our aim is to offer great value while moving the sector and the nation forward.

As a connectivity and digital leader in Oman, we carry a huge responsibility towards digital enablement. We connect the world and have always thrived to deliver a great experience, stand out from the competition and become the provider of choice for the communications experience and technology needs of our customers. This fresh approach to the experience has seen us become the industry leader across many social channels.

Our recent focus on regionalization has seen a separate and unique focus on the regions within Oman to reach customers with services important to them in their area. One of the challenges for Oman is that it is such a large country with a small population and vast areas in between the major centres. So, our regionalization strategy and presence on the ground place us close to customers so that we can better understand their needs and cater to them, and this is what sets us apart. A solid partnership with our distribution network has been invaluable in covering the entire country and meeting the needs of diverse communities.

Customers are at the top of our focus hierarchy and we reach them 24/7, across our channels, providing a multilanguage service in Arabic, English and Urdu. We also continue to invest in people and technology to constantly evolve our customer journey and experience.

We want to cater to our customers with a diversified portfolio of products and services that addresses their needs and solves their problems; reflecting a fair value proposition to them at all times. From cloud solutions, IoT and mobile financial solutions (MFS) in our awardwinning pay+ mobile wallet, to a huge array of home and mobile choices, we have something for everyone!

#### Who are the key partners that Ooredoo Oman collaborates with and how does the company plan to expand business ventures in the coming years?

We believe in becoming stronger through partnerships with international and local companies from within and outside the sector. We have partnered with industry leaders to offer the very best hardware and product support. In this way, every step of our service is backed by the best, which also streamlines operations and makes us more efficient. Our partners are part of the value chain and everyone has a major role in keeping the ecosystem rolling.

Our network managed service is powered by Huawei, and we have expanded our relationship to include smart innovative solutions powered by Cloud Campus to B2B customers. This will support retail, education, hospitality and healthcare sectors to reduce operational costs and improve overall operational efficiency.

We also collaborated with the National Bank of Oman (NBO) to launch pay+, the first telecoms mobile wallet in the market, while also working with Ericsson for our digital billing system.

Elsewhere, we partnered with organizations such as banks, tech companies, and other third parties to maximize, optimize and differentiate the CX and customer journey. Every partner is an important part of the value chain and every organization has a major role in keeping the ecosystem that we have created going, and enriching our value proposition.

We select a partner based on their expertise and ability to meet ours and our customers' aims. From cybersecurity, Internet of Things (IoT), value added services (VAS), bank payments (MFS), and more. It's a holistic service – we are a major part of this service and every agreement provides benefits for Ooredoo and our customers.

We also use local partners to provide a trusted service in each region, and this creates local employment and supports local businesses.

Overall, our view is that the whole world for customers is about digital and telecoms. Every aspect of their lives relies on being connected, so we have a major role to play as these connections depend on Ooredoo providing a high quality and reliable service, and this is something we do well!

#### What has been the progress on Ooredoo Oman's vision of "enriching people's digital lives," and what more can customers expect from the company?

The Ooredoo Group will continue its digital-first strategy into 2022. We will stay focused on being agile and adaptable, and on maintaining a culture of innovation within both our organization and in our many partnerships with world-leading technology providers. We are investing heavily in digital capability and capacities.

For us, it is digital from A-Z. We have the highest penetration for digital services. Including our apps, social media channels, website and chatbots, and all other digital touchpoints, we have over 50% digital penetration to our customer base and 35% of all Ooredoo transactions are now digital interactions/services. You could say, we have shifted from 'brick to click' but we think beyond digital to see what is next and how to empower customers even more. This is reflected in the many awards we've won and been nominated for as providing one of the best digital experiences.

#### What are the actions being taken to ensure that Ooredoo Oman's branding, sales, and customer service are keeping up with the trends of the modern era?

As part of the Ooredoo Group, Ooredoo Oman has the best practices among the operating companies when it comes to catering to customers. We provide the best experience and our customer centricity strategy is driving this. Every aspect of our service is tailored to deliver the absolute best customer experience.

We are proud of our global brand with an Omani twist. Understanding the society, community and culture has been a key success for Ooredoo ever since its inception and has allowed us to take the position as a major player in the market, leveraging our brand. national pride and resources. In fact. part of our brand philosophy is our commitment to society and indeed, our responsibility to society. It is a way of life for us, an ethos within the company, and drives much of what we do on a daily basis. And our role in the community is unrivalled. Ooredoo Goodwill has not only provided sustainable support to communities around the country, but has also helped to kickstart hundreds of digitally-focused small businesses and continues to make a telling contribution to the local economy, as well as the overall well-being of society in Oman. The social development message at the centre of our CSR efforts is a further reflection of our customer-centric approach. We see what is needed and we deliver.

In the same way, we spare no effort in providing our customers with the best tools, tech, and service, to fulfil their dreams as business owners, elevate their quality of life, and have greater access to education, training and opportunities.

All of our achievements are reportable too, so customers can trust Ooredoo. We measure our customer experience and CSAT (customer satisfaction). And in fact, we had the highest score in Oman in terms of CSAT and customer care, store experience, customer journey and network last quarter. This will continue as we take the next step in our own journey.



**Denise Helou**, Senior Business Development Manager, Verizon Partner Solutions

# Verizon Enhances Its Digital Journey with Diversity and Inclusion

Women are proving themselves in the workplace and developing their skills in all sectors which has allowed them to assume leadership positions, notably in the telecommunications and ICT industry. Denise Helou, Senior Business **Development Manager at** Verizon Partner Solutions, shares, in an exclusive interview with Telecom Review, the achievements made by the company thus far during its digital transformation journey, and tackles the importance of Arab women's role in this field.



eing a leading woman in the field of technology, and given your managerial position at Verizon, how do you see the role of women in this

#### Sector?

Verizon strongly believes in diversity, equity and inclusion. Consequently, Verizon supports women through programs such as mentorship, development and employee resource groups, as well as supporting womenowned businesses and internships. Verizon created the Women's CoLab in October 2021, bringing together an impressive group of companies all focused on helping women succeed in the digital economy. It's an acknowledged fact in businesses around

20

the world today that improving workforce diversity, and particularly gender diversity, is a business industry imperative.

I work for a company that has diversity at the heart of its belief system. Our credo states that we embrace diversity not only because it's the right thing to do, but also because it's smart business. Our business is all about helping people, businesses and things communicate better in the digital world. We also focus on fostering diversity and inclusion, because when you're in the business of connecting people and cultures across the planet, it is your blueprint for success. It's a blueprint that builds relationships on which your future business depends. This is why I work for Verizon.

#### With over 24 months of the pandemic behind us, how did the need for digital acceleration impact the wholesale industry?

The pandemic accelerated digital transformation for enterprises of all sizes. Specifically, it changed not only the fact that most workforces were immediately dispersed from offices, but the manner in which many businesses interacted with their consumers. Customer experiences were disrupted in a major way out of necessity due to distributed workforces and social distancing requirements.

The wholesale industry provided the products and solutions that helped enable mass digitization of business processes and customer experiences. Connectivity from the telecom industry was crucial in ensuring businesses continuity with a remote workforce. Telecom providers needed to pivot from modernizing customers' office communications to enabling remote workforces in a very short period of time, all while much of their workforce also transitioned to work from home. Our online portals and APIs rapidly enabled new service orders for this shift and voice network capacity was added for the short term spike in voice traffic.

Our prior digital transformation investments have served us well throughout the pandemic. What the future holds for the wholesale industry is an uncharted course without a historical precedent.

#### Where is the industry heading in terms of technology, solutions, ecosystem, and business model and what are some of Verizon's priorities in these areas?

Products and services built on top of the network and enabled by our connectivity are significant growth areas. That includes above the network solutions such as security and BlueJeans (audio/ video conferencing), MEC, massive IoT, private on site 5G/LTE networks. Network as a Service (NaaS) to include Ethernet, Wave and Internet network services growth, and fixed wireless access products like 5G and LTE Business Internet from Verizon. Moving 'up the stack' and offering or enabling useful applications holds promise for future growth. Verizon is investing in expanding our data center presence with higher bandwidth capabilities.

#### With the aim of achieving digital transformation and 5G adoption, what is the vision of Verizon to reach the next stage for a digital future?

Verizon continues to invest in the product portfolio and digital tools to deliver the best experience for customers. Some of the most valuable lessons we learned during the pandemic have been around our ongoing digital transformation and digital experience efforts. While improving digital experience is always a work in progress, our Verizon Partner Solutions Exchange portal has been a home run for ease of doing business during the crisis and beyond.

As we move forward in this transformation, we are integrating digital technology into our business operations and enriching the exchange platform with digital capabilities that deliver value to our customers and create the networks that move the world forward. We highlight its capabilities in customer forums, to help ensure customers have awareness of the platform roadmaps and releases.

We are also driving adoption of this customer self-service platform through our interactions with our customers. Connecting people, places, things across the globe with initiatives such as the MEF interoperability standards will enable us to provide access to technology to all and education to develop the future workforces and ultimately transform the customer experience.

#### With women occupying several leadership positions in the business and communications sector, what would you like to tell all the pioneering women, especially in the Arab world?

I personally believe in the perseverance, capacity and performance of women in leadership positions, particularly women of the Arab world. The presence of female leaders in senior managerial positions would contribute positively to the improvement of career prospects of all women.

Besides equity and diversity that those senior female leaders enrolled in leadership positions enable, they usually tend to develop a positive and energized workplace and contribute positively to the company's policies and to the customers' perception.

Along that line, I strongly encourage all Arab women - whether in leadership positions or not - to get involved, work hard and contribute positively not only to their company's success and development, but to work on a larger scale so as to advocate widescale societal & cultural changes to their communities, economies and countries



Verizon continues to invest in the product portfolio and digital tools to deliver the best experience for customers



**TELECOM** Review



KINGDOM OF SAUDI ARABIA

# Saudi Arabia:

# A Tech-Powered Economy and Digital Hub

The Kingdom of Saudi Arabia (KSA) is opening new economic opportunities with its digital transformation well underway. The Saudi Vision 2030 aims to transform KSA into a global ICT hub, supported by modern technologies, advanced digital infrastructure, competent talents, and diverse investments. mong the most connected populations in the world, Saudi Arabia's internet penetration rate stood at 98% with a

population of 36 million, at the start of 2022. With this in mind, it's expected that the ICT market in KSA grows in size in parallel to tech investments.

A leading G20 economy, Saudi Arabia has been ranked second globally among the G20 countries in the 2021 Digital Competitiveness Report. This reflects the qualitative leaps made by the Kingdom in boosting its telecom infrastructure, enhancing its digital capabilities, and executing mega projects.

Its strategic location in the Middle East also makes it at the heart of major trade routes and home to natural resources. Despite being one of the leading oil exporters in the world, the focus within the economy is shifting towards a tech-powered path.

Saudi Arabia's GDP marks Middle East's biggest economy, which the International Monetary Fund (IMF) forecasts to exceed \$1 trillion in 2022. In line with this, Arthur D Little expects the digital economy to contribute around 20% of the country's GDP by 2025.

#### Saudi Arabia's ICT Market

One of the major enablers of KSA's Vision 2030 is the ICT market. Its core objective is to build tomorrow's digital foundations for a connected and innovative Saudi Arabia. Developing standards, partnerships, and investments are key to attaining ICT's affordability, accessibility, and service quality.

Relatively, as per the Saudi Arabia ICT Strategy 2023, the ICT sector in KSA encompasses several key technologies in IT, emerging tech, and telecommunications. Reportedly, Saudi Arabia's ICT infrastructure market growth is driven by increased spending in the telecom and ICT industry by the Saudi government, bring your own device (BYOD) trend, supportive government initiatives for 5G commercialization, and massive cloud adoption.

As a matter of fact, the government, finance, and communications sectors are expected to spend more than \$3.6 billion on ICT. More so, the overall ICT spending is expected to increase to over \$46 billion by 2023. With legislation and policies facilitating access to the internet and other digital-centric services, Saudi businesses have started to adopt cloud computing, data analytics, artificial intelligence (AI), and IoT technologies.

Having said that, in June 2022, the Ministry of Communications and Information Technology (MCIT) announced the new ICT Law approved by the Cabinet that would boost the Kingdom's position as a regional hub for innovation and technological investments.

On the other hand, KSA's ICT workforce is anticipated to reach beyond 200,000 professionals, highlighting the need to develop the skills of the existing Saudi ICT talent pool and encourage STEM education to the youth.

#### **Telecommunications**

Saudi Arabia is a global leader in 5G penetration and speeds. Its wireless ecosystem is also thriving, showing support for next-generation Wi-Fi standards and spectrum regulations. Saudi Arabia's Communications and Information Technology Commission (CITC) announced that KSA would be the first country in the EMEA region to make the full 6 GHz frequency band available for Wi-Fi use.

CITC has collaborated with vendors in the industry to facilitate importing Wi-Fi 6E devices into the Kingdom. In the hopes of accelerating the adoption and deployment of Wi-Fi 6E in Saudi Arabia, CITC has also published its WLAN regulations which strengthen the Kingdom's regional and global leadership in the field of Wi-Fi and license-exempt technologies and activates the latest generation of highspeed telecom technologies in the Kingdom. By and large, the telecom market in Saudi Arabia is one of the fastestgrowing markets for G20 nations. CITC Governor Mohammed Al-Tamimi commented, "The Kingdom has also achieved the highest level of progress and achievement, through the amount of frequency spectrum allocated to mobile communication services globally, thus ranking second among the G20 countries."

Across the country, 5G rollouts continue to expand and CITC is aiming to award spectrum in the 600 MHz, 700 MHz, and 3.8 GHz bands in June 2022 to support the expansion of 5G across the country.

CITC Governor also highlighted the strength of the telecom infrastructure in the Kingdom, as the average mobile internet speed reached 179.9 Mbps by the end of 2021 and the fiber coverage reached over 3.5 million homes. Additionally, 5G networks exceeded 12,000 towers in more than 51 cities and governorates in the Kingdom.

The frequency spectrum allocated to mobile services exceeded 1,110 MHz, with the percentage of IoT coverage reaching 95% in urban areas.

#### **Emerging tech**

Limitless opportunities exist in the cloud, IoT, AI, and blockchain, among other emerging technologies in Saudi Arabia. KSA is the largest technology market in the MENA region, worth more than \$40 billion, and has been attracting new investments to transform into an innovation-based economy.

"These investments and initiatives are a manifestation of the Kingdom's push toward the growth of the digital economy for the greater good of people, the planet, and the prosperity of the MENA region. They mark the next level of growth for the digital economy in Saudi Arabia, the MENA region's largest technology and digital market," said HE Eng. Abdullah Alswaha, Saudi Minister of Communications and Information Technology (MCIT).

By 2030, AI is expected to contribute \$133 billion to local GDP, with support from SDAIA's multibillion-dollar AI and data strategy while the domestic data center market will gain around \$1 billion worth of investments by 2026.

According to MCIT, there are over 400 data centers benefiting from KSA's strategic location which allows global cloud service providers (CSPs) to serve the MENA region. During LEAP 2022, stc announced its billion-dollar investment in MENA HUB for regional connectivity and infrastructure. This will support Saudi Arabia's rapidly expanding digital and cloud sectors.

Saudi Cloud Computing Company (SCCC), a new joint venture formed by Alibaba Cloud, stc Group, eWTP Arabia Capital, SCAI, and SITE, has chosen Riyadh as a regional hub for Alibaba Cloud operations. Two new data centers have been unveiled in the capital city to provide a wide range of proven and secure public cloud computing solutions.

A billion-dollar investment was also stated by NEOM Tech & Digital Company

with a focus on future technologies. As part of it, they launched the world's first cognitive metaverse, XVRS, and M3LD, a personal data management platform.

Citing an example of blockchain integration, the Saudi Arabian Monetary Authority (SAMA) is among the first Saudi government authorities and central banks in the world that announced the deployment of blockchain technology for money transfer.

For AI, pilgrims visiting Makkah's Grand Mosque can now get guidance from new four-wheeled AI robot guides that speak 11 languages and are designed with a smart stoppage system that will prevent them from running over people or objects while roaming.

According to CITC, by the end of 2022, 82% of medium-to-large organizations in the Kingdom are expected to adopt an IoT solution for their business; elevating customer experiences among other priorities.

#### **Digital Saudi**

Is Saudi Arabia technologically advanced? This is a no-brainer question, evidenced by the Saudi innovation initiatives being carried out. From within the public sector to the various sectors of the economy, a digital Saudi phenomenon is on its way to maturity.

Building a digital economy is not a choice but a requirement that conveys economic vibrancy and resilience, and within GCC countries, Saudi Arabia has been proactively building adaptive regulatory frameworks, developing talents, expanding innovation capacity, and increasing local production of digital goods and services.

#### Government

Saudi Arabia's digital maturity level percentage of eGovernment services is 71%. The Smart Government



Strategy sets an ambitious goal that, by 2024, KSA will be agile, capable, and innovative in delivering smart government experiences. As an example, the digital government authority (DGA) launched the regulatory sandbox initiative that would govern and enhance digital government services and prepare the necessary regulations to improve the business environment. The Saudi Arabia Government also pursues a digital-by-default approach and a mobile-first strategy.

#### Healthcare

For the next five years, Saudi Arabia's National Transformation Plan has estimated almost \$1.6 billion worth of investment in electronic health initiatives. Middle East healthcare providers including those in KSA can deploy visibility and mobility solutions to empower staff and gain intelligence to perform better patient care. By 2025, the Health Sector



Transformation Program aims to cover 100% of the population with a unified digital medical records system.

#### Education

KSA has taken a step in the right direction by initiating new ICT programs in Saudi universities, a Saudi digital academy, and a national information technology academy, to promote the learning of specific technical skills, tools, and programs. Saudi Arabia's Ministry of Education recognizes the need for a longterm strategy for blended learning needs and for children as well as teachers having access to devices and connectivity. KSA's innovative distance learning platform "Madrasati" benefited six million children benefited during the pandemic.

#### **E-Commerce**

E-commerce will help drive Saudi Arabia's economic growth, with the domestic online market expected to double to \$2 billion by 2025. The Kingdom is also well positioned to become a regional e-commerce hub, reaching most Middle East markets, with ICT and financial services supporting e-commerce's advancement. The government's e-commerce law has defined e-payment services and created a customer protection framework; increasing the trustworthiness of the technology.

#### Transportation

Saudi Arabia has reportedly earmarked \$140 billion for mobility optimization over the next ten years. In fact, some of the world's top engineering minds are helping to design a fully autonomous transportation system for NEOM. Self-driving electric vehicles will use advanced radar technology and communicate with each other to transport goods and people. Riyadh has also invested in a multibilliondollar public transportation project with driverless trains.

#### **Startups**

One initiative launched during LEAP 2022 was The Garage, which aims to inspire Saudis to start their own tech business. Acting as an innovation hub, The Garage focuses on the financing and mentoring of emerging and disruptive technology-based startups. Around \$1.4 billion will be spent on fostering entrepreneurs through this program. It involves multiple stakeholders such as King Abdulaziz City for Science and Technology (KACST), MCIT, and SAFCSP.

#### Fintech

In 2021 alone, a record level of over SAR 1.3 billion (\$347 million) in venture capital investment was plowed into Saudi Arabia-based fintech companies. More so, over \$33 billion of transactions are expected through KSA's fintech market by 2023. The shift to instant payments would not have been possible without increasing the accessibility of digital payment channels which SAMA. the Central Bank, has spearheaded as a priority. New fintech ideas are also being nurtured within the SAMA regulatory sandbox. In compliance with SAMA's open-banking policy, by the end of 2022, the first examples of consumer-facing open banking products and services will be accessible.

#### Infrastructure

Saudi Arabia is currently building smart cities, aiming to be the world's most connected and digitized nation by 2030. According to MCIT, approximately \$4 billion has already been invested in digital infrastructure, focusing on industrialized IoT, AI, cloud computing, and data centers. Al Ula, Qiddiya, NEOM, Red Sea Project, Jabal Omar, Amaala, Ad Diriyah, Al Widyan, and King Salman Park are among the mega projects that will make Saudi Arabia embody the future of business, livability, and sustainability.

#### Cybersecurity

Saudi Arabia is ranked second in the world on the Global Cybersecurity Index (GCI). Raising the level of cybersecurity in the Kingdom, the National Cybersecurity Authority (NCA) launched the national portal for cybersecurity services (HASEEN). In retrospect, the National Digital Transformation Program allotted cybersecurity investments reaching \$425 million in 2020.

25



Raed Aoude, Director of Sales - MENAPAK & SEA, CommScope

CommScope Mosaic Fixes 5G Rollout Issues, Now and in the Future CommScope Mosaic comes as a solution to the challenges of 5G rollouts. On the sidelines of the 5G MENA event, Raed Aoude, Director of Sales - MENAPAK & SEA, CommScope, enlightened Telecom Review of the 5G commercialization scene in the MENA region and how they are addressing the problems being faced by their partners on this matter.



an you tell us about CommScope's participation in 5G MENA? CommScope has been in the Middle East and

North African region for decades. Our participation in 5G MENA complements the existing markets that we serve in this area. Mostly, we are working with service providers and MNOs in MENA for their technology upgrade — from 3G to 4G and now 5G.

Because of that, we wanted to be here to make sure we fortify our presence with our partners and customers in this region; get to know what are their challenges and expectations; and show them the latest and greatest innovative solutions that CommScope is offering to this specific market and globally.

#### What is your outlook on the 5G commercialization in the MENA region? And what are the challenges behind this?

While some of the markets in the Gulf region have started their commercial deployments of 5G, we see some other markets still waiting for the spectrum allocation, mainly in North Africa. It would probably be mid-to-end of next year when we would see commercial 5G rollouts in this market.

In parallel, the big markets in the Gulf have already have done a great milestone by deploying 5G. I would dare to say that they are the world's leaders in terms of adopting 5G technology, considering what else to come and how to serve the different perspective of customers in this region.

There are common rollout challenges. Nevertheless, the advantages that 5G gives to the operators are huge. Following discussions and meetings with our partners, we concluded that one of the challenges was the use cases such as how to find the monetization aspect of 5G. We see a lot of new verticals arising that will fix that type of challenge coming up our way.

Private networks, AI, and IoT are coming into play which could fill in those gaps relatively. Site zoning and site-level infrastructure are also becoming a bit problematic because the number of spectrum bands and technologies added to the site is becoming huge. We still have 2G, 3G, and 4G, and a lot of those markets are now adding a new layer with new frequency bands for 5G. This is creating some challenge to the operators plus the power consumption that this also brings on board.

Luckily, it's not the end of the world. There are available solutions that CommScope and other industry leaders are here to offer.

#### CommScope is introducing the Mosaic platform in the Middle East. How will this benefit the operators in the region? What other solutions do you offer to address operators' challenges?

CommScope Mosaic comes as a solution to all of those challenges that we're seeing on the level of 5G rollout. MNOs are faced by crowded tower tops due to the need to add more radios and elements on the site level on the tower, but the space requirements and the wind loading in those towers might not allow for that integration in a simple way.

CommScope Mosaic comes as a reply to those challenges in the market. It

allows operators to integrate the passive and active elements of the frontend of the antennas in that perspective. In one platform, the same form factor will be used as the existing solution. Imagine, as an operator, you can integrate with 5G without the need to have an extra wind load or an extra form factor on the tower. And this was like a click of a button for them as this is what they need. This is how we move forward from here.

The simplicity of installation has a huge effect to the operators. When we discussed the CommScope Mosaic solution, everyone raised their hands and said this is what they want to proceed with. It's a cost-effective solution to be deployed, and it's also future-proof because some operators that are now looking at maintaining current network topology, while preparing for 5G, can just slide in their 5G radios whenever the time comes within the CommScope Mosaic platform — without the need to touch their site tower top configuration for one more time.

Overall, the CommScope Mosaic is a new solution that will fix issues for the 5G rollouts now and in the future. If your 5G is one year down the line, you can make sure that the asset you are investing in right now is ready and capable to take 5G at a later stage.

#### What other verticals would likely impact CommScope's business strategy in the years to come, specifically in the MENA region?

One of the topics we have also discussed include Open RAN (O-RAN). We see this as something that will be one of the major ecosystem changer in the coming future, in one to two years. It's a buzzword, but there's a lot of interest from the MNOs to see what the O-RAN can bring to the table. And this is something we are heavily engaged in with our partners in the industry — from software to O-RAN providers. We are also part of global groups like the O-RAN Alliance and Telecom Infra Project to make sure that there's a seamless integration of the new technology in our markets in MENA.

I was also surprised to hear many of the MNOs talk about private networks. There is also a good interest in private networks, whether that's going to be like a slicing of the existing networks or standalone networks. I think the market doesn't have the answer for that yet. The MNOs as well as the industry players are looking at ways to make it easily implemented and then integrate already on the current rollout.

Of course, other verticals that are part of normal rollout are there to stay and grow like small cells, densification, capacity, etc. But in my perspective, those two verticals are the newcomers to the ecosystem of the telecom industry.

Whether it's Open RAN or traditional RAN rollouts, these will face the same challenge of the tower top crowded infrastructure: how can we fit more radios, nodes, and equipment in that tower without adding extra load, cost and complexity? The CommScope Mosaic fits that angle. Furthermore, when we talk about our indoor solutions (DAS and small cells), we'll be opening our interfaces to cater network slicing of the Open RAN or private networks.

CommScope Mosaic comes as a solution to all the challenges that we're seeing on the level of 5G rollout



**TELECOM** Review



# Why mmWave Network Deployment is Crucial for 5G?

Smartphones and other home electronic devices use frequencies on the radio spectrum, typically under 6 GHz, but these microwave bands are starting to get crowded. As more devices come online, carriers can only squeeze that much data on the same radio frequency spectrum, resulting in slower services and dropped connections.



G benefits from hundreds of megahertz (MHz) of bandwidth that can be deployed in frequency bands from sub-1 gigahertz (GHz) up to the millimeterwave (mmWave) range above 24 GHz. Experiments are ongoing with mmWave that fall between 30 GHz and 300 GHz to achieve that muchneed bandwidth and connectivity speed for modern, hyper-connected networks. 5G mmWave delivers a

wide spectrum and capacity along with ultra-low latency; however, it comes with its share of challenges and improvement opportunities.

**mmWave Network Trails in UAE** In October 2016, Etisalat

**TELECOM Review** 

demonstrated the first live 5G mmWave in the Middle East at 36 Gbps. In November 2017, the company conducted a live precommercial trial over an e-band of 2GHz and massive MIMO at 71 Gbps. In December 2020, Etisalat achieved the world's fastest 5G download by aggregating 2.6GHz, 3.5GHz, and mmWave at 9.1 Gbps. Then in June 2021. Etisalat in collaboration with Ericsson deployed 5G mmWave across its commercial network, achieving high-performance 5G downlink data speeds of 4.2Gbps and latency of 8 milliseconds (ms). Similarly, du successfully deployed the MENA's first 5GmmWave site at the du arena in Yas Island, Abu Dhabi, achieving ultra-high mobile broadband speeds of up to 2.1 Gbps using 26GHz frequency.

#### Challenges for mmWave Deployment Globally

While low-band networks provide wide-area coverage with limited throughput, mmWave networks provide high throughput but in very limited range. Millimeter waves cannot travel well from buildings or walls and also tend to be observed by plants and rain. Operators need dense small cell deployment for mmWave to overcome propagation limitations. There are physical as well as financial constraints to re-design wireless backhaul networks to efficiently connect the small cells to the macro base station (BS) instead of fiber.

An immature device ecosystem with low mmWave handset adoption is a primary cause of the delayed deployment of the technology. However, almost 202 million 5G mmWave-supported devices were reportedly shipped in 2021 and are likely to reach 1.1 billion units by 2026.

High power consumption at both node and user device sides is an issue that needs focused attention as it involves higher costs impacted by energy usage. The viability of the services enabled by 5G and Beyond (5G&B) is directly tied to energy efficiency, which needs to be addressed across the whole ecosystem due to up-time requirements and reliability of the network. The higher cost incorporates not just CAPEX (equipment and installation) but also OPEX (maintenance and energy cost).

#### **Technological Advancements**

MmWave communication has in recent times matured owing to hardware design advancements and has been proposed to support the high bandwidth demand in 5G cellular networks.

3GPP Release 17 introduces further improvements in integrated access backhaul (IAB) for distributed deployment. This release introduces operating in full-duplex mode and introduces mobile relays to improve coverage, capability, and QoS. 5G NR mmWave IAB can be used for costefficient dense deployments.

Improvement of power efficiency for 5G mmWave can happen through device-assisted power savings and low power modes. New devices are expected to provide additional information on battery level and temperature and allow the network to select carrier or power mode. The device can also provide antenna information to enable more power-efficient beam sweeping/ switching through multi-panel beam management.

Advanced techniques including beamforming and beam management at base stations can improve cell range over multiple kilometers providing a better Gbps experience. MIMO beamforming has been suggested to support long-range transmissions between the macro cell and the cluster heads.

Reconfigurable Intelligent Surfaces (RIS) have recently gained extreme popularity as they can create Smart Radio Environments by EM wave manipulation and act as passive relays of wireless communication systems via software with the advances in low cost, high energy efficiency.

Moreover, new tests are ongoing to create seamless transition between

mmWave and C-band, with the technologies able to combine and de-combine as people move in and out of range with high-power devices for the enhancement of ultra latency coverage.

#### **Potential for 5GmmWave**

Among the key capabilities of 5G, the ability to connect huge numbers of IoT elements, now forecasted in the trillions, will be the enabler for broad sensing and control applications, especially in industrial, robotics, agriculture, and mobility sectors. The majority of mmWave use cases focus on 5G enablement and there is a long list of experimental cases to follow including VR/AR, immersive customer experience, connected vehicles, robotics and automation, missioncritical communication, and others.

5G technologies will not be limited to telecom operators but will expand to support verticals including first responders, public safety, tactical networks, defense, agriculture, entertainment, eHealth, smart cities, and so on. Enterprises will take advantage of 5G enablers such as Edge Cloud, SD-WAN, network slicing, virtualization, orchestration, and AI/ML to customize their private 5G networks and support a variety of applications including ultra-low latency, enhanced mobile broadband, and massive machinetype communications. Moreover, with carriers beginning to sunset their 3G networks, additional spectrum for 5G-SA networks will free up.

To benefit from the full potential of 5GmmWave networks, 5G ecosystem players will require active participation and collaboration with industry authorities such as ITU, 3GPP, and GSMA and lead negotiations with other regions on harmonization of technical and regulatory specifications of IMT within the mmWave bands and the adoption of feasible emission limits of IMT system. Contributing to international coexistence studies including sharing and compatibility between IMT and earth exploration satellite service (EESS) is also a proposition worth pursuing. 🎹



# Fighting Telecom Fraud with Al

Today's digital ecosystem is witnessing rapid growth across e-commerce, fintech, health tech, edutech and other sectors. However, this ecosystem faces the everprevalent threat of fraud that offsets business plans, and risk investments and essentially puts people's lives in a tight spot. The growing complexity in the digital services ecosystem demands a future-proof approach to secure the networks and prevent revenue losses.

> illions of dollars are being spent on developing advanced technologies and gaining access to

the market. Moreover, investors, corporations, government, and academia partners are involved in providing tech startups with the essential elements to grow and succeed in the UAE and globally. Striving for operational excellence through digital transformation in terms of RoI, time efficiency, and customer satisfaction is an essential component of any innovative framework in the digital economy.

Fraudulent actions have spiked in telephone network functions, online

banking, and e-commerce. For instance, in the UAE, a court penalized a bank and telecommunication provider concerning a SIM swap fraud, which was attributed to breaches in the security systems of both the bank and the telecommunications provider. Conversely, to combat telecom fraud from foreign destinations, one of China's largest telephone service providers will soon restrict users in



the eastern Zhejiang province from receiving international phone calls. More than half of the telecom fraud in China originates from outside the country.

#### **Fraud Patterns**

Traditional telecom fraud may include the following:

- In subscription frauds, a fraudster accesses a service with false identity details with no intention to pay the bills, all transactions are fraudulent for personal use.
- In superimposed fraud, a fraudster gains a legal account or superimposes upon the normal usage of the legal customer for cellular cloning, calling card hacking, phone misuses, etc.
- PBX hacking/fraud occurs when someone gains access to a business's PBX phone system and generates a profit from the international calls at the business's expense.
- Message previews let fraudsters access sensitive information and hack people's WhatsApp and bank accounts, among others.

Apart from the traditional cases of telecom fraud, with the emergence

of multimedia applications and digital audio/video transport over IP-based networks, Session Initiation Protocol (SIP) is becoming the de facto signaling protocol standard for telecom LTE/VoLTE services. SIP is the session control protocol that can establish, modify, and terminate multimedia sessions such as Internet telephone calls (VoIP), multimedia distribution, and multimedia conferences.

Fraud detection cannot be a fixand-forget exercise. Fraud patterns can differ drastically over time with changes in customer behaviours and traffic volumes in today's dynamic telecom ecosystems.

#### **Leveraging Artificial Intelligence**

The telecommunication industry is facing slumping sales due to fierce competition and fraud-related problems. As such, telcos can benefit from leveraging AI's powerful analytical capabilities to combat instances of fraud.

Al and machine learning algorithms can detect anomalies in real-time, effectively reducing telecomrelated fraudulent activities, such as unauthorized network access and fake profiles. The system can automatically block access to the fraudster as soon as suspicious activity is detected, minimizing the damage. With industry estimates indicating that 90% of operators are targeted by scammers daily, amounting to billions in losses every year, Al application is a must for telecom companies.

Markets estimate that global AI in the telecommunication market size will reach \$14.99 billion by 2027, from \$11.89 billion in 2020, at a CAGR of 42.6% during 2021-2027.

Moreover, network intelligence and automation are a crucial part of the evolution of 5G, IoT and industrial digitalization. Data flow generated by the telecom industries to provide billing information, call details and network data can be routinely analysed by leveraging AI capacity. AI in realtime learns to interpret data, detects new cases, and expands its knowledge base with new behaviours that may require a reaction.

AI/ML help define the correct behaviour that will automatically be performed when specific events are detected. This approach translates into savings in implementation and maintenance. It also dramatically simplifies architecture because fraud prevention mechanisms use the same data in real-time as other processes. Above all, this process secures business operations in a completely new intelligent way.

As per the latest data released by UAE's Telecommunications and Digital Government Regulatory Authority (TDRA), the total number of telecom subscribers in the UAE, including mobile phones, landlines and Internet stood at 21.929 million by the end of 2020. The number of mobile phone subscribers touched 16.820 million by December end from 16.707 million in November. The subscription per 100 people stood at 186.1, with mobile subscriptions accounting for 76.2% of the total subscription base.

With this growth in online activities, fraudsters are using even Google ads on Google search result pages or ads on social media channels to promote fake brands. Victims to such nefarious activities have lost money purchasing counterfeit products.

#### **Brain Power and AI**

By investing in a network-level fraud mitigation system using AI, CSPs can substantially enhance fraud detection but it will require the support of the unique intelligence of the human brain. As we all know, AI can only detect and predict fraud using historical data, whereas the human mind can develop creative, logical solutions to fight fraud, without having to have much data on hand. However, the processing power of compute-heavy AI technology cannot be overlooked at any cost. What will be needed is an integrated approach to fraud management and security using AI/machine learning combined with talented and creative human minds to create the ultimate machine for CSPs to fight the menace of telecom fraud effectively.

# Cloud Migration: An Important Digital Enabler

Cloud migration helps businesses move their applications, databases, and other IT resources to remote servers in a seamless, secure, and transparent manner. According to the 2022 State of Multicloud report, 60% of organizations are now running production workloads in a public cloud, with migrating more workloads as the most important cloud initiative overall.

or better scalability, availability, cost savings, improved productivity and business agility, and operational resilience, cloud migration strategies are being adopted faster than before. Depending on which cloud provider you will choose and the workload you have, effective cloud migration will result in building your organizational, operational, and technical capabilities.

From the planning stage up to selecting an appropriate cloud environment, migrating data and apps, and evaluating the progress, making the transition is not easy but worth it when done right. Leveraging new technologies, consolidating resources, and enabling digital transformation as a whole will allow enterprises in the cloud era to grow further.

#### Cloud Migration Roadmap and Strategies

Cloud is becoming the new normal for companies of every size. For most organizations, the question isn't if anymore but instead what are we moving as well as when and how fast can we move? Indeed, there are many opportunities to grow, succeed, and advance when moving towards the cloud.

The cloud's strength lies in its flexible infrastructure, manifesting advantages such as decreased hosting costs, enhanced customer experience, improved team collaboration, disaster recovery, and security. As a matter of fact, many companies accelerated their cloud migration process in 2020/2021 to support remote working, online transactions, and online data storage.

A typical cloud migration scenario involves moving data from a legacy system to the cloud. An ideal roadmap would include defining your strategy before you plan your migration, preparing the team for migration before adopting the cloud environment, and after migration, securing and managing your workloads to ensure cost optimization.

Before getting started, it is smart to assess the current environment and calculate your cloud server requirements based on current or planned application resource. After which, you can choose your cloud service provider – Amazon Web Services (AWS), Google, or Azure – and the cloud model you prefer to adopt (public, hybrid, private, or multi-).

Companies need to build a unique cloud migration strategy that reflects where the company needs to grow in the future to accomplish business and operational goals. There are common migration strategies you can follow, depending on your needs:

#### (1) Rehosting

Cloud rehosting is the simplest and most popular method of cloud migration, causing minimal disruption on all fronts. Also known as the lift-andshift migration, it transports an exact copy of your current environment to the cloud. Involving the infrastructureas-a-service (IaaS) model, it redeploys existing data and applications on a cloud-native server. This is a good option for cases where no code modifications are done and applications are kept intact.

Huawei Cloud surged by over 200% in the IaaS market, positioning itself among the top five IaaS vendors with 4.2% in global market share. Using Huawei's global experience, the vendor provides leading data migration services, as well as application integration migration and virtualized migration services to customers around the world.

#### (2) Replatforming

This involves making further adjustments to optimize landscape for the cloud. The core architecture of applications stays the same, but any incompatibility will undergo a rewrite on the codebase. By modernizing legacy applications, this move-and-improve approach is a good strategy for building trust in the cloud – the middle path between rehosting and refactoring.

Adopting a third-party software-asa-service (SaaS) platform could be beneficial, without doing all the work of building and maintaining it yourself. Relaunching Console Connect's CloudRouter solution, businesses can instantly use CloudRouter to connect between different cloud platforms and cloud regions, and establish secure and fast connections to multiple SaaS providers.

#### (3) Refactoring

Also known as the rearchitecting or rebuilding, this involves a complete refurbish to a company's existing environments. When a legacy software is too old to run on current cloud tech, rebuilding from scratch is the solution. Following a lift-tinker-andshift approach, it is the most expensive option, but also the most compatible with future versions.

This includes the use of virtualization with containers or VMs and microservices that make more efficient use of resources, supporting businesses for their digital transformation journey.

On the other hand, retaining and retiring are also other cloud migration strategies to consider. The former is when you plan to revisit cloud computing at a later date, while the latter means letting go of applications that are no longer useful.

#### **Case Studies**

20 years ago, Amazon already began the development of infrastructure-as-aservice (IaaS) at Amazon Web Services (AWS). On 2006, AWS started offering web-based computing infrastructure services, now known as cloud computing.

Now, AWS is the most popular public cloud platform, particularly in the telecom industry. Nokia has collaborated with AWS to extend the reach of its Cloud RAN technologies in support of 5G deployments and the development of new use cases. In this collaboration, Nokia will leverage AWS services such as Amazon Elastic Compute Cloud (Amazon EC2), Amazon Elastic Kubernetes Service (Amazon EKS), AWS Outposts, and AWS Local Zones for automating network functionality.

Independently, Nokia's new softwareas-service (SaaS) offerings – Nokia AVA and the Nokia home device management SaaS – aim to help communication service providers (CSPs) and enterprises strengthen their energy efficiency efforts and optimize home device management.

Netcracker also announced the deployment of its full stack digital BSS/ OSS and orchestration applications on AWS. Netcracker's modern cloud BSS/ OSS and SaaS-based model allows operators to transform into technology enablers. "Operators no longer need to worry about cumbersome BSS operations and can instead rely on an experienced agile partner to increase the speed and flexibility of their business operations," said Mervat El Dabae, Regional Vice President, EMEA, Netcracker.

By incorporating AWS marketplace services into its own marketplace solution for CSPs, Netcracker is strengthening its ecosystem approach to telco service agility. Relatively, Bernard Najm, Vice President, Telco, MEA, AWS has mentioned why they focus on the automation of OSS/BSS. "We focus on the automation of OSS/BSS, cloudifying those complex structures because we believe that complexity will increase, so the earlier we start with the simplification, the easier it will be to manage complexity and thus reduce the cost," he explained.

While thinking about which hyperscaler to trust, Red Hat has pointed out how operators in a multi-cloud environment must control their own destiny and build the ideal strategy fitting to their services. "Red Hat's goal is to make the cloud infrastructure, the software layer, as easy to consume as possible. Whether you're deploying that for RAN, edge, IoT, 5G core, or enterprise services, it needs to be consumable in a very easy way and provide all the capabilities as part of that infrastructure," said Azhar Sayeed, Senior Director, Global Telco Technical Development at Red Hat.

Moreover, AWS Direct Connect makes it simpler to establish a private, lowlatency network connectivity from your premises to AWS. Providing a more consistent network experience, Etisalat supports businesses in their cloud journey with AWS Direct Connect, enabling the secure transfer of data directly from data centres, offices or a colocation environment.



# Future-Ready Networks for Connectivity beyond 5G

The need for robust and agile mobile networks to empower and drive a country's digital transformation cannot be understated. Digitalization is helping companies address and solve their biggest and business-critical challenges, using applications that depend on reliable and ultra-low latency connectivity to deliver the goods. As such, the evolution of telecommunication networks is happening at a faster pace.

he 5G rollout has made considerable progress in the last two years. According to the latest Ericsson Mobility Report, 60% of global mobile network data traffic is expected to be over 5G networks by 2027. The report also highlights that in 2021, broadband IoT (4G/5G) overtook 2G and 3G as the technology that connects the largest share of all cellular IoT-connected devices, accounting for 44% of all connections. Moreover, the use of massive IoT technologies (NB-IoT, Cat-M) increased by almost 80% during 2021, reaching close to 330 million connections. The number of IoT devices connected by these technologies is expected to overtake 2G/3G by 2023 as 5G compatible and affordable mobile devices start to hit the market.

Furthermore, as the demand for cloud solutions grows, CSPs are already working with big cloud players such as Google Cloud to provide customers access to cloud solutions that address strategic customer initiatives around app and cloud modernization, as well as distributed workforces. Cloud enables enterprises to run the most demanding, file-based workloads, which require extreme performance and throughput.

Only robust, flexible, and innovative IT systems will sustain businesses into the future. CSPs have to shoulder the responsibility to offer customers the performance, scale, and enterpriseclass features with the economics and flexibility of evolving technologies.

#### **Innovation-Driven Businesses**

Telecommunication is an innovationdriven business and the only way to be on top of the game is to keep up with the pace of the evolution. "The deployment of 5G standalone (SA) networks is increasing in many regions as communications service providers (CSPs) gear up for innovation to address the business opportunities beyond enhanced mobile broadband. A solid digital network infrastructure underpins enterprises' digital transformation plans, and their new capabilities can be turned into new customer services," says Peter Jonsson, Executive Editor, Ericsson Mobility Report.

Moreover, 5G New radio (NR) and 5G core (5GC) evolution is continuing in 3GPP toward 5G Advanced, to ensure the success of 5G systems globally and to expand the usage of the 3GPP technology by supporting different use cases and verticals. Al/ ML will play an important role in 5G Advanced systems in addition to other technology components providing support for extended reality (XR), reduced capability (RedCap) devices, and network energy efficiency.

Although some legacy networks are still serving their purpose of connectivity, the inevitable adoption of 5G powered-applications will compel the phasing out of such networks sooner than anticipated. For instance, the UK is expected to phase out all of its public 3G mobile networks by 2033 to facilitate the mass rollout of 5G, and even 6G, as encouraged by the Department for Digital, Culture, Media, and Sport (DCMS).

Going by the principles of technological shifts, even the current transformation taking place will start to face challenges beyond the capacities of 5G and 5G Advanced. Industry players are already talking about 6G technology to provide an efficient, human-friendly, sustainable society through ever-present intelligent communication. In no time, 6G wireless communications will become the mainstay for running huge bitrates (terabits per second) and less than 1 ms latency connecting people to things. Along with AI and AR/VR, many future data-intensive applications and services such as pervasive edge intelligence, highprecision manufacturing, holographic rendering, ultra-massive machinetype communications, and MR-based gaming are expected to demand a higher data rate (+1Tbps) and extremely low delay (0.1ms).

And on top of that, deployment of internet protocol version 6 is already

underway in different parts of the world as the IP address space in the current version IPv4 begins to narrow rapidly.

#### What Role Should Network Operators Adopt then?

Network operators must be the enablers for people and businesses to reap the benefits of the latest technology whatever that may be. Operators have to maintain their revenues and cash flow through proper strategies in put in place. Here are some key considerations:

- 1. Focus on innovation: Investment in the latest software and hardware, along with digital-age management practices can help mobile operators achieve breakthrough cost savings and capital intensity while maintaining or even increasing their scale. Managing networks with next-generation technologies can cut the capital spending and operating expenses of wireless operators. Digitalization can support streamlining of business functions and customer service operations. Upgrading the platforms and network elements that do not support the full capabilities of the existing technologies should remain a constant feature.
- 2. Leverage data: Advanced analytics can help mobile operators determine which capital investments will benefit their network operations the most. Operators can look through ample data about where, when, and how much subscribers' behaviours and device use patterns in less time. This practice will ultimately result in better subscriber retention management.
- 3. Enhance Industry collaboration: Collaboratively developing knowhow and best practices for upcoming technologies through multi-vendor interoperability of service providers transport network solutions, etc. Testing and validation of various integration points between IT and network systems for new technology-based changes are key.

# **Connectivity:**

# Pushing Modern Transformation to Happen

Connectivity underpins different aspects of our personal and corporate lives – from emails and calls up to online transactions and cloud-based applications. Fast connection speeds and reliability are essential to keep a business running smoothly, meeting user demands and expectations.

Broadband services have ceased to be a mere luxury," said ITU Secretary-General Houlin Zhao. "They are a necessity for communication, teleworking, online education, and other essential services." It has been found that relative prices of fixed broadband services climbed to 3.5% while mobile broadband services

edged up to 2% of the gross national income (GNI) per capita globally in 2021.

The digital decade we are in targets gigabit coverage of all households and 5G in all populated areas. Yet, putting universal and meaningful connectivity is a challenge for different lines of business, including broadband, TV, mobile, and business-to-business (B2B) services.

The online experience is at the center of global development, and despite Internet access still being prohibitively expensive in many low- and lowermiddle-income economies, businesses globally are pushing to sustain their activities amid the COVID-19 situation. They are doing this through digital transformation, which is basically powered by connectivity. In fact, 70% of customer engagements will be driven by intelligent systems by 2022, according to Gartner. Without connectivity, businesses' operations, customers, and product delivery will be impacted significantly.

Some examples of operators providing support for enterprise connectivity are du's 5G private wireless network in collaboration with Intel; Zain KSA's 5G B2B leased line; and Intelsat's FlexEnterprise solution being integrated within the Console Connect digital platform.

#### For Business Growth

It is a must for companies nowadays to invest in IT modernization. In parallel, connectivity is the key to every business' success, virtually and within premises. Having reliable connectivity solutions helps any type of business to disrupt the markets they operate in.

From small businesses that are still starting out to multinational companies, high-speed broadband is one of the most basic requirements. From this, a healthy business environment where firms thrive and benefit from ICTs emerge. As per Kearney's analysis, rapid digital disruption will displace 40% of incumbent companies across industries in five years' time. But unfortunately, innovation models in global companies across diverse sectors fail between 70-80% of the time. This could be because of various factors such as weak connectivity, incompatibilities, security risks, and an incompetent workforce.

Technologies such as 5G, Wi-Fi 6, IoT, cloud, and AI, have redefined the ways people communicate and interact, and this new reality will be at the core of business strategies. This enables a transparent, open, and competitive business framework. Without ICT and digital applications, costs, time-tomarket, efficiency, and scalability are impacted.

Among the companies that embraced innovation with connectivity at the

core is Amazon creating Amazon Web Services (AWS) an on-demand cloud computing solution that has become an integral part of other companies' digital transformation. Moreover, communication service providers (CSPs) are also turning into digital service providers (DSPs) like how e& – former Etisalat Group – has rebranded to encompass all of its brands under one roof and Ooredoo Oman's digitalization journey.

#### **For Customer Experience**

In any business setup, when you lose customers, you lose a chunk of profits as well. This domino effect makes connectivity a crucial aspect of meeting customers' expectations. Most often than not, poor service in customer interaction – via online, email, in-person, or call – could affect loyalty and retention to a brand's product.

If a user has a more positive experience elsewhere, they will likely leave and choose another service provider. Churn is a direct reflection of the product's value wherein a high churn rate indicates customer dissatisfaction. Affecting a company's profitability and growth, high levels of churn risk canceling out new sales due to the loss of revenue from churned customers.

Billions of dollars per year are estimated to be lost in companies due to poor customer service. Staying connected 24/7 through an omnichannel approach can help a company improve customers' experience. Particularly in social media where reviews spread quickly, a quick response time in acknowledging an issue and offering solutions can keep customers happy.

Having the right systems and the processes defined can also garner valuable feedback directly from customers. A Salesforce study states that 67% of consumers say that connected processes are very important to winning their business. Having a contactless and digital-first customer experience is common now. This means fast webpage loads and near-to-real-time customer service responses, anytime and anywhere. In reality, connectivity allows big data to be turned into smart and actionable data and by developing a good foundation of APIs that enables interconnectedness internally and externally, you'll have better coordination and visibility to create personalized and relevant experiences for customers.

#### **For Automation**

From what we have seen in the past few years, AI, quantum computing, and machine learning had a greater impact on professional services, while 3D printing, robotics, and automation are disrupting sectors like manufacturing, real estate, and healthcare.

With connectivity, combining software and hardware technologies results in new products and business models. From sensors, digital twins, nextgeneration chipsets, and AR/VRpowered components, the exponential growth in technologies have led to faster processing, cheaper computing power, and safer data storage.

Relatively, network automation is the process of shifting from a manual to an automated way of configuring, managing, testing, deploying, and operating physical and virtual devices within a network. Intelligent automation typically results in cost savings of 40-75%, with the ROI ranging from several months to years. In line with this, network operators are under more pressure than ever to reduce their costs and improve their margins.

A reliable, low-latency, and highthroughput connectivity is vital in keeping everyday tasks and functions automated and repetitive processes managed automatically. When maintained in the long run, a more agile and smooth-running network will be achieved, and transforming a business would lead to a more productive and secure outcome.

By forgoing automation, businesses not only miss out on benefits like errorfree data processing, detailed records for auditing, and real-time monitoring but also the capability to scale and free up capacity for employees and customers.

### 'Etisalat By e&' Launched as New Brand Identity for Etisalat UAE



e& (formerly known as Etisalat Group) has unveiled "etisalat by e&" as the new brand identity for Etisalat UAE in line with the Group's recent positioning as the global technology and investment conglomerate that digitally empowers societies.

The brand evolution comes at a time when the Group continues to accelerate its digitalisation leadership in line with its objectives for exploring new geographies and adjacencies and pursuing strategic partnerships and acquisitions.

Etisalat UAE has been a key enabler of the Group's business growth, enabling the UAE's Fiber Household Penetration leadership since 2016, maintaining market leadership in the UAE, constantly ranking as one of the most advanced mobile networks in the world, providing premium connectivity and supporting customers every step of the way through holistic digital-first offerings. It continues to lead the digitalisation conversation, driven by its robust UAE strategy that envisages it to be the digital telco that is a customer champion in a hyperconnected digital world.

Etisalat UAE is on a mission to "Grow", "Transform", and "Excel". The technology leader has embarked on a new journey that predicates upon a shift in operating model, which will support sustaining its leading position, while enhancing digital customer experience and operational agility.

As part of its new strategy, Etisalat UAE will grow core and digital services, by enriching consumers' value propositions with digital services that cater for consumers' new lifestyles and emerging demands beyond basic telecom services. including areas like gaming, health. and insurance. Moreover. Etisalat UAE will continue to act as the business trusted partner and advisor by enabling their connectivity and beyond connectivity requirements, which, in turn, will accelerate the digital economy and pivot new, sustainable demand in futureforward spaces like private networks, autonomous vehicles, and AI.

Superior customer experience is a foundational block in Etisalat UAE's transformation into a digital telco. The company will harness the power of analytics to offer personalised experiences across all digital and physical channels. The step-change in experience will be enabled by a radical simplification in the operating model, which will power value creation in a more efficient and innovative manner.

### du Appoints New Emirati Professionals to Executive Team



du, from Emirates Integrated Telecommunications Company (EITC), announced the appointment of Mohamed Al Qubaisi, Khaled Al Mazrouei and Hasan Ali Hasan Bulhoon Alshemeili to its executive leadership team with a purpose to accelerate growth and support the telco's robust Emiratization agenda.

With an ambition towards leading Emiratization in the industry, the appointments are part of the telco's efforts to facilitate the development of Emirati talent and build a team of qualified leaders in the telecommunications sector whilst mobilizing human capital to its full potential.

Effective immediately, Mohamed Al Qubaisi will serve as the Head of NBI Products, Solutions & Digital Services, having nearly 20 years of telecom industry experience gained in the UAE while Khaled Al Mazrouei will serve as the Head of NBI Business Development, having two decades of experience working in public and private sectors. Hasan Bulhoon Alshemeili will play the role of Head of Technology Planning, after holding a number of senior positions in the telecommunication sector over the last 25 years.

Furthermore, the move aligns with du's strategic and coordinated approach to

ensure that Emirati talent is nurtured with long-term career prospects – 40% of the telco's workforce is Emirati with 47% in leadership positions.

Commenting on the new appointments, du CEO Fahad Al Hassawi said, "We are pleased to announce the appointment of three high-potential Emirati professionals as we advance our strategic priorities in alignment with our vision for the future. Emiratization is a crucial component of the UAE's long-term economic prosperity and we are keen to contribute by investing in it through wide-ranging initiatives, training and development. The extensive experience and leadership vision of our new executives will support du in the next phase of our strategic iourney – with a stronger focus on our customers and our business transformation."

### Zain KSA Welcomes 100 Fresh Graduates in Evolve Program



Zain KSA's one-year Evolve program was launched as part of its strategy to empower young Saudi women and men. The program aims to create the right combination of experience, global knowhow, and local market requirements.

100 fresh graduates have joined Zain KSA's Evolve program to leverage workplace training and skill development opportunities.

Specifically designed to educate fresh graduates and prepare them to join the

workforce with competence, the Evolve program reaffirms Zain KSA's belief in the capabilities of the youth and its ongoing efforts to empower them and develop their abilities. In partnership with Huawei, the Evolve program supports the SDGs that Zain KSA is committed to achieving, particularly providing employment opportunities for both genders.

In this context, VP of Human Resources, Loluwah bint Saad AlNowaiser, stated,

"At Zain KSA, we strive to support our nation's astute leadership and the goals of Saudi Vision 2030 to achieve nationwide digital transformation. We want to ensure that this transformation is carried out through our young talents who can effectively participate in channeling the huge technological progress the world is witnessing to serve their nation and its people. Our vision revolves around youth empowerment and we fully realize that the sustainability and localization of innovation and technology can only be achieved if we have skilled and trained national capabilities working in the Kingdom's telecom market. This is how we can achieve the optimal harmony and integration between human capabilities and technical systems in a digital and integrated work environment."

It is worth noting that Zain KSA has received the "HRSD Labor Award" for ICT talent localization by the Ministry of Human Resources and Social Development (HRSD).

### du Accelerates Digital Transformation With New HQ



du, from Emirates Integrated Telecommunications Company (EITC), opened its new headquarters (HQ) in Dubai Hills to accommodate rapid growth and accelerate its transformation journey to a digital telco. The new space supports the company's growth strategy as part of its ongoing transformation agenda through four key elements – design, culture, productivity, and employee well-being.

As part of its strategic growth initiative, the purpose-built HQ is designed to inspire innovation, collaboration, efficiency in a future-proof sustainable environment. du has a strong culture of employees from diverse backgrounds working towards a shared vision, taking pride in what they do and sharing their successes collectively.

Fahad Al Hassawi, Chief Executive Officer at du, said, "The new HQ in Dubai will bring our team together in a modern environment, transforming the way teams work. It represents a purpose and culture change within du – to an agile, forward thinking telco that is able to adapt to the challenges and opportunities presented by the acceleration of digital technologies. The new HQ is designed to create an integrated work environment, which will enable our employees to deliver great results and better services for our customers."

The new HQ will bring employee groups together to improve teamwork, advance innovation and increase efficiency – making du a more streamlined and agile company and improving profit growth for the organization.



### etisalat by e& Brings 5G Forward with Network Slicing



etisalat by e&, the new branding of Etisalat UAE, announced the successful deployment and testing for mobile network slicing through 5G, in collaboration with Huawei.

The 5G network slicing technology is an integral service that can harmonize the infrastructure as well as improve its visibility, control and flexibility. By definition, network slicing works by chopping up the existing network to ensure dedicated bandwidth to a selected application or process, offering reduced latency, sensitivity or speed to a company's most critical systems. Moreover, this architecture is more advanced in 5G private networks, with both operators and customers benefiting from the technology's control and efficiency.

It is worth noting that etisalat by e& has offered the world's fastest 5G download speed but alongside speed, it is also important to have a reliable connection, uplink throughput, improved latency and stable connectivity. Hence, with 5G network slicing, etisalat by e& can add value to the end-user experience by meeting the increasing connectivity requirements with guaranteed service levels.

Khalid Murshed, Chief Technology and Information Officer, Etisalat UAE (etisalat by e&) said, "This is yet another incredibly valuable step forward in delivering outstanding customer experiences where we bring new ideas to life through 5G slicing of the network by partnering with Huawei. Network slicing will play a crucial role in relaying a seamless experience for consumers and enterprises by enabling new and innovative 5G services as well as creating an indelible impact on industries such as gaming, entertainment and healthcare."

etisalat by e& was provided Huawei's support through the vendor's unique end-to-end (E2E) converged approach and its 5G core solution. Gavin Wang, Head of Etisalat Key Account at Huawei Technologies, commented, "We are proud to continue supporting the UAE to realize its digital transformation objectives and, in particular, Etisalat UAE in its vision to bring the best in smart connectivity and innovative digitalized solutions to its customers."

### Ooredoo 5G Powers New Experiences at Royal Opera House Muscat



Ooredoo 5G indoor internet, with superfast speeds up to 1 Gbps, will enable the Royal Opera House Muscat to deliver new interactive experiences. Combining seamless connectivity and outstanding entertainment, Ooredoo has partnered with the Royal Opera House to allow audiences and visitors to enjoy more responsive, fast downloading content, and unlock the potential of augmented reality and virtual reality at the Royal Opera House Muscat.

By being fully-connected exclusively by Ooredoo 5G, the Royal Opera House Muscat will also be able to enhance the presentation of live shows throughout the year using data-rich applications to display live-streaming videos, real-time information and utilize the power of 5G to stay connected.

Ooredoo 5G internet uses the latest technology, with low latency, increased capacity and amazing browsing opportunities for more users and more devices. Moreover, this service facilitates the Internet of Things (IoT) and allows subscribers to stream and download everything they need, to stay connected to work, home and entertainment.

## etisalat by e& Launches All-in-One 'GoChat Messenger' App



etisalat by e& announced the launch of GoChat Messenger, an all-in-one free voice and video calling app, giving customers the flexibility of accessing unique features.

GoChat Messenger offers a hasslefree experience for customers to easily make and receive voice and video calls, chat with friends and family, transfer money to their families, pay bills, play games, stay updated with the latest news and events, and access Smiles vouchers and deals as well as several home services.

The app is in line with the overall vision of etisalat by e& to empower customers with seamless digital applications, enabling experiences that enhance their digital lifestyles. Since the pandemic, the market witnessed an increase in penetration and popularity for internet calling apps.

GoChat Messenger is the latest addition to the suite of products and services that will benefit customers in the face of the ever-growing need for amplified connectivity in a post-pandemic era. It is a global application that can be downloaded by anyone in the world, only requiring a mobile number for registration, connecting the UAE population with friends and family across the globe and can be downloaded via Android and iOS app stores.

At etisalat by e&, there have been continuous efforts to ramp up efforts to ideate and create innovative propositions that drive smart connectivity, maximize value creation and enhance customer experience.

The GoChat Messenger launch follows e&'s recent unveiling of "etisalat by e&" as the new brand identity for Etisalat UAE, in line with the Group's positioning as the global technology and investment conglomerate that digitally empowers people and societies.

## Ooredoo Oman Honored for Its Commitment to Social Programs and Services



Ooredoo's commitment to the community has been recognized by the Ministry of Social Development at a ceremony held under the patronage of H.H. Sayyid Kamil bin Fahd bin Mahmoud Al Said, Assistant Secretary General of the Office of the Deputy Prime Minister for cabinet affairs, and Her Excellency Dr. Laila Ahmed Al-Najjar, Minister of Social Development, with the attendance of several ministers, undersecretaries, and senior officials from public and private sectors.

Since 2005, volunteers from Ooredoo have traveled across the country to

bring joy to thousands of people by donating essential supplies, the latest technology, and medical equipment to support and empower the community. Ooredoo has also collaborated with the Ministry of Social Development, to build specially-equipped rooms at social welfare centers across the Sultanate.

By investing in network, technology and people, Ooredoo is guided by its vision to enrich people's lives and is focused on building stronger communities. Each year, Ooredoo leaves its mark by developing local communities and empowering families and individuals socially and economically by supporting female entrepreneurship, education and by assisting voluntary organizations, government, and non-government organizations (NGOs).



# The 3<sup>rd</sup> Middle East IPv6 Enhanced Online Summit Wraps Up with Great Success

The annual IPv6 Enhanced Summit was held online on June 23, in its 3<sup>rd</sup> Middle-Eastern edition, with international and regional industry experts who gave insightful keynotes on the online summit's main theme "IPv6 Enhanced: Inspiring Innovation, Boosting Middle East Digitalization".

oni Eid, Founder of Telecom Review Group and CEO of Trace Media, who was the moderator and MC, welcomed the speakers and

gave an overview on the online summit's main topics and points of discussions. He then gave the floor to the first speaker, Dr. Bilel Jamoussi, Chief of Study Groups Department, ITU TSB.

#### IPv6 Enhanced for National Development

Entitled "IPv6 Enhanced for National Development", his presentation focused on the importance of the transition from IPv4 to IPv6 and the different country status. According to Jamoussi, 5G deployment is accelerating, which requires a significant number of addresses for the massive pipe connectivity, to connect the Internet of Things devices, "The IPv4 address space has been depleted, so there is a need to go from IPv4 to IPv6."

"There is a high demand for IP addresses, at the same time, there's a total depletion of the V4 space around the world, thus this puts the IPv6 at the forefront of policymaking, then the technology transition and capacity building", he said.

"At ITU we have a number of resolutions agreed by 193 member states of the ITU from the private sector and other stakeholders that tackled the importance of IPv6 deployment.

These are important instruments to make sure that the transition from v4 to v6 is at the highest level. According to Dr. Jamoussi, policymakers, ministers of ICTs, and regulators of ICTs are the decision-makers who have the power to accelerate this transition.

ITU also accompanies the member states who wish to do this transition. "We have an accompaniment project to help build the capacity, along with our partners in the regional internet registries and other stakeholders to make sure that the engineers that used to deploy only IPv4 networks are now capable of deploying, managing, and running the IPv6."

#### UAE Government IPv6 Policies and Strategy

One of the keynotes addressed during the 3rd Middle East IPv6 Enhanced Online Summit tackled the UAE government's IPv6 policies and strategy. Eng. Meshal Al Mheiri, Manager - Digital Policies Development, Telecommunications and Digital Government Authority (TDRA) shared a comprehensive presentation discussing the importance of IPv6; the current status of IPv6 in the UAE; risks and challenges of transitioning; the transformation deployment plan; and the stakeholders involved in the IPv6 journey. "We are in the time where we need to enhance the adoption of IPv6 within our country, with the support of different countries to achieve the highest adoption rate," said Al Mheiri. With IPv6 being adopted worldwide, this internet protocol enhancement is already part of the present, and not the future.

Highlighted by TDRA, IPv6 brings simplified and more efficient routing, end-to-end (E2E) encryption for all connections, auto-configuration and mobility, and has built-in authentication and privacy support.

Al Mheiri pointed out that IPv4 was fully allocated in 2011, with 3.7 billion usable addresses. But with the growing dependence on connected devices and IoT, there's an increased need for a large number of addresses. Google IPv6 data has shown that, as of June 17, 2022, there has been a 39.52% native adoption of IPv6 around the world.

Globally, India, Belgium, Malaysia, France, and Germany are leading the IPv6 adoption race while in the Middle East, the Kingdom of Saudi Arabia and the United Arab Emirates (UAE) are prominent. Al Mheiri described that the adoption rate in the region can be categorized as either low or mid-tohigh.

#### Current status of IPv6 in the UAE

Al Mheiri confirmed that there is a steady growth in the adoption rate of IPv6 in the country during Q4 2021, and yet, the utilization remains to be low, recording less than 10% registered IPv6 addresses.

Based on leading content delivery network (CDN) providers Akamai, Google, and APNIC, the UAE's conversion rate to IPv6 stands at 42.2%, 45%, and 42.5%, respectively. At present, there has been a 10% surge in these percentages.

Among the strategic importance of IPv6 in the UAE, Al Mheiri mentioned that the country needs about 35 million addresses, a huge difference to the around 4 million existing IPv4 addresses. Aside from that, IPv6 can also led to sustainable as well as modern and supportive infrastructure development, higher cybersecurity features, accelerated digital transformation, and more attractive ground for investments.

The UAE started the IPv6 deployment in 2009 on fixed broadband network, followed by mobile network in 2018. Starting from the allocation of IPv6 subnet by RIPE up to the architecture design and pilot traffic for service assurance, TDRA had to undergo network and firmware upgrade as part of its transformation deployment plan.

At the moment, "We have more automated IPv6 parameters to support any kind of new customers, being from a fixed or mobile network, to be registered with the parameters required to have a traffic initiated from there end-devices in the IPv6 cloud," Al Mheiri expounded. They are also more focused on migrating legacy systems to avoid complexities and have smoother transformation towards the future of IPv6, while keeping track of ISPs' progress on a monthly basis.

Accordingly, Al Mheiri emphasized that "the adoption of IPv6 is not an individual work, it's a joint venture... Any country that would like to adopt IPv6 need to have a community, a complete chain that needs to be connected."

In the UAE, TDRA, as the regulator, has partnered with local operators (Etisalat and du), CDN providers, manufacturers, and end-users for a holistic transformation.

#### Risks and challenges of transitioning

With all innovation comes risks and challenges, and these are present as well during UAE's IPv6 transition. "Most of the organizations, particularly the ISP sector, from an infrastructure perspective, consider these challenges to transit from IPv4 to IPv6," explained Al Mheiri.

Hardware lifecycle, higher costs with longer ROI, technical expertise, complex systems, and lack of user awareness are the challenges Al Mheiri stated on his presentation.

"Customers need to understand the benefits of transforming their home

networks and business networks into an IPv6-enabled environment," stressed Al Mheiri.

Despite these, the risks of not transitioning will entail increased cost, obstruction of smart city projects, interrupted cybersecurity measures, decreased service performance, and low investment opportunities.

### Embrace IPv6 to Unleash Enormous Value

Xiaohong Yang, Project Manager -Information, Technology and Internet, Roland Berger presented on the social and economic benefits of IPv6 and IPv6 Enhanced (IPE). She categorized the benefits in three categories – sustainable economic growth by driving innovation and entrepreneurship, development of science and technology through promotion of emerging technologies, and improvement in peoples' general well-being through enhanced IPv6 enabled applications.

"IPv6 is key to the essence of the free and open internet and it would empower digital economy transformation," said Yang. "IPv6 could balance the digital power and provide equal access for all."

She pointed out that IPv6 value creation is expected to reach \$10.9 trillion in 2030 globally which translates to around 4.8% of all global real output. IPv6 high impact industries included information and communication, public service and utilities, hospitality and entertainment and professional services and finance, among others. "Application scenarios and business models, such as industry 4.0, smart manufacturing, 5G factories, etc, will lead to about 3.6 trillion value creation."

She said that IPv6 will stimulate growth mainly via data security improvement, increase in efficiency and innovation empowerment. "New connections and in-depth innovation applications will garner almost 80% of the total sales enablements." She pegged IPv6 enabled percentage of industry sales in 2030 of information and communication at 6.4%, public service and utilities at 5.9%, manufacturing at 5.8% and transport and storage at 5.6% among others.

In collaboration with Huawei, a byvalue-chain method IPv6 deployment progress index for 2020 showed countries such as Belgium, Germany, Finland and India as front-runners; Norway, United Arab Emirates, China as adopters; and Chile, Venezuela and Lithuania as starters, among 79 countries.

Yang highlighted the discrepancies in core and user indicators and said IPv6 deployment at network core is crucial for country-wide adoption. She said that Roland Berger analysis shows that growth in IPv6 index can lead to GDP growth of a country. "For about every 10% increase in our IPv6 index, it resulted in about 0.4 increase in GDP."

As an example of an adopter country, Yang cited Saudi Arabia. She said that CITC enabled IPv6 for public-facing services such as publish guidance to support private and government bodies in deploying IPv6. CITC also set up the National IPv6 Task Force in 2008. Yang stated that major operator stc enabled IPv6 on fixed network since 2015 and is leading 48% IPv6 deployment rate in the country.

In terms of policy recommendations for IPv6 deployment. Yang said that overall strategy could include creation of high level of IPv6 roll-out strategy in line with a roadmap with other digital strategies; creation of dedicated national taskforce, encouraging IPE pilot in telecommunication and government networks, and enhancing international collaboration on knowledge exchange. She also stressed on skills enablement and boosting of IPv6 awareness. Yang added that frontrunner countries should take the next step toward driving IPE adoption and adopter and starter countries should leverage the recommended policies to further encourage the IPv6 and IPE deployment.

Latif Ladid, Founder and President of IPv6 Forum & Chair of ETSI ISG IPE explained in a pre-recorded video how IPv6 Enhanced drives digitalization and innovation.

Ladid discussed the importance of having an IPv6-only network, without

having to carry 3 protocols at the same time. "We are moving to IPv6only in certain domains. In the next 5 years, this will be an important step into getting IPv6 done which will give us a network control and facilitate configuration and maintenance of the network", he said.

On IPv6's impact on certain areas, he highlighted the influence on IoT, cloud computing and blockchain, while mentioning the need to protect data privacy and take into account data sovereignty. "It's time to move to something faster and a lot cheaper", he stated.

In his presentation, Latif Ladid explained how SRv6 is the cornerstone for smart connections in the 5G and cloud era and how it unleashes IPv6's potential. He also emphasized that in the 5G and cloud era, IPv6 Enhanced is the key to improve service experience.

To wrap up, he gave an overview on ETSI ISG IPE and the latest releases it has done.

"We have 90 partners and members who have joined ETSI IPE from the five continents. The first release we have done is an analysis on the IPv6 Enhanced which has concluded that we're on the right track. Also, IPE 5G Transport over IPv6 and SRv6 is under final review and is being tested by ISPs in Europe mainly. In addition, we're also drafting the IPE Data Center and Cloud-Network Integration report."

#### **Etisalat IPv6 Adoption Journey**

One of the keynotes addressed during the 3rd Middle East IPv6 Enhanced Online Summit tackled Etisalat's IPv6 adoption journey.

Omar Almansoori, Vice President/ Technology Acceleration, Etisalat UAE shared an insightful presentation discussing the operator's IPv6 implementation journey; the challenges and pain points faced; and suggestions on what needs to be done to increase the IPv6 adoption.

Starting off his presentation from the beginning of their journey, Almansoori said, "We started in 2009, and of the

main component we have to get is the IP addresses. We had 34 billion /64 subnets , and this would be sufficient in the long run".

"Etisalat has a lot of integration points including GPON, business, access PE, packet core, etc. We had to put all these measures into deployment and upgrade all these components to support IPv6," Almansoori explained.

Accordingly, the IPv6 addressing scheme was built from scratch, "putting a lot of consideration on prerequisites that we had," Almansoori continued. The proposed IPv6 address allocation accommodates current and future customer requirements.

The allocation consideration was divided into several areas: internal, business, international, and mobile networks; Etisalat infrastructure, telecom services, and customer LAN/64; and future unallocated subnets.

Almansoori also laid out the main services within their IPv6 implementation journey. These include fixed broadband, mobile broadband, and business services. "Within each pillar are multiple components which have to be enabled with IPv6 support," he described. "It sounds straightforward, but we need to make sure that those protocols are not only supporting the capabilities, but also you have to make sure that users don't face issues during deployment."

Following the actual implementation, the IPv6 traffic started to increase in May 2019. At the moment, 45-50% of Etisalat traffic is over IPv6, with Youtube, Facebook and Instagram videos, and Netflix as the leading applications utilizing it. As per Akamai, the Etisalat IPv6 traffic is 50.6% while the Google IPv6 for UAE, in general, is 44.78%.

To reach where they are today, some of the challenges Almansoori stressed are replicating all IPv4 network and security use cases/functions to work with IPv6; training staff for technical knowledge and practice; developing CPEs with various vendors; and aligning compatibility for all managed users.

To increase IPv6 adoption, Etisalat is focusing on two things: conducting customer awareness campaigns and approaching content delivery network (CDN) providers.

"We cannot approach every individual to replace their CPE. They have to adopt and acknowledge that they need IPv6 to improve credibility and performance of their connectivity," Almansoori remarked. In comparison, IPv6 has better performance by almost 20% than IPv4.

#### EITC-du IPv6 Enablement and Future Prospects

Ali Alawadi, Head of Services Enablement, du gave a brief overview on du's IPV6 enablement. He said that the means of communication were evolving from people-centric to machine-centric. "IPv4 helped us get where we are but it's no longer sufficient to take us where we want to be", he said.

Alawadi said that from a telecom operator perspective, "IPV4 is today a rare commodity" and "with IPv6 we're removing that limitation in terms of numbers of the available resources," he said. "There is a high necessity for the IPv6 to be rolled out and adopted as soon as possible."

"Optimized costs, fewer network elements will ultimately lead to improved experience and improved performance," he said.

He pointed out 4 key considerations for the evolution to IPv6 – Maintaining stable services during the evolution to IPv6, handset and device readiness for IPv6, know-how and awareness, and content provider adoption.

Highlighting du's IPv6 deployment growth for provisioned subscribers, Alwadi said, "In 2021, we were only at 15%, and this year in June, we have jumped to 46% of our customers. He said that this could be achieved in a collaboration with the strong support of the regulatory body TDRA.

"As part of our journey based on our projection Q2 2023, we expect 100% of

our customers to be fully provisioned with IPv6."

Regarding the challenges in the IPv6 journey, Alwadi pointed out the following:

- Developing know-how and best practices for IPV6 rollout
- Upgrading the platforms and network elements that did not support the full capabilities of IPv4/IPv6
- Testing and validation of various integration points between IT and network systems for IPv6-related changes
- Handset and devices compatibility with IPv6
- Content providers' adaption of IPV6 (web applications)
- Prospects, unlimited possibilities IPV6 + PI and IPv6+ AI will bring industry innovation, experience assurance, and enormous connections

After his keynote, Toni Eid announced that EITC-du has joined the IPE organization and Dr. Will Liu, Vice-Chair of the IPE presented the official certificate.

#### EANTC and IPv6

Carsten Rossenhoevel, CTO and Co-Founder of EANTC, the European Advanced Networking Test Center in Berlin, Germany presented the latest SRv6 industry updates in a prerecorded video.

As per Rossenhoevel, being an independent test lab, EANTC is running multivendor interoperability test events, focusing on transport technologies and application technologies in the fixed and mobile sector.

EANTC's technical goals were to advance the multi-vendor interoperability of transport network solutions across the whole telco industry. In addition to SRv6 coverage, the center also covered SDN segment routing, NETCONF, EVPN services, flexible algorithm, FlexE, and clock synchronization.

According to Rossenhoevel, the building blocks for the success of SRv6 are the following:

- Routing basics: BGP Global Routing Table, Route Summarization
- Services: L3VPN, EVPN
- **Resiliency:** Multi-Homing, Loop-Free Alternate (TI-LFA), Seamless BFD
- Interworking: with MPLS, L3VPNs, with routed EVPN SR-MPLS, with EVPN over VXLAN
- Constraint-Based Routing: FlexAlgo

Furthermore, Rossenhoevel added that "SRv6 is not going to substitute other types of transport networks completely anytime soon, and maybe that's also not even the goal. For this reason, Interworking is very important either with MPLS or with routed and switched EVPNs over a segment routing MPLS and over VXLAN."

He also stated, "Constraint-based routing is a new trend which allows to automate slicing and qualitybased routing and guarantee some constraints. An old topic but with a new type of solution."

Lastly, Rossenhoevel concluded his intervention saying that "SRv6 is on a great path, and the technology is becoming more and more complete and more aligned with the other implementations of segment routing, over MPLS or VXLAN. The ecosystem continues to grow, more router vendors are supporting it, which also means that there are more ways to expand the network with different vendor integration."

He also highlighted that during the EANTCs's interoperability events, they intentionally only focus on functional testing. The areas that they still have to focus on in the future to close the gap to production networks are performance and scalability, in addition to energy efficiency and security aspects. These are important building blocks, which remain yet to be tested at a broader scale. However, "SRv6 is ready for primetime."

At the end of the Online Summit, a poll was launched to know more about what the audience had to say about some of the IPv6 aspects and then a Q&A session followed.

### **Huawei Showcases Three New IP Networking Solutions**



Huawei unveiled three new IP networking solutions, with an aim to empower Middle East enterprises with super computing power and intelligence and accelerate digital transformation across industries.

Launching the new solutions at the Huawei IP Club Carnival MENA 2022 event, Faisal Ameer Malik, CTO, Huawei Enterprise Group, Middle East said, "Intelligent IP networks - connecting things on one end and applications on the other end have now become the cornerstone for digital transformation across industries. As enterprise digital transformation picks up speed, IP networks need to keep pace with the evolving cloud technologies and enterprise demands. Our new solutions aim to address these challenges; with its launch, we are reaffirming our relentless efforts to develop scenario-tailored solutions for partners and customers, creating new drivers for digitalization across industries."

CloudFabric 3.0, Hyper-Converged Data Center Solution. This featurerich solution has "fast" and "stable" key characteristics - ideal for building best-in-class data center networks and helping enterprises usher in a service center with super computing power. It offers the industry's only L3.5 autonomous driving network, which is needed to propel enterprise data centers towards multi-clouds and multi-DCs. Another highlight is Huawei's unique AIFABRIC technology which enables data center switches to ensure zero packet loss high reliability, low latency, and high throughput, facilitating convergence to an all ethernet data center.

Huawei's SD-WAN Solution. This provides powerful networking, a superior user experience, and simplified O&M capabilities, meeting WAN interconnection requirements of enterprises of all shapes and sizes, as well as carriers and service providers. SD-WAN is an obvious choice in the cloud era for interconnecting enterprise branches, headquarters, and multiple clouds.

CloudCampus 3.0 Solution. Drawing on continued innovations in the WLAN, LAN Switch and SD-WAN fields, this solution introduces an extensive range of all-new products, including AirEngine 6761 Access Points. CloudEngine S8700 switches. and NetEngine AB6710 routers. As such, CloudCampus 3.0 stands out by offering "300 Mbps @ Everywhere" access experience for enterprises and doubling the cloud access efficiency. With these strengths, CloudCampus 3.0 can be widely used in industries like education, healthcare, finance, and energy to shorten time-to-market and improve operational efficiency.

### **CommScope Expands its Leadership in Video Devices**



CommScope, a global leader in home network solutions, has partnered with Telenor Sverige AB to provide their customers in Sweden with the VIP5702W set top powered by Android TV<sup>™</sup>.

This marks a continued expansion of CommScope's leadership in video devices and a further commitment to our strong presence in the important Nordic region.

"Telenor Sverige is a leading service provider that wants to grow its business with a new video offering," said Phil Cardy, Vice President, International PLM, Home Networks, CommScope. "By using a solution powered by Android TV from the Home Networks' business, Telenor Sverige will deliver a great viewing experience to its customers with its own branded user interface using a solution that is compact and easy to install."

The VIP5702W set top delivers ultrahigh definition 4K video and comes with dual-band selectable Wi-Fi for flexible deployment in Telenor's managed networks. The set top also provides users with a state-of-the-art interface and Android TV features for an enhanced viewing experience.

"We are excited to offer our customers a new TV and entertainment experience by deploying CommScope's innovative set top solution," said Hanna Idstam, Manager TV and Media, Telenor Sverige AB. "CommScope's expertise in deploying solutions powered by Android TV enabled us to deliver a rich, entertainment offering that our customers have come to expect."

The set top's live and on-demand viewing experience on the set top is powered by 24i's software platform which supports attractive features such as unified search and single signon, while allowing the Telenor team the freedom to build and design its own user interfaces.

"24i is delighted to support our friends at Telenor Sverige with its on-going service enhancement, including the rollout of this new generation of Android TV set tops, powered by the same 24i software platform that brings the Telenor Sverige customer experience to existing set tops, iOS and Android mobile phones as well as Apple TV devices," said Dr. Neale Foster, CEO, 24i.



# CLOUD AND DATACENTER Shaping the digital economy

July 27 at 5 pm Dubai time

Telecom Review will discuss the topic of cloud and datacenters and their role in accelerating the digital economy in an engaging and interactive virtual panel.

The session will revolve around the following topics: - Accelerating cloud and data centers in the digital era - The issue of data sovereignty in the MEA region - Importance of data regulations and policies

- The role of cloud and data centers for the future of digital economy

- Towards the future of the cloud, today

For information about sponsorship and participation, contact Mohammed Ershad: ershad@tracemedia.info



# **Al Engineering:** Creating Value for Enterprises

Al engineering involves designing, implementing, and managing machine learning (ML) algorithms and artificial intelligence (AI) tools. Across enterprises and other entities worldwide, AI engineers are needed to properly automate processes, enhance customer services, analyze data, increase output, and gain a competitive edge, among others.

lobal spending on AI and cognitive systems reached over \$55 billion in 2021, which is somehow correlated with the number of enterprises using AI in business growing by 270% between 2015 and 2019. More so, over 90% of leading businesses invest in AI continuously, which could push the global AI market value to be worth beyond \$260 billion by 2027.

Without a doubt, there is widespread adoption of AI in businesses as companies are finding new ways to monetize, innovate, and expand. By applying AI and ML, businesses can utilize the massive amounts of data they generate daily to improve and simplify day-to-day tasks. Technologies like speech recognition, business process management, image processing, and robotic process automation are some of the AI technologies changing the world today.

Companies need AI engineers to put these systems in place, maintain them, and adapt them to changes in the business, coupled with the increasing adoption of cloud-based services. As AI and machine learning capabilities mature, the core pillars of AI engineering should be mastered and integrated within businesses' systems. This is paramount to transforming business and technology processes and delivering optimal business value.

#### AlOps

The concept of AIOps – artificial intelligence for IT operations – aims to move away from the classic observe-engage-act model to a more predict-prescribe-prevent policy.

Having said that, AIOps is an approach to manage complex IT operations. This is done by running on multi-layered technology platforms that harness machine learning, predictive analytics, and AI to automate, enhance, and improve IT operations.

Central to the success of AIOps is big data, and through algorithms on data selection, pattern discovery, inference, collaboration, and automation, the AIOps platform acts as the brain that brings together these tools.

AlOps solutions provide greater visibility of IT environments that are becoming increasingly distributed and hybrid in nature. By aggregating data from multiple tools and systems and stitching that data together, the platform can advance traditional analytics capabilities and automatically spot and react to issues in real time.

Companies surveyed by Enterprise Management Associates ranked AIOps as the most successful IT analytics investment, making sense as IT is at the heart of digital transformation efforts. With this in mind, AIOps lets organizations operate at the speed that modern business requires. Furthermore, this Al engineering pillar is applicable for event noise reduction, intelligent anomaly detection, capacity analytics, cross-domain actionability and situational understanding, and cloud migration.

The results of the AIOps journey are not immediate, but it exemplifies how automation is important as a business proposition enabled by technology.

#### **DataOps**

In short for data operations, DataOps delivers high-quality, on-demand data to organizational customers by speeding up the development and deployment of automated data workflows. It allows feeding data consumers, internal and external stakeholders, and customers the data they need, when they need it. According to IBM, a proper DataOps framework sets companies apart from others due to improved data quality, self-service access, and clearly defined governance and rules for usage. Leaders are leveraging DataOps to realize increased ROI, gain an edge in AI initiatives, and strategically drive their businesses.

In this collaborative data management practice, the principles of agile development are used to build data pipelines. Central to the success of DataOps is automating and orchestrating data pipelines for the optimization of its health and performance as well as quick and efficient movement of data between various systems.

In this way, accuracy, simplicity, and quality of developing business insights are achieved. Measuring data analytics performance depends on how insightful analytics are delivered with correct data. In parallel, the beginningto-end orchestration within DataOps is a key driver of analytic success.

An important aspect of AI engineering, data pipelines should be built with a foundation capable of automated detection of abnormalities and security issues in code, configuration, and data. Apart from this, continuous feedback should be provided to avoid errors.

#### **ModelOps**

100% of the respondents from The State of ModelOps 2022 report have dedicated budgets for ModelOps; up from 51% in 2021. AI model operationalization also known as ModelOps is the key capability for scaling and governing AI at the enterprise level.

Excelling in a dynamic environment, this AI engineering model can be easily adjusted whenever the defined condition changes. It is a collection of tools, technologies, and best practices to deploy, monitor, and manage AI and decision models such as ML, knowledge graphs, and agentbased models.

It is worth noting that all models degrade, and if they are not given regular attention, performance suffers. This is the reason why ModelOps is crucial for enterprise operations. It is responsible for managing and scaling models to meet demand and continuously monitoring them to spot and fix early signs of degradation.

Based on DevOps principles, its core capabilities include continuous integration/continuous delivery (CI/ CD) integration, model development environments, champion-challenger testing, model versioning, model store, and rollback.

Acting as a bridge between data scientists, data engineers, application owners, and infrastructure owners, ModelOps fosters dynamic collaboration and improved productivity. It allows moving models from the lab to validation, testing, and production as quickly as possible while ensuring quality results.

ModelOps platforms and capabilities are used to ensure reliable and optimal outcomes for any and all models in production; providing reliable decision-making and adhering to all regulatory, compliance, and risk requirements and controls. CIOs and IT Operations, working with lines of businesses, are the leaders behind ModelOps execution.



# **Telecom Customer Experience:** A Crucial Success Factor

Telecom customer experience has become one of the biggest factors for driving customer loyalty and revenue growth in the industry. Telcos must become far more agile to deliver a superior experience and embrace technological advancements.

s a matter of fact, the expectations of customers—whether a consumer or an SMB – have evolved and become more challenging within a highly competitive business landscape. Retaining high-value customers (both B2C and B2B) relies heavily on the customer experience they get.

A customer-focused telco will not only convert new leads but keep them for many years to come. Having said that, the probability of selling to an existing customer is 60-70% versus selling to a new prospect at just 5-20%. When a customer enjoys dealing with you, its customer lifetime value increases. Selling more products and services as well as maintaining profitability follows through as a result.

A study found that a 5% or more increase in the retention rate can lead to a 25% or more increase in profits.

Indeed, a loyal customer tends to buy 90% more frequently than a customer who does not feel satisfied with their provider. With a lot of options in the market, ensuring the best telecom customer experience is a necessity.

Digital services and new technologies are crucial to telcos' ability to derive insights about customers and optimize customer interactions accordingly. This will empower a seamless, personalized experience and interactions across channels throughout the customer journey.

Customers are Important Assets No matter how marketable a product or service is, if customers are not buying it, there is no use. Did you know that one in three adults consider a single bad customer experience enough to consider switching providers? This again points out why telcos must make customer experience a priority in providing best-inclass services.

It has been known that Middle East telco operators are more focused on digitalizing their journey, leading to more intuitive, convenient, and trusted relationships with customers.

To help telcos remain relevant, improving levels of support and personalization are seen as the most important routes to improving telecom customer experience in the Middle East. It is worth noting that customer experience involves excellence in operations and service design as well as digital transformation.

Based on a GSMA survey, 85% of operators in the 5G era will play the role of digital service providers. This transition from CSP to DSP is necessary as customer experience becomes more proactive. Putting more value on digital customer service channels and improving engagement are key drivers to customer retention and long-term loyalty.

An exceptional telco customer journey gives the customers what they need and want, and nowadays, a digital-first approach works. Digital onboarding, eKYC, and intuitive live chats are preferred over lining up at in-store kiosks. Certainly, the strategy has to change to optimize customer value. Telcos need to reduce losses, prevent churn and maximize revenue on their offerings. How? By focusing on not only acquisition and retention but also the entire customer lifecycle. The focus on the next best action (NBA) can bring customers their desired core experience, coupled with technology.

#### Products to Customers: The NBA Approach

To meet customer expectations within the telecom industry, reducing customer effort, creating benefits from product usage, and satisfying emotional needs are critical. Helping telcos to shift to a more customercentric approach than products is the next best action (NBA) capability.

Adopting an NBA approach gives telcos a multidimensional view of their customers. By combining big data with artificial intelligence and machine learning (AI/ML), telcos can integrate the next best action models. These NBA models predict future lifetime value and make smart and advantageous recommendations.

Taking into consideration the next best action, operators can be more strategic across all touchpoints. These include personalizing and targeting offers, retaining the most profitable customers, managing omnichannel interactions, and rendering services quickly.

Every enterprise and individual would benefit from an NBA approach. With AI/ML, telcos will be able to know their customer personas better and provide highly contextualized services. Deep diving into consumer behavior will ultimately reduce churn and increase customer satisfaction.

With more accurate data analytics and value calculations and the right layer of real-time technologies like cloud and virtual assistants, telcos can continually innovate their customer experience and transform themselves into data-driven organizations.

No doubt that data and technology are fundamentally changing the business

model, driven by the belief that a superior telecom customer experience is a key lever for the industry's future success. Predictive analytics like NBA has advanced to be more accurate and leads to higher customer value.

Also, telcos closely monitor and manage possible setbacks in customer service performance and quality by using quality of experience (QoE) features in their networks, OSS/BSS systems, and customer devices.

#### Effective Customer Value Management

Along with the next best action model, telcos must strengthen their customer value management (CVM) capability to deliver simplicity and self-sufficiency; agility for faster time-to-market; realtime engagement; and co-creation of digital services.

This capability covers the telecom customer experience at every stage, relying on a combination of tactics, including customer payback period, budget rebalancing, tailored customer rewards, and cross- and up-selling campaigns.

The customer experience trends in telecom push operators to embrace the growing trends for intelligent automation, self-service, and other AI-powered tools. These will make sure that customers will get consistent service in every channel.

If operators want to keep growing profits, they will have to focus on the value of each and every customer in their current base. A first-rate, datadriven CVM engine allows telcos to be extremely precise in understanding what their customers need and how to target them.

A forecast projected that CSPs will spend about \$14 billion per year on customer engagement automation until 2025. The potential for additional value creation becomes much greater when modern, cloud-based and automated engagement solutions are utilized. This will tap into new 5G and IoT revenue streams and deliver an advanced digital experience for both enterprises and consumers.

### MTN Ghana to Postpone the 5G Pilot Phase

Selorm Adadevoh, managing director, MTN Ghana, announced that the company no longer expects to roll out the pilot of 5G network in the country as planned.

This decision is a result of the industry not appearing ready to award licenses to operators this year, according to the company. The new timeline for the rollout of the 5G pilot phase in Ghana has not been revealed at this time, "Since I promised once and failed, I don't want to make another promise until we are absolutely sure," Adadevoh said.

In August 2021, MTN began outlining its plans for 5G in Ghana as part of its "Ambition 2025' strategy. In March 2022, the company announced that ongoing discussions with regulators could lead to a possible acquisition of the 5G license. As of that date, the company said it had upgraded at least 1,322 sites in preparation for the ultra-broadband rollout. In addition, MTN Ghana entrusted the digitization of its activities to Tecnotree, a Finnish company. The latter was to, among other things, rapidly develop new service offerings to meet the requirements of 5G and the Internet of Things (IoT)

According to Adadevoh, the rollout of ultra-broadband in Ghana is of paramount importance to MTN, which aims to become a "leading provider of digital solutions for Africa's progress." The company is aware that the 98% 4G coverage planned for the end of this year will not be enough to achieve this goal in a context of high digital demand. In its Mobility Report, Ericsson said that, "5G networks will play a key role in achieving the technology pillars to realize MTN's Ambition 2025 plan."

# ZTE and IPMA partner for innovative project management in Philippines

ZTE has signed an MOU (Memorandum of Understanding) on strategic cooperation with International Project Management Association (IPMA) Philippines in Manila. The strategic cooperation between IPMA Philippines and ZTE Philippines further recognizes ZTE's mature corporate project management capability.

This is ZTE's first overseas IPMA corporate membership, and the company has become a corporate member simultaneously certificated by IPMA International and IPMA Philippines.

IPMA is a non-profit international academic organization, with commitment to promoting professional development of international project management. IPMA, PMP and PRINCE2, are known as the three major international project management organizations. IPMA's membership certification is widely recognized, representing the highestlevel certification of project management across the globe. At the ceremony, IPMA Philippines and ZTE Philippines principally agreed on joint development and win-win collaboration. IPMA will invite ZTE to deeply participate in industry symposiums, industry forums and professional training meetings, as well as joint application for telecommunications-related awards and reviews of outstanding project management cases. In return, ZTE will give its priority to the interviewees who have passed the IPMA certification.

"With the development of its business in the Philippines for more than 15 years, ZTE has extensive experience in project management and project delivery," said Jin Zhichao, General Manager of ZTE Philippines. "ZTE is keen to explore and learn excellent experience and effective management approaches from different industries or IPMA corporate members, further improving the level of ZTE's project management and corporate competitiveness. At the same time, we are willing to share our own experience with them."

## Verizon is Key to Providing AR to K-12 Students Across the US

McGraw Hill and Verizon announced a new mobile application to bring augmented reality (AR) learning activities to K-12 students and classrooms across the country. The free app leverages the immersive and interactive features of AR technology to bring academic concepts to life and give students and educators new ways to engage with educational content.

"As we look to combine the value of hands-on learning with the benefits of emerging technologies, we found AR to be a natural area of exploration in the development of our suite of education tools," said Shawn Smith, chief innovation officer for McGraw Hill's School group. "Following the disruptions to classroom learning over the past few years, our AR app will pioneer new ways of engaging students with important concepts and materials. While AR technology may still be an area of uncertain utility today, we see the possibility of boundless impact tomorrow and are excited to take this step in support of the students and teachers we serve."

The McGraw Hill AR app is available with standards-aligned lesson plans for educators that are exclusively available through Verizon Innovative Learning HQ - a next-gen online education portal that provides free access to immersive extended reality (XR) educational experiences for K-12 students. The McGraw Hill AR app joins a plethora of AR and virtual reality (VR) educational materials, tailored lesson plans, and credentialed professional development on technology integration within the learning environment. The app currently features three activities on algebra readiness and geometry for grades 6-12, with the full suite of 10 math-centric activities to be live by fall 2022.

### Canada's Rogers, Shaw Make Deal to Sell Freedom Mobile With Glaring Competitive Issues

Rogers and Shaw struck a merger agreement last year, but it has been delayed after the Competition Bureau concluded the combined company would reduce wireless competition and raise prices

Rogers Communications Inc. and Shaw Communications Inc. have struck a deal to sell Shaw's Freedom Mobile wireless operation to Montreal based Quebecor Inc. in a bid to push through their \$26-billion merger, which has been held up by Competition Bureau concerns that the combination of the two telecom giants will reduce wireless competition and raise prices.

The chief executives of Montreal-based telecom giant Quebecor Inc. and Torontobased independent Globalive have been vocal about their interest in acquiring Shaw's Freedom Mobile division, which analysts said could fetch as much as \$4 billion. Pierre Karl Péladeau and Anthony Lacavera have also been critical of the sale process run by Rogers, which initially excluded both parties.

Péladeau, chief executive of Quebecor, said the deal marks "a turning point for the Canadian wireless market." He said his company's subsidiary Videotron is already a strong fourth wireless competition in Quebec, which "coupled with Freedom's solid footprint in Ontario and Western Canada, can deliver concrete benefits" in British Columbia, Alberta, and Ontario.

Globalive's Lacavera lashed out at the sale process calling it "anticompetitive." He claimed Rogers accepted "\$900 million less than Globalive's offer for Freedom Mobile for the simple reason that Globalive is a real independent and pure-play national long-term competitor and Videotron is a regional cable company that cannot risk a retaliatory strike from the big three against its legacy businesses."

# Thai PM Announced Thailand 5G Alliance

Thailand's Digital Economy Promotion Agency (DEPA) announced the establishment of the Thailand 5G Alliance with the support of Thai Prime Minister H.E. General Prayut Chano-cha. The Prime Minister explained the alliance would be to help Thailand become a digital center for the entire ASEAN region. He said, "The government has assigned MDES to lay down the policy framework and action plans to promote applications of 5G technology and manage the telecommunication infrastructure that supports 5G technology. This framework will also encourage new product and services development based on 5G infrastructure and will promote continuing usage and a digital industry ecosystem from infrastructure deployment. Additionally, it will also promote collaboration between the public and private sector, through companies such as Huawei, to commercially drive Thailand's 5G technology development in every industry and elevate Thailand's

competitive advantages towards the Thailand 4.0 era." The alliance will include DEPA, and representatives from multiple Thai government agencies, the private sector, as well as industry associations such as the Office of the Digital Economy and Society Commission (ONDE), the Office of The National Broadcasting and Telecommunications Commission (NBTC), the Federation of Thai Industries, Advanced Info Service plc (AIS), True Corporation plc (True), the Thai IoT Association and the Telecommunications Association of Thailand Under the Royal Patronage. As a founding member, Huawei will also play an important role. The Thailand 5G Alliance's main goal will be to increase the country's economic value by promoting the use of industrial 5G applications to achieve service system upgrades in public health, security, education, transportation, factory management and modern agriculture. Ultimately, these advancements will elevate quality of life, equally, and economic efficiency in Thailand.

### The CBN Grants New MMO License in Nigeria

The Central Bank of Nigeria (CBN) has granted an Approval in Principle (AIP) to Abeg Technologies Limited, a product of Piggytech Global Limited, as a Mobile Money Operator (MMO) in Nigeria, becoming Nigeria's first social commerce platform to secure the CBN's AIP for an MMO license.

The announcement will help the company support seamless payments and online commerce throughout the country.

Additionally, in a move to underline its evolution from a money transfer app to a social commerce platform, Abeg is rebranding completely to "Pocket by Piggyvest" (PocketApp). The platform's new name references its added functionalities for users to buy and sell items via virtual pocket shops and reinforces its push into a social commerce market estimated to reach US\$23.8 billion by 2028 in Nigeria alone.

PocketApp affirms its commitment to the financial inclusion agenda of the CBN and the Federal Republic of Nigeria and will continue to make it easier for their teeming young population to seamlessly carry out their transactions while saving them costs and giving them more access to get paid.

The Mobile Money Operator license will enable the company to carry out activities around: Wallet Creation and Management, E-money issuing, USSD, agent recruitment and management, pool account management, non-bank acquiring as stipulated in the regulatory requirements for non-bank merchant acquiring in Nigeria, card acquiring, and any other activities that may be permitted by the CBN.

### mmWave Licensing Framework Consultation Launched in Canada

"The release of mmWave spectrum is an opportunity to support investment and improvement of services by service providers," an excerpt derived from the published consultation document on the policy and licensing framework for spectrum in the 26, 28, and 38 GHz bands said.

Open for a 120-day comment period, this consultation follows a repurposing decision announced in 2019 and is the next major step in the lead-up to a mmWave spectrum auction planned for 2024.

Access to large blocks of mmWave spectrum is said to enable service providers to offer high-speed and highcapacity 5G services to consumers. Additionally, the mmWave spectrum presents a key opportunity to continue to facilitate competition at the regional and national levels, resulting in a mobile wireless market that has greater choice and competitively priced offerings for consumers.

Aside from the mobile and fixed wireless service providers, the mmWave band will allow nextgeneration satellite technologies such as LEO satellites to provide advanced services and broadband Internet throughout Canada, helping to bridge the digital divide between rural and urban areas.

Thus, Innovation, Science and Economic Development Canada (ISED) is of the view that sharing between satellite and commercial mobile services in the mmWave bands can be facilitated to make 5G and advanced satellite services more accessible to Canadians.

### Belgium's First 5G Spectrum Auction Raised €1.2 Billion

Belgium has finally concluded its first 5G spectrum auction after missing the two European deadlines for the 5G rollout set in 2020.

The Belgian Institute for Postal Services and Telecommunications (BIPT) closed the main phase of the radio spectrum auction that started on June 1, 2022. The new 5G spectrum – 700 MHz, 3600 MHz – and the existing 2G and 3G radio spectrum – 900 MHz, 1800 MHz, and 2100 MHz – generated proceeds worth 1,202,192,400 euros.

Five operators, namely Citymesh Mobile, Network Research Belgium, Orange Belgium, Proximus, and Telenet Group participated in the auction, "thus shaping our country's mobile telecom landscape for the next 20 years," stated BIPT.

It is worth noting that in July 2020, the BIPT granted temporary 5G user rights

in the 3600-3800 MHz radio frequency band to Orange, Proximus, and Telenet.

Proximus, the first operator in Belgium to launch the 5G network in December 2020, has the largest bid for the 700 MHz band (122,870,000 euros) and the 3600 MHz band (56,320,000 euros). For the 5G low-band spectrum, Orange Belgium (122,860,000 euros) was the second biggest bidder. Both top bidders garnered 10 MHz duplexes each, with Telenet Group and new operator Citymesh Mobile securing 5 MHz duplexes each.

Moreover, for the mid-band spectrum, Proximus, Telenet Group (55,800,000 euros), and Orange Belgium (54,850,000) are guaranteed 100 MHz each, while Citymesh Mobile (30,990,000 euros) locked 50 MHz and new entrant Network Research Belgium reserved 20 MHz for 10,970,000 euros.

### EMIC-1 Subsea Cable to Land on Trans-Egypt Crossing

EMIC-1 – the Europe Middle-East India Connect 1 subsea cable – will be a valuable addition to the subsea cables landing in Egypt.

Under a cross and landing agreement, Telecom Egypt will provide EMIC-1 with a seamless optical path between East Africa, Asia, and Europe. Being the first modern cable along this route, it will connect up to 3 billion people to the internet and accommodate the growing demand for data in the world's fastest-growing regions.

EMIC-1, developed by Digital 9 Infrastructure as well as operated and managed by Aqua Comms, will land in Ras Ghareb on the Red Sea and Port Said on the Mediterranean Sea side. The two landing stations are connected over two diverse terrestrial routes, deploying next-generation of fiber optics. The new routes are adjacent to the Suez Canal, between Suez and Port Said.

Additionally, this crossing will also include a third new marine path, the Red Sea Festoon, that will link the Ras Ghareb and Suez landing stations with an option of the Suez Canal route (aka the Al Morshedeen route), linking Port Said and Suez on the bank of the Suez Canal. This offers a new level of resilience and diversity to the crossing solution.

Managing Director and CEO of Telecom Egypt, Adel Hamed, commented, "We are pleased to offer Aqua Comms a seamless trans-Egypt crossing for their new cable. For years, we have established tangible steps to revamp our international infrastructure and increase our assets' geodiversity to keep pace with the rising global demand for large bandwidth and global reach."

# Cloud and Datacenter Shaping the Digital Economy

Telecom Review will discuss the topic of cloud and datacenters and their role in accelerating the digital economy in an engaging and interactive virtual panel.

Place: Online



# NGMN Industry Conference & Exhibition

The IC&E is a highly recognized bi-annual global industry event, where CTO/CTIOs and other top management level participants share their perspectives on today's and tomorrow's opportunities and challenges of mobile communication.



Place: Paris, France

# MWC Las Vegas

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Place: Las Vegas Convention Center



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Place: Dubai World Trade Center, UAE

# Telecom Review Leaders' Summit 2022

The 16<sup>th</sup> edition of the leading ICT gathering will be held in a hybrid format where the latest industry trends will be tackled.

**Place:** Intercontinental Dubai Festival City, UAE





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