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5G SA: The next step in revolutionizing the industry

Zhang Jianpeng, Senior Vice President, ZTE

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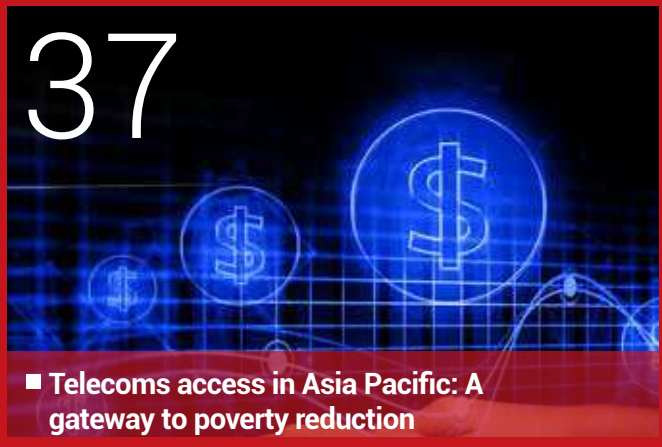

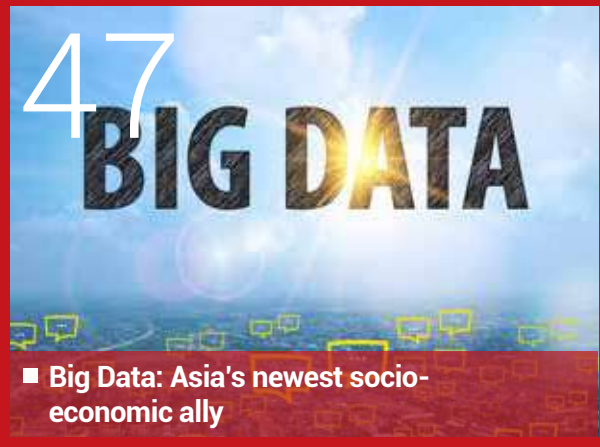

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The rise of video call applications

The Covid-19 has negatively impacted many businesses such as airlines, hotels and most of tourism-related companies and activities. But, in the same time, it has benefitted the companies who run video conferencing and online meetings applications, namely Zoom, in addition to Cisco WebEx, Skype for business by Microsoft, Microsoft Teams and lately the free app Google Meet.

Last quarter, Zoom announced increased profit by 125% Year-on-Year which will also reflect on the results of others.

Telecom operators and analysts see an opportunity of increased data revenues, but not enough to compensate the losses from roaming revenues or selling short term SIM cards to travelers.

After Covid-19, the telecom scene will not be the same and interests will be different. 5G will be the tool for mobility services in video conferences and calls.

People's behavior will not be the same as well in a way that will serve the interest of the ICT sector and vendors will leverage the situation to create more hi-tech video services.

Zhang Jianpeng, Senior Vice President, ZTE

5G SA: The next step in revolutionizing the industry

With the pandemic still wreaking havoc on the global community with no foreseeable end in sight, the GSMA has managed to successfully launch GSMA Thrive for the first time this year, enabling key industry leaders to come together online and thus, remain connected despite the current circumstances.

The online event, held from 30th June to 2nd July, showcased the industry's determination, robustness and adaptability in powering through these uncertain times so that it may continue providing opportunities for operators to network, innovate and evolve.

In partnership with the GSMA, the ZTE Corporation hosted the 5G SA Summit 2020 at GSMA Thrive, live streaming the event for viewers worldwide with the theme "Opening a New Era of Industry". During the Summit, ZTE's Senior Vice President, Mr. Zhang Jianpeng presented the opening speech, emphasizing that "the year 2020 is a significant year for 5G commercialization."

Telecom Review Asia Pacific secured an exclusive interview with Mr. Zhang Jianpeng to discuss his experiences with 5G SA deployment, end-to-end solutions in the international market and the challenges faced during the pandemic.

What are ZTE's key strategies for 5G SA deployment in the global market?

5G SA is the eventual reality of a fully 5G architecture, which is also the most distinct advantage to the legacy of 3G/4G mobile networks. 5G SA maximizes the values of 5G in support of various vertical industries' needs. It also promotes the collaboration of the telecom and vertical industries, trigs the innovation and digitization of the verticals, and creates monumental benefits for human society.

ZTE, the 5G pioneer, is committed to the commercialization of 5G SA. ZTE is the forerunner and practitioner of commercial 5G SA. By deploying 5G SA, ZTE fulfilled many 5G competitive

services and built an extensive 5G ecosystem for the industries.

With regards to the maturity of the 5G SA industrial chain, terminals, RAN, Core and the practical use cases for consumers and industries, they are all ready to go. As such, the top three Chinese telecom operators have steered to scale up 5G SA commercialization with over 600,000 sites being deployed by the end of this year.

In China, operators and their strategic supplier, ZTE, are jointly rolling out the 5G SA network and launching commercial services based on SA. We are delighted to inform you that ZTE plays a major role with over 30% occupation.

We are confident of the successful use cases for 5G SA. We retain a great deal of large-scale deployment of 5G SA, leading technologies, and mature engineering experience. The advantage of ZTE is to help telcos accelerate the progress to SA networks, from the transition of NSA or a straight-up deployment of 5G SA.

> 5G SA is that kind of genius; it enriches our lives, innovates our products, and creates more possibilities than we could have ever imagined

In terms of network commercialization, which industries would benefit from the implementation of 5G SA?
The 2B industries are the primary beneficiaries once 5G SA is achieved commercially.

5G SA has the native characteristics of high-speed, high-capacity, low latency, and flexibility. These substantial improvements allow 5G to achieve "mission impossible" by tackling critical industrial scenarios.

This provides unprecedented opportunities for all industries and allows operators to address the diverse applications and scenarios for the surging demands from the 2B industries like intelligent manufacturing, smart health, and smart grid.

One example comes from ZTE's Nanjing factory, where AGVs (Automatic Guided Vehicles) are extensively used in ZTE factories. At first, they were connected by Wi-Fi. Once the factories switched to the 5G SA network, the latency was dramatically reduced from hundreds of milliseconds to less than 10 millisecond, which realizes seamless switching of AGV and greatly improves reliability.

5G SA is also applicable for 2C services. The characteristics of high-speed, high-capacity and low latency provide an unprecedented experience for consumers with a lower cost. For instance, AR/VR and connected cars will achieve the best advantages with the deployment of 5G SA. 5G SA will accelerate the fusion of the digital world and the real world, ultimately satisfying the interests of high-end consumers.

As such, 5G SA is that kind of a genius; it enriches our lives, innovates our products, and creates more possibilities than we could have ever imagined. Achieving a fully 5G SA network is indispensable. In a word, if 5G turns on a pivot of fully connected world, Stand Alone mode is the pivot.

What has the response from the overseas market been so far when it comes to utilizing ZTE's end to end solutions?

ZTE adheres to a strict strategy of globalization. It has built a global R&D environment with end-to-end solution capabilities for the telecommunications and digital infrastructure.

As a terminals vendor, ZTE is one of the earliest vendors to launch 5G commercial terminals. As a RAN vendor, ZTE is also the leading supplier who provides NSA/SA dual-mode base stations and integrated 2G/3G/4G/5G core network to operators. This reduces the complexity and cost of 5G deployment and helps operators deploy 5G networks quickly and flexibly.

In terms of bearer networks, ZTE has worked with many global operators to expand and build bearer networks in advance to meet the incremental needs of 5G services.

> With the rapid commercialization of 5G SA, the 5G ecosystem will gradually mature into a catalyst for enterprise development

ZTE has implemented multiple end to end 5G networks across Europe, Asia and the Middle East in both

developed and emerging markets. This emphasizes ZTE's role as an transparent, reliable and trustworthy industry leader.

How important are collaborative partnerships in ensuring a seamless transition into the 5G ecosystem?
5G SA is a disruptive technology for all industries' and their digitization processes. However, each vertical has its own unique scenarios, requirements, knowledge and industrial standards which address the enormous difference between verticals, even for individual enterprises.

Those difficulties and problems might not be resolved by a single vendor. It must be the result of joint exploration and practice by vertical application providers, telecom operators, telecom equipment providers, third-party system integrators and enterprises. Therefore, it is necessary for all parties to participate in the construction of a mature 5G ecosystem, which is also the key to realizing the digital transformation of operators and the success of 2B / 2C new business development.

Presently, while 5G approaches scale-up commercialization, ZTE has introduced the best technologies in terms of virtualization, IoT, cloud and AI into 5G system engineering and collaborated with over 500 partners from 15 vertical industries around the world to test the industrial use cases.

As a comprehensive enabler of 5G, ZTE is assisting different industries to access the 5G ecosystem, launching more business initiatives and building a real 5G ecosystem alongside key industry players.

With the rapid commercialization of 5G SA, the 5G ecosystem will gradually mature into a catalyst for enterprise development.

The COVID-19 pandemic has undoubtedly affected the technological growth and progress of many industries. What challenges did ZTE face during this time and how did you manage to overcome them?
The COVID-19 has caused a huge negative impact on the global society and world economy, especially on operators' businesses.

However, we can see that the seamless exchange of information is the basis for ensuring economic vitality and social stability. The need for societal communication is extraordinarily strong during this time. This highlights the critical role the telecom industry plays during COVID-19.

As a responsible global telecommunication supplier, ZTE plays an important role in maintaining safe network operations and assisting global operators to deal with emerging events.

Meanwhile, ZTE has also been collaborating with operators to realize telemedicine in order to help patients get expert diagnosis and treatment the first time around and reduce the impact of the pandemic on economic and social life.

Although the pandemic may have an impact on the investment confidence of the telecom industry in the short term, we are still optimistic that the investment in the telecommunications industry is still vital for the economy and society. We believe that this aspect of the industry will not be affected in the long run.

Do you think the impact of COVID-19 on global industries would have been different if 5G was deployed and actively operated worldwide?
If 5G network was deployed and commercialized on a large scale, the world would have received great benefits from 5G. If this were the case, 5G could have been applied to the industrial field by helping factories realize unmanned and automatic production and reduce the risk of infection in crowded areas.

Additionally, the large-scale deployment of 5G would have further reduced communication costs, which is extremely beneficial to the development of new use cases in other fields such as medicine, media, education and so on. All these new applications would have had a greater impact on our daily lives and production patterns.

We believe that with the extensive deployment of 5G networks and further integration of vertical industries, there will be more representation and high-value use cases that can be utilized in combatting the pandemic. TR

COVID-19: The pandemic that changed the world

In 2003, the world was overcome with a crippling fear of the SARS virus that claimed the lives of more than 700 people worldwide. Almost a decade later, the global community was faced with yet another paralysing health crisis known as MERs or camel flu. Although this disease mostly affected a large portion of the Arabian Peninsula and eventually spread to parts of Southeast Asia and North America, almost 1000 people were reported to have perished from it; around 30% higher than the death toll for SARS. This time, we are being forced to grapple with a deadlier and more aggressive form of a similar respiratory disease known as novel coronavirus or COVID-19; a virus that was first identified in Wuhan, China and one that has already racked up a death toll close to half a million as of June 2020.

The situation that is unfolding in real time is frightening to say the least, but what is most concerning is the gargantuan impact COVID-19 will undoubtedly have on the global economy and its role in powering vertical industries, specifically when it comes to the ICT and technology sectors. Since news first broke of the outbreak, China has been desperately trying to curb the spread of the disease by ordering all but a few companies to be closed until further notice. These restrictions not only threaten to deal a blow to local manufacturers, but foreign investment in the country that rely heavily on China's output would surely be devastated by this cataclysmic disruption.

The major industrial hub of Suzhou, situated in the northwest of Shanghai, was forced to close its businesses until further notice due to its close proximity to the city of Wuhan. In a similar fashion, employees of tech giants Alibaba, Baidu and Tencent were all told to work from home until it was safe to do otherwise. The Samsung business site located in Suzhou has halted production at the factories for the time being but concerns have been expressed about the possibility of the quarantine being extended, which could severely derail the supply of new devices.

The pandemic has even put multinational tech behemoths in a nightmarish predicament; with the likes of Apple, Amazon and Microsoft having to suspend the travel of their US staff to and from the country for business trips. Tesla's factory in Shanghai has shut down indefinitely while Google's operations in mainland China, Taiwan and Hong Kong have also been indefinitely held in abeyance. China's own home-grown tech companies like ZTE, Huawei and Xiaomi have had no choice but to reduce productivity in their R&D hubs based out of the country, proving to the world that no matter how powerful an entity you are, some risks are not worth taking, especially when the success of a corporation depends solely on the good health of its employees.

Many of these tech companies employ tens of thousands of workers across China in its corporate and retail companies and there are millions more who work in its supply chains. Virtually all of Apple's iPhones in the world are made by contract manufacturers based in China, and the fact that the company has been experiencing a spike in production demand does not make the situation any less complicated. Dan Ives, an analyst at Wedbush Securities Inc., said of the crisis, "If the China outbreak becomes more spread it could negatively impact the supply chain which would be a major investor worry."

Apple's manufacturing partner, Foxconn, who owns factories all over mainland China, is caught in an equally distressing conundrum and has decided not to reopen its component production site situated in Shanxi Province until the beginning of February. Foxconn also added that it is closely monitoring the situation but is positive that business will continue as usual. "As a matter of policy and for reasons of commercial sensitivity, we do not comment on our specific production practices, but we can confirm that we have measures in place to ensure that we can continue to meet all global manufacturing obligations," the company said.

According to industry experts, China's position as the world's second largest economy means that the massive lockdown of its international industrial and financial hubs could potentially plunge the global economy into a heart-dropping downward spiral. As a significant contributor to the global economy, any minute see-sawing in its GDP growth rate projection will inevitably influence the economic slowdown.

In the past, the SARS outbreak managed to be contained after six months, but its effect on the global economy, particularly in Asia, was felt deeply. China's and Hong Kong's GDP slumped 1% and 2.5% respectively. The investment implications, though damaging, were rather short lived and market economies eventually bounced back stronger than ever as we were able to see with China's rise as an infallible superpower alongside the US.

Market analysts, however, believe that the market structure and the general global context in the early years of the new millennium were vastly different from the current environment we are living in now in 2020. The interconnectivity boom between nations in the last few years has pushed governments worldwide to provide more transparent communication when it comes to handling serious global issues. According to Seema Shah, chief

> "As global supply chains have multiplied and become more inter-reliant, the potential for a rapid domino effect, triggered by another part of the chain, has never been higher"

strategist at Principal Global Investors, the advent of social media and the culture of rapid emotion-driven news sharing has inadvertently created what she calls a "global echo chamber".

"The echo chamber to amplify market anxiety has never been more powerful," she said. This is why real time updates of the ever-growing death toll caused by the virus were already available way before the US markets opened.

Furthermore, global technology supply chains are more heavily connected now than any other generation before it, so much so that any erratic behaviour in its international trade network could easily cause a major fallout in the world economy. Shah comments, "As global supply chains have multiplied and become more inter-reliant, the potential for a rapid domino effect, triggered by another part of the chain, has never been higher."

With regards to the ICT industry, GlobalData's Nishant Singh, head of technology and telecoms data, reiterated this reality by stating that "the manufacturing of these devices and components is via an intricate supply chain which traverses the region, and hence a prolonged outbreak can drastically affect the manufacturing obligations - this will in-turn impact the product release roadmap of these technology giants." He added, "Even if factory operations for these technology hubs are temporarily suspended, like it has happened with Tesla's Shanghai plant, the impact of the reduced production might cascade through to the rest of 2020."

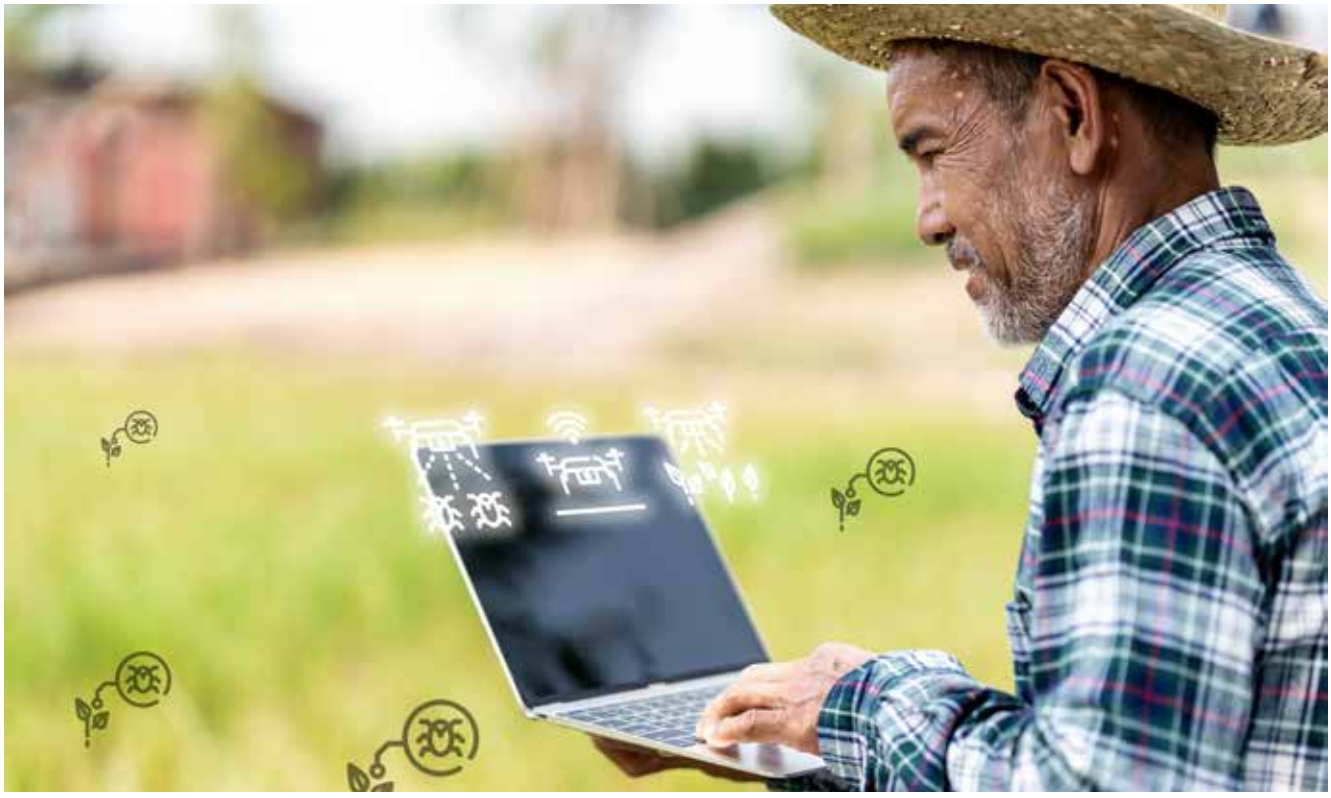
Despite the availability of market data analytics at our fingertips, it is still incredibly difficult to predict or even quantify the extent of the economic impact of the virus, particularly in the ICT and tech fields. At this juncture, it is believed that the Chinese economy will bear the brunt of this economic setback. Singh says, "The outbreak will have a significant impact on the growth of the domestic technology market. IT purchases within China will be hit and sales are expected to drastically fall, at least for this quarter." Before the outbreak, China's market for ICT services and products were predicted to soar 7.9% at a compound annual growth within the next five years, with an estimated growth of 8% in 2020 itself.

Early this year, a blow was dealt to the ICT and technology industries with the shocking cancellation of the Mobile World Congress 2020 (MWC2020) that was due to take place in Barcelona from the 24th to the 27th of February. In over thirty years of this prestigious event's history, there has never been a reason serious enough to cancel until now. General panic and a rising fear of health risks associated with the virus forced many companies involved to back out weeks before the scheduled event, citing health and safety concerns.

As a result of this, over half a billion dollars (US$) was lost in what would have been one of the largest and most successful tech events and revenue-creating turnouts for Spain's local economy. This devastation clearly bled into the morale of multiple industry key players who were looking forward to attending the annual trade show for networking, brand recognition building and income generating purposes.

More recently, China has begun to ease the restrictions pertaining to the workforce which previously included the closure of factories, ensuring people work from home and stay off the streets. The majority of the world is, for the most part, still on lockdown. Governments and employers have responded to the crisis which has inherently led to decreased incomes, an increase in unemployment and even some businesses closing down.

Despite these circumstances, the need for telecom services has become more important than ever before. Given the increased demand for bandwidth, Huawei's vice president Victor Zhang said that the fastest possible way to ensure better coverage would be using 5G. "We need to accelerate the network bandwidth... to make sure everyone can work and can entertain and can share information," said Mr. Zhang, adding that the existing mobile broadband coverage needs to be improved in order to support people who are working from home. TR



Agritech and the future of farming in Southeast Asia

Agriculture has played a major role in the birth and expansion of human civilisation for tens of thousands of years. With each millennium that passes, humans have found new and innovative ways to further develop the process of farming, harvesting and livestock domesticating in order to achieve maximum output for the continuous survival of their kin. This principle is in no way any different from what we are currently facing now in the digital era, albeit with a little help from 21st century technology.

The utilisation of technology in the development of modern-day agriculture is known as "agritech" - now a widely circulated buzzword within tech and start-up communities looking for more sustainable, renewable and cost-effective ways to support the ever growing global population. More specifically, agritech helps farmers maximise yields and efficacy using comprehensive data analytics, artificial intelligence and robotics. In addition to agriculture, horticulture and aquaculture are also included in the categorisation of agritech.

In Southeast Asia, agriculture plays a pivotal role in developing and emerging economies, so it comes as no surprise that this industry contributes to almost half of the rural income in this region alone. Despite a number of regional start-ups successfully making headway in this sector, there exists flagrant inefficiencies in the agricultural value chain that have unfortunately proved almost impossible for the sector to continue moving forward. In this instance, start-ups have turned towards mobile technology to support agribusinesses and come up

with a range of solutions to a variety of multifaceted business challenges.

One example is Cambodia-based Agribuddy, launched at the end of 2016 with the tagline "Changing agriculture in Cambodia" and with the goal of building a system that would transform the agricultural sector in the country. They succeeded in doing this within 2 years and even secured more than US$3 million in investment. The concept of Agribuddy employs a "buddy" network system that connects smallholder farmers and enables them to share information about their farms and themselves to build a credit scoring profile, which will then provide them with access to loans and credits. "We have thousands of farmers, hundreds of suppliers, Buddies, banks, and we have to talk to them one by one, it's very very tough," said Pakk Yourng, managing director of Agribuddy Cambodia.

In Vietnam, agritech start-up MimosaTek uses an IoT platform to provide data, support decision-making and remotely control farming using sensors on agricultural equipment and a cloud platform. Founded in 2014 by a group of young visionaries who were passionate about creating a positive impact in their society, MimosaTek has garnered a number of impressive accolades since its conception, including winning the IDG Ventures and Samsung-backed Go Live! Vietnam Venture Cup contest in Ho Chi Minh City in 2015 and becoming the first Vietnamese organisation to win the Securing Water for Food Challenge in 2017.

Co-founder and strategy director for MimosaTek, Nam Dang said, "Agriculture in Vietnam is super inefficient. Productivity is among the lowest in Asia. Waste is everywhere — more than 50% of water is wasted as a result of over-irrigation, up to 60% of the fertilizer is not absorbed by the crops which run off and destroy the environment, 20%-30% of the crops are lost due to pests and diseases, and over $700 million are lost in export opportunity because of overusing pesticides and chemicals. All of this is caused by the fact that farmers do not have data about the demands and health conditions of the crops, and therefore cannot tailor their services to meet their needs."

He added that Vietnam welcomes innovators from all over the world to come and help solve the country's agricultural issues. "We believe in the potential of agriculture technology market and trust that local start-ups will lead the change."

In terms of aquaculture, Indonesia's eFishery integrates a sensory feeding device to measure the animal's food intake in fish and shrimp farms in order to avoid overfeeding which would lead to excessive water pollution. Using IoT, eFishery's farmers manage their ponds more efficiently and from anywhere in the country with just a click of their smartphone. In 2018, eFishery managed to raise US$4 million in funding from institutional investors like Aqua-spark, Wavemaker Partners and Maloekoe Ventures, just to name a few.

"Ultimately, with this new round of investment, we want to further scale and refine our operating model. We aim to be a platform that connects the entire ecosystem in fish and shrimp farming, creating a more accountable and profitable industry across the region," explained eFishery co-founder and CEO Gibran Huzaifah.

Even with all this cutting-edge technology, why is it still necessary to care about agritech? Firstly, agritech allows for the growing of food in urban areas and in a myriad of climates, instead of miles and miles away in a giant field which is out of reach and out of sight, that in turn allows for decreased hassle in transporting these goods to different parts of the country. The closer the food is to your home, the fresher and better it tastes. Secondly, the use of agricultural technology also mitigates the need for pesticides or chemical fertilisers that could potentially manipulate the nutrients in the soil and cause health problems in humans. Therefore, the proper use of agritech could, in the long run, assist in the promotion of healthier food and a sustainable environment. TR


Bernardo Lucas, Chief Marketing Officer (CMO) of Mobileum

CMO: Mobileum's action driven solutions will set a new paradigm for the telecom industry

The telecoms industry is on the fast track towards global digital transformation and, by the looks of it, isn't planning on slowing down anytime soon. With the arrival of 5G and a list of other emerging technologies into the ecosystem, it is no surprise that data analytics and network security will play a critical role in protecting and optimizing mobile network operations in the future.

This sense of urgency and determination to provide cutting edge, analytics-based solutions for the telecom industry and other verticals is what drives Mobileum to continuously improve, innovate and most importantly, evolve their business to suit the needs of its diverse customer base. At the helm of this trailblazing enterprise stands Bernardo Lucas, Chief Marketing Officer (CMO) of Mobileum who oversees the company's marketing strategy, product marketing, lead generation, and communication and branding.

Bernardo's career spans working at US-based Boston Consulting Group (BCG) for almost a decade. At BCG, he led technology, media, telecommunications, retail and financial services consulting projects, with a big focus on strategy assignments and large scale transformation programs. After which, he became CMO of WeDo Technologies, which was recently acquired by Mobileum in 2019. As Mobileum's CMO, Bernardo has been focused on helping the company achieve its vision, of becoming the leading provider of actionable analytics solutions for the Telecom industry.

"Mobileum has a set of very strong technology assets and our expertise in the areas of Roaming, Risk Management and Security, is second to none. This makes me confident that we are on the right track and building a unique platform in the industry". In 2019, the company was highlighted as a reference vendor by Gartner for their application of machine learning capabilities to risk management. Additionally, Mobileum was presented by Frost & Sullivan with the Price/Performance award for their roaming solutions and market leading signaling firewall. To top it off, they ended the year on a high note by winning the Global Telecom Summit

Glotel award for the Best Network Security Solution of the Year.

Even taking this strong market leading position, Bernardo believes there is still much more to accomplish. "We kicked-off 2020 with some fresh news. Mobileum's brand has undergone a transformation. Our new identity is important to strengthen our positioning as a provider of analytics-based solutions and to represent our mission of helping customers grow their business by providing them with unique insights and connecting them with action," he says.

The task of improving their customers' businesses is no easy feat, as many communication service providers (CSPs) have found it challenging to make the transition from traditional telecoms to software-based platforms. Bernardo explains that 5G's potential for revamping the CSP infrastructure is limitless, which in turn means that it will "allow the implementation of new-tiered pricing schemes and open the door for new monetization opportunities across the board, from the traditional wireless product lines to international roaming." He added that 5G will also provide unparalleled network connectivity, speed and capacity that can host multiple applications like smart homes, autonomous driving, smart factories and others. This is where the role of network slicing will be the most essential.

"Network slicing is a key enabler of 5G, giving network operators the ability to allocate portions of their network for specific customer uses cases. This requires ensuring the network is optimized to meet the specific SLAs needed to support each application," he says.

When asked how Mobileum is approaching this operation, Bernardo says, "The key to fully monetize 5G networking slicing will be the deployment of flexible tools that enable service providers to monitor multiple SLAs while still offering the flexibility needed to meet changing and diverse customer demands. Mobileum is working closely with its customers to put the right strategy in place across devices, systems, networks, partners, and business models."

Speaking about Mobileum's unique Big Data platform, Active Intelligence, Bernardo explains that both machine learning and artificial intelligence techniques are utilized to inform and make traffic management decisions, assess risk, and protect the network. "One of the biggest advantages we bring to the table is our unique framework that links a service provider's core network with various business applications." In terms of applying such an intricate platform within CSPs across a socio-economically diverse region like Asia Pacific, Bernardo stresses that operators in the region will undoubtedly face many challenges when it comes to security and data protection, but that is where Mobileum steps in to ease the burden.

In this respect, Mobileum is no stranger to Asia Pacific. With a significant global footprint and new partnerships constantly being developed with key industry players in the region, the company has established itself as a force to be reckoned with; an entity that is highly committed to its customers and determined to help CSPs grow their revenues and mitigate network and business inefficiencies.

"We find that each region has their own unique challenges when it comes to optimizing roaming and identifying and mitigating fraud and security threats, so we work with operators across the globe to better understand and resolve these issues in new and innovative ways." TR

Network slicing is a key enabler of 5G, giving network operators the ability to allocate portions of their network for specific customer uses cases

Advancing digital education in Asia Pacific

The current digital transformation has brought about sweeping change that not only affects the political and economic sectors of a country, but most importantly, introduced a number of important social changes as well triggered by the growth of knowledge in the information and communications technologies (ICT); namely in the field of education.

As we have seen, education in the 21st century is incomparable to previous generations and is unlike anything we have seen before. The topic of education has been a nuanced one in Asia Pacific, which is one of the fastest developing regions in the world. Despite their similarities, many countries in the region have vastly different socio-economic and cultural landscapes that contribute significantly to each of their societies' pursuit of knowledge. With 45% of the world's youth calling Asia Pacific home, it's a sad reality to know that many young people in the region are struggling to find a balance between what they are being taught in schools and the whirlwind digital ecosystem that they are expected to traverse once they graduate.

Furthermore, the fact that many young people living in the region's developing countries have no access to educational resources, let alone the ability to secure employment, has not only widened the disparities between rural and urban areas but also exacerbated underlying issues like socio-economic inequality and social exclusion amongst youth.

In this situation, various questions arise; will digital education be able to bridge this gap? Would students be able to

reconcile their current learning strategies with the ever-evolving, fast paced digital technologies outside the classroom? What should we do as a society to ensure that no one gets left behind?

One of the methods proposed by institutional stakeholders would be to take advantage of the rapidly growing and increasingly tech-savvy mobile technology subscriber base in Asia Pacific. With almost half of the population already having access to mobile devices, a number which is expected to rise exponentially by 2020, it is absolutely crucial that higher education institutions and relevant government bodies seize the opportunity to leverage the versatility of mobile technology to boost educational reform and provision in areas where it is most needed. Mobile technology like smartphones, laptops, tablets and others offer a more customizable and flexible form of learning for students, regardless of their location.

An analysis of case studies discussed in the book "Mobile Learning in Higher Education in the Asia Pacific Region: Harnessing Trends and Challenging Orthodoxies" highlighted the sustainable utilisation of mobile learning strategies within the Asia Pacific region. In Japan for example, a mobile app known as SCROLL aims at linking learning in formal and informal environments to enhance opportunities for students to engage in informal learning. This allowed users to record everyday learning experiences with their smartphones and, if they chose to do so, share these experiences with other learners. The initiative was implemented in various communities and universities across Japan; with new configurations constantly being added to further improve and refine the system.

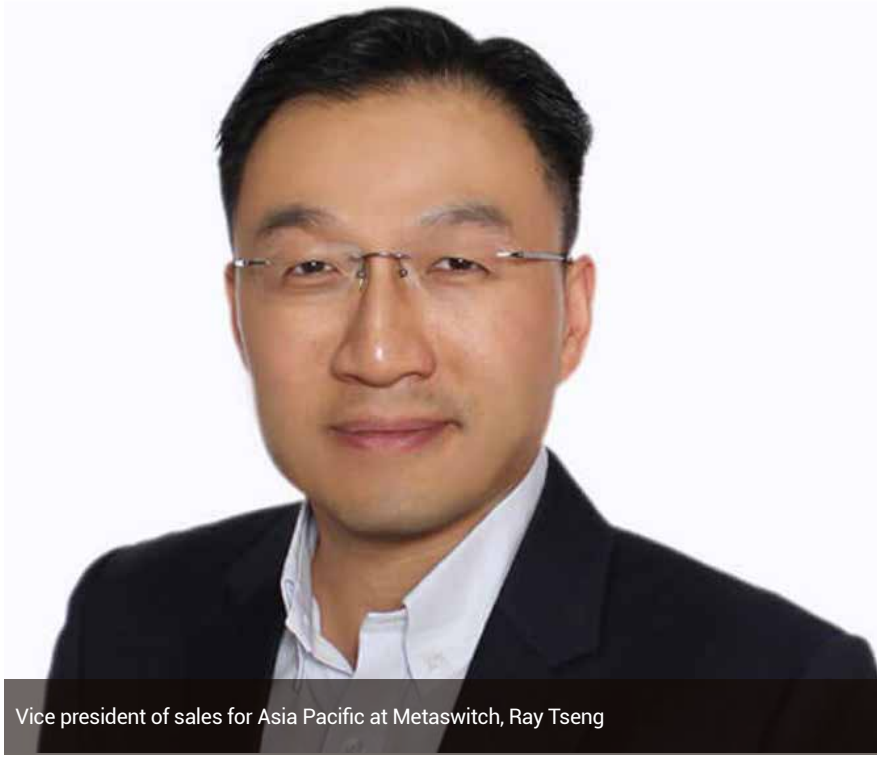
In South Korea, a pilot project employing the use of mobile instant messaging (MIM) was conducted to alleviate social and cultural challenges faced by international exchange students when it came to learning the Korean language and conversing with Korean speakers. The interesting aspect about this experience is that users are able to facilitate language contact with each other in other locations around the world and do not necessarily need to be sitting next to each other. This allows international students learning Korean to combine MIM texts and visual tools in order to grasp the language skills in a short amount of time.

In addition to mobile technology education, another mode of digital learning has also surfaced and gained traction in the region in recent years. Massive open online courses or MOOCs enable greater participation and the ability to address common issues prevalent in education such as inequity and inefficiency. Although MOOCs in the US are spearheading the digital education revolution, the ones in Asia Pacific are not far behind; with homegrown MOOCs thriving in countries like the Philippines, China, Malaysia and India. Many of these initiatives can be seen predominantly in a higher education setting like India's Delhi University and the University of the Philippines' Open University's MODeL, to name a few.

Considering that MOOCs is a relatively new system, there is still much to be done in terms of research and availability of resources. Due to this, several overriding issues have surfaced such as low completion rates as well as language barriers; as most lessons are conducted in English, and inadequate learning support in developing countries. Even with these inevitable teething problems, MOOCs have facilitated greatly access to education, but it is only a matter of time that we would be able to see if marginalised groups that deal with the issues mentioned above are also allowed access to this method of learning without being left behind by the strong current of rapid digitization.

Intelligent tutoring systems (ITS), on the other hand, are computer-based learning environments that employ AI to give students a customised educational experience. This system not only provides students with a personalised mode of study but also uses hints and remediation, cognitive and metacognitive scaffolding, affective support, and alternative teaching approaches as tools to engage with students and fuel motivation. One of the major factors for ITS' popularity is its ability to be deployed in situations where there is a lack of adequately trained educators. Although some ITS activity has been documented in developing countries in Asia Pacific, with a specific focus on cultural factors, mobile gadgets and language support, most of the research has been done in developed nations like Singapore, South Korea, Taiwan, Japan and Hong Kong.

Clearly, there is still a lot to be done in terms of evolving the digital education scene in Asia Pacific to make it accessible and adaptable to all communities across the region. In cases like these, it is important that the governments of these countries work closely with non-governmental organisations and tech support groups to build infrastructure that will allow for the continuous sharing of knowledge on a digital platform that is not only user friendly, but is considerate of cultural boundaries and regional and socio-economic factors. TR



Vice president of sales for Asia Pacific at Metaswitch, Ray Tseng

Metaswitch's contingency plans successful in combatting pandemic

The severity of COVID-19 has hit an all time high. In addition to the human toll that the virus has accumulated, the significant commercial impact on various global businesses has been unprecedented. As a result of the pandemic and its consequences on industry operations, companies worldwide have been forced to adapt and adopt new ways of handling the crisis in order to maintain business continuity and cater to the changing needs of their customers.

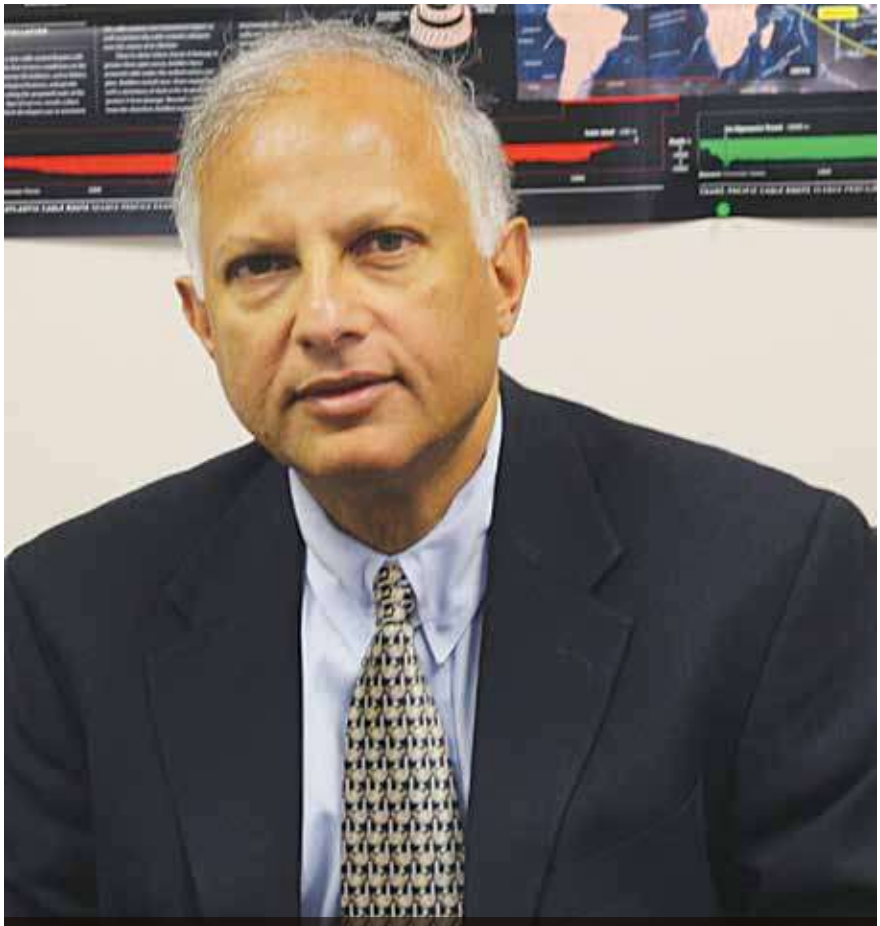
The situation is no different when it comes to the telecommunications sector. The gargantuan impact of the crisis has certainly shaken the industry to its core, but instead of conceding, companies like Metaswitch have taken significant steps to mitigate its damages early on and begin the process of navigating through these unchartered waters. As the vice president of sales for Asia Pacific at Metaswitch, Ray Tseng's vast leadership experience has not only prepared him for the most unexpected of circumstances, but also to approach them in a way that prioritises the wellbeing of employees and customer relationships.

"Metaswitch moved early on reacting to the COVID-19 crisis. We quickly shut all offices and enabled every employee to work from home effectively. All employees and departments were fully up and running within 5 business days. We posted guidelines for any potential office visitors, and also made clear how we would still be responding to customers and partners," Tseng said.

Tseng also explained that, despite the seriousness of the situation, motivation and morale amongst employees have remained high. Additionally, the concept of working from home is not something new for the company. "Teams meet virtually each day, and virtual all hands meetings are also being held. Beyond that, we market and sell products to communication service providers, all of whom are playing a key role in keeping their end users reliably connected and collaborative during this outbreak."

In terms of business continuation, Tseng stresses the importance of maintaining client relationships and high standards of customer support during these uncertain times. He also added that product delivery remains unaffected. "Given that most of our networking products and solutions are now delivered as software, "shipments" have not been impacted. A high degree of automation in our cloud native virtual network functions also helps to ease remote installation, testing and launch," he said.

Seeing that almost all the company's operations are now being conducted remotely, Tseng says that this has not posed a hindrance to business continuity thanks to Metaswitch's seamless technology portfolio. "We supply our MaX Unified Communications and Collaboration portfolio to communication service providers around the world. Not surprisingly, we use and depend on the same solution internally as well. While many employees were aware of this part of our product portfolio, this might be the first time that EVERY employee is now using the software as part of their daily workflow. And valuing it!" TR



Chief Growth Officer at Bankai Group and member of the Pacific Telecommunications Council Organization (PTC), Nakul Rege

PTC spearheads success of ICT industry in the Pacific

As the Chief Growth Officer at Bankai Group and member of the Pacific Telecommunications Council Organization (PTC), Nakul Rege is responsible for successfully expanding the Group's footprint globally across all segments – wholesale, retail and technology solutions. Telecom Review explores PTC's vast influence on the ICT sector and what this means for the future of telecoms in the Pacific Rim.

For the benefit of our readers, could you please explain the organization's role within the industry and how it has benefitted its subscribers?

The Pacific Telecommunications Council (PTC) is a global non-profit membership organization promoting the advancement of information and communication technologies (ICT) in the Pacific Rim, including Pacific islands, through collaboration, knowledge, and outreach. PTC is led by a Board of Governors and an Advisory Council, both comprising of global executives in the telecom, academia, and other ICT industries.

I first attended PTC's annual conference in 1992. I found it gave all operators and carriers working with Pacific region operators an opportunity to meet and negotiate with senior executives in a less formal setting, to get to know them better and to set the course of action at the start of the business plan year.

You are always learning something new at each PTC annual conference, meeting new faces and it helps you keep in touch with developments and changes in the world, particularly in the Pacific area. A few years ago, I decided to serve on the Advisory Council and give back to PTC and share with newer members my experience and knowledge in this field.

Unlike other organizations, funds from PTC annual conferences and membership support research and projects to improve the quality of life in the Pacific Rim. One example is the PTC Academy where experts share their knowledge and experience with young executives from around the globe. Many 'students' welcome this opportunity to learn and improve their skills and are able to go back more motivated and it has a positive effect on their fellow colleagues and their organizations as a whole.

Another example is the PTC Young Scholar Program (YSP) and Research Awards that encourage young scholars to submit papers, which are independently reviewed and awards given, with the opportunity to present their research at PTC's annual conference. This brings

in new blood into the telecom and ICT industry.

In addition to its annual global conference, what other events or projects does the PTC get involved in to advance its role in the ecosystem?
Many people think of PTC as simply the January conference but it is a lot more than that. There are various chapters in Japan and India associated with the PTC. Apart from the Academy Young Scholar Program, and Research Awards mentioned earlier, PTC also funds projects that promote the use of telecommunications and ICT to improve the quality of life in the Pacific region.

Additionally, the PTC network continues to expand, as there are individuals involved with subsea cables, data centers, satellite technology as well as the major players these days like Google, Facebook, and Amazon. PTC's Board of Governors and Advisory Council, with their knowledge and industry experience, work hand-in-hand to provide strategic direction of PTC's involvement and work in the industry.

In your experience, what do you believe are the advantages of being a member of the PTC?
I have attended every PTC annual conference since 1992 and by being a PTC member, it has enabled me and my colleagues to develop long relationships with people. Knowing your subject matter is important but earning the respect and understanding of people takes a very long time – it is difficult to imagine this developing without my companies (over the years) being members of PTC.

Over time, as you understand the challenges that some of the Pacific Islands face in their day to day operations to communicate with their own people (some countries extend over 1 million square miles across the Pacific), you want to assist them to the best of your abilities. The academy and research studies that the PTC is involved with is only a small step but it is in the right direction.

The telecom and ICT community are very closely knit. Based on my personal experience, once you are in it, you are often associated with it for a long period of time. Your actions are seen by all and communicated by others in different parts of the world. People will also find the need to communicate with each other as long as life exists - there were days of Telex and Telegram, then voice (regulated and unregulated), Internet, now OTTs but more and more people are being brought together as part of the ecosystem.

Membership fees at PTC contribute to the overall growth of activities that the Council can run – it is a non-profit organization. The memberships have been tailored according to company size, university, and individual member capabilities. In addition, if there are specific topics or areas that members would like to be addressed, PTC welcomes the feedback and insights on new ideas and initiatives.

Do you have any future plans in the pipeline for the PTC?
Some of the steps that the council has recently taken is to expand the Board of Governors categories to Middle East and Africa regions and encourage global participation and not just restrict the area of coverage to the Pacific Rim/Asia regions.

The PTC Job Board is a recent PTC Member benefit that has been set up to allow members to post job vacancies that are available for the general public to view and apply. The PTC Academy was being held once or twice a year, and in 2020 is now expected to be held four times.

All these actions have been based on member feedback but the core mission and objectives of PTC remain. I am sure as the participation of the OTTs increases, it is expected that they will also make some changes based on their outlook. New contributing members and fresh ideas are therefore important for the long term success of PTC, their members and the Pacific region. TR

“The telecom and ICT community are very closely knit. Based on my personal experience, once you are in it, you are often associated with it for a long period of time”

An era of tremendous progress for telcos in Asia Pacific

The telecommunications industry in the Asia Pacific region is one that is simultaneously rich in history and revolutionary in its vision for the future. In the past couple of decades, we have witnessed radical transformations within the industry worldwide as a growing number of consumers with smart devices are continuously demanding for higher bandwidths and larger data to enhance their digital experience. This predicament is no different in Asia Pacific, where the number of mobile subscribers has grown exponentially; 2.8 billion people in the year ending 2018. According to the GSMA, it is estimated that 370 million more new subscribers will be added by 2025; equivalent to 72% of the population or 3.1 billion, with many of these new users hailing from China and India.

Although both these countries are undergoing different challenges in terms digital advancement, the introduction of 5G and a slew of rapidly emerging technologies have managed to put Asia Pacific on the map in terms consumer engagement and technological innovation. Undoubtedly leading the digital revolution is China, who has demonstrated unprecedented leadership in acquiring technical superiority in the global 5G arena. The countries three main telco giants, China Telecom, China Mobile and China Unicom have dominated the competition through a series of country-led key strategies that have provided a complete market ecosystem for the flourishment of a 5G environment. At the end of 2019, the three telcos deployed their 5G services across more than 50 cities in the country.

More recently, China Telecom announced in March 2020 that by the end of the year, it will have access to 300,000 5G base stations. "5G, as an important engine of the digital economy, is a key new infrastructure to realize the interconnection of all things and devices," Wen Ku, a MIIT representative said.

In a similar vein, India being the second largest telecoms market in the world has registered a solid growth performance in the past 15 years. With a subscriber base of 1.2 billion, the Indian telecoms sector has successfully and significantly contributed to the country's GDP thanks to government efforts in securing reasonable tariffs, larger 4G and soon to be 5G coverage, wider availability and changing consumption patterns among the younger generation. Due to this, it is estimated that the mobile industry supports 6.5% of India's GDP which is about (USD 140 billion).

In the next couple of years, we can expect to see a huge transformation when it comes to the telecoms network infrastructure. It comes as no surprise that the Indian telecoms sector is greatly influenced by technological innovation, customer demands and other competitive entities. As such, the top three telcos; Airtel, Reliance Jio and Vodafone-Idea have been mulling over the possibility of extending coverage to resolve the issue of rising data consumption.

Additionally, the Indian government has been immensely supportive of the growth of the telecoms sector by proactively organising key initiatives for telecom companies, with Prime Minister Narendra Modi pledging to make the country 5G-ready by 2020. According to the Economic Survey, "For India, 5G provides an opportunity for industry to reach out to global markets; consumers to gain economies of scale and citizens to reap benefits of doorstep governance and availability of services, medical support, benefit transfers, education, entertainment and also build a digital payments, knowledge and services economy." Some of these initiatives include permitting 100% FDI in Bharti Airtel, providing mobile banking services and reforming the National Telecom Policy 2018 due to sector advancements just to name a few.

As of now, the telecoms sector in Asia Pacific is continuing to address the demand for efficient and seamless connectivity. The 5G phenomenon is seen as not just a generational step, but as a way for the region to advance together towards a more connected future. Through the application of 5G technology and government support, the telecoms sector in Asia Pacific will witness greater market proliferation and a stronger regional infrastructure. TR

> The introduction of 5G and a slew of rapidly emerging technologies have managed to put Asia Pacific on the map in terms consumer engagement and technological innovation

Ivan Landen, the CEO and founder of Blue Wireless

Global Service Consistency is a key element for our business success, says Blue Wireless CEO

"Our global expansion is really customer driven. Blue Wireless serves global enterprises and the fact that we can serve them wherever their business takes them is a key value for them."

Telecom Review Asia Pacific had the pleasure of speaking to Ivan Landen, the CEO and founder of Blue Wireless about the company's expanding footprint, the future of 5G and its focus on providing high quality services to its ever-growing customer base.

Could you tell our readers about the company's background and journey so far?
Absolutely! We started Blue Wireless back in 2015 to make wireless communications reliable, simple and cost-effective for enterprise customers. Having worked in the managed network services space my entire career, I know the pain first-hand which companies face to connect their branches to the WAN, with high cost and long lead-times for wired lines.

By leveraging 4G/LTE, we are cutting the delivery time by 90%, offering on-demand SD-WAN connectivity as a flexible cost-effective alternative to wired connectivity. Since our launch in 2016 our customer base has exploded and we have grown the team with offices in Australia, Malaysia and last year in Netherlands, to serve customers in Europe.

But we are not stopping there. Together with our technology partner Cradlepoint we are now enabling other service providers across Asia to launch 4G/LTE based wireless SD-WAN connectivity for their corporate customers.

Blue Wireless has expanded its service coverage significantly over the last years to now include 55 countries in Asia Pacific and Europe. What was the motivation behind this move?
Our global expansion is really customer driven. Blue Wireless serves global enterprises and the fact that we can serve them wherever their business takes them is a key value for them.

For some of our corporate customers we first started serving them in one or two countries and then gradually added more and more locations for them, offering consistency in the service globally.

The fact that Blue Wireless leverages multiple 4G/LTE networks per country means we can always select the best possible connection for their needs. Combined with our central management using Cradlepoint NetCloud, it means we offer peace of mind with a fully managed service across 55 countries globally.

Considering that the Asia Pacific region is made up of countries with diverse socio-economic backgrounds, how can Blue Wireless tackle the different demands/needs of each market?
The countries across Asia Pacific are quite different in many aspects, but one thing unites them; 4G wireless connectivity is everywhere! In fact, some of the developing countries such as Myanmar or Vietnam have excellent 4G/LTE infrastructure as they were able to do a 'technology leap' and use the latest technologies for their networks, so fast 4G is a given

For our corporate customers, the key element we offer is service consistency, so no matter they need a service in Hong Kong or in Ho Chi Minh or in Holland, they can rely on us. We offer guaranteed fast installation and our pricing structure is also based on fixed monthly charge, so there is no usage overage or bill shock.

This year Blue Wireless was listed as one of the Fastest Growing Companies in Singapore by Straits Times and in the Deloitte Technology Fast 500 in Asia Pacific, so we are certainly delivering something that companies want!

How do you think 5G will fare in the future seeing that 4G/LTE still has quite a strong presence in supporting digital transformation and business continuation?
The introduction of 5G will enable a range of new exciting applications from Augmented Reality to E-Sports to Autonomous vehicles, but it will also facilitate more mundane but critical communication requirements such as corporate branch connectivity for retailers.

The good thing about all this investment in 5G is that that wireless will become the primary communication option for the future, both reliable and affordable and that is good for every business.

How is Blue Wireless reviving its own business model to prepare for 5G adoption and to deliver this to the region?
For Blue Wireless, our key element is offer reliable, consistent service to our corporate customers and 5G will certainly play a key role in this.

As a Virtual Network Operator, we leverage local 4G and 5G networks so we are able to mix and match the best of what's available.

We are targeting to use our first 5G commercial services in second half of this year, so we will keep you posted! TR

"The countries across Asia Pacific are quite different in many aspects, but one thing unites them; 4G wireless connectivity is everywhere"

Answering the call to serve during a global crisis

The world has been hit by an unimaginable impasse. The coronavirus or COVID-19 has irrevocably transformed lives and industries in the most startling ways. The pandemic has directly resulted in the near-complete shutdown of all social and economic activity across the globe. Considering that there is no modern precedent to such a catastrophe in existence that can inform us of what lies ahead, the road to recovery will undoubtedly be a long and arduous one. Even with the inevitable risks and damages the pandemic has caused to major industries, the communications sector has managed to overcome these hurdles and has continued to remain relevant during this period.

At a time when sharing a meal with a colleague or going for coffee with friends could put you at risk of an infection, the communications industry, specifically telecom operators, have stepped up to the challenge by continuing to connect families, communities and businesses virtually. For many of us, this could be considered a new market reality, and this is where telecom operators will shine the most doing what they do best. In this instance, they are spearheading the effort towards working from home/remote working, online learning and virtual business continuation.

At the beginning of the crisis, operators were focused mainly on preserving crucial fixed, mobile and TV infrastructures. These operations were not easy to conduct either way as the operators themselves had to worry about coping with their own employees working remotely. As such, many telcos were forced to move a large portion of their customer service centres to a home environment and still be able to operate their businesses in a seamless and uninterrupted way.

Despite these challenges, telcos worldwide have undergone a metamorphosis of sorts over the past few months; the complete reorganisation and remodelling of how their companies will run during a global crisis. The total revamp of the telcos' core infrastructures within a short amount of time has highlighted the resilience and robustness of the industry and, additionally, has showcased how these companies have used these qualities to give back to the community in times of need.

In the United Kingdom, telcos support their national healthcare system (NHS) and government agencies by supplying field hospitals with high speed connectivity, devices, and other tools to assist in the treatment of patients and vaccine research virus. They also provide information and data on population movement to combat the rapid spread of the virus in countries and areas that are severely affected. Companies such as BT, Virgin Media, Tesco Mobile, Three, O2 and Sky are just a few of the telcos that have agreed to support the NHS in these ways.

"We know how hard NHS staff are working at the moment and we want to help keep the frontline staff connected. This is a way to show our appreciation for the remarkable job they're doing to help the nation. We hope that providing increased connectivity will allow them to continue their incredible efforts – we really can't thank them enough," said Tom Denyard, CEO of Tesco Mobile.

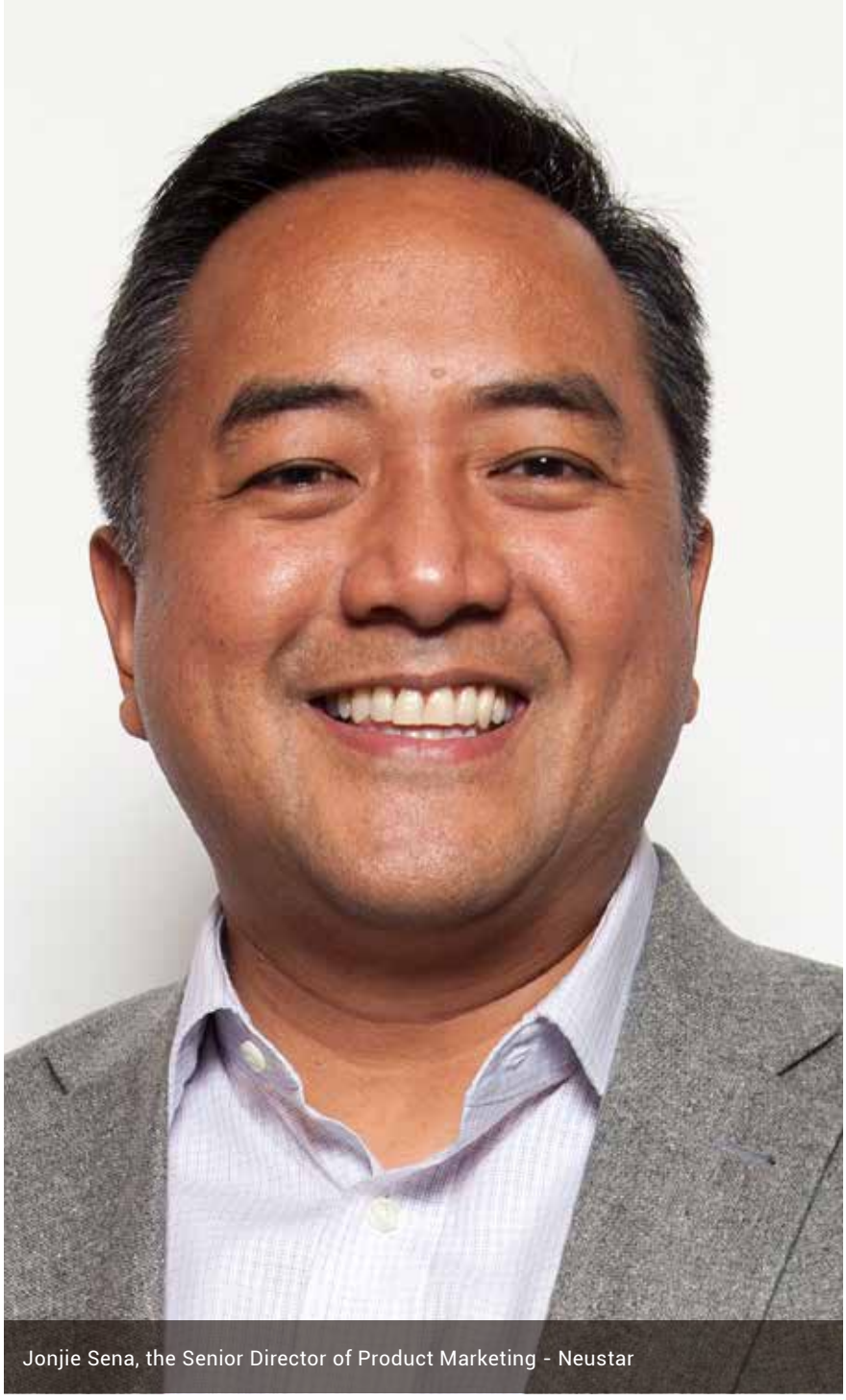
When it comes to the education sector, telcos have also increased network capacity by almost 50% to bolster distance learning systems in order to connect teachers and students via virtual classrooms. Major telecommunications conglomerates in the United States such as Verizon, AT&T and T-Mobile are providing free broadband and WiFi access to households with college students for the next 2 months. Additionally, these telcos have collaborated with schools in their district to ensure that students are constantly kept up to date with their lessons and not get left behind.

In March, the US' Federal Communications Commission (FCC) introduced the "Keep America Connected" initiative, calling for telcos and ISPs to waive late fees for customers who are unable to pay their bills and withhold from terminating their Internet connection during these uncertain times. "As the coronavirus outbreak spreads and causes a series of disruptions to the economic, educational, medical, and civic life of our country, it is imperative that Americans stay connected. Broadband will enable them to communicate with their loved ones and doctors, telework, ensure their children can engage in remote learning, and—importantly—take part in the 'social distancing' that will be so critical to limiting the spread of this novel coronavirus," said Ajit Pai, the FCC chairman.

In the Asia Pacific region, telecoms giants like Digi in Malaysia and StarHub in Singapore are also lending a helping hand to its respective communities to ease their burdens during the pandemic. In April, Digi launched its first Yellow Heart crowdfunding campaign to collect funds supporting healthcare workers and other frontliners combatting COVID-19. In partnership with the Malaysian Ministry of Health, the initiative urges Digi customers to contribute to the cause which they can do conveniently over the MyDigi app. All proceeds of the campaign will go towards purchasing vital medical equipment, personal protective equipment (PPE) and other medical supplies needed by hospitals across Malaysia in fighting the pandemic.

On the other hand, StarHub extended its support for the migrant community in Singapore, many of whom are forced to isolate alone in a foreign country without having their families there with them. Free calls to their loved ones back home, public donations and even a mental health safety message broadcasted in seven different languages are just some of the ways StarHub is giving back to those in need in the middle of the crisis.

Veronica Lai, CCO of StarHub said, "During these challenging times, we empathise with the prolonged isolation and despair of the workers confined in dormitories and community facilities. We want to use what we do best – our connectivity, products and technology – to shrink the distance between the workers and their loved ones, and to enhance quality of health care and emotional support for them. We are delighted to work with likeminded partners from the government ministries and non-profit organisations (NPOs) to reach out and help alleviate the hardships." TR



Jonjie Sena, the Senior Director of Product Marketing - Neustar

"Trusted connections" at the core of Neustar's success

In the last decade, we have witnessed an explosion of global interconnectivity, further enhanced by the arrival of a cache of emerging technologies ranging from biometrics to blockchain. Unfortunately, increased interconnectivity also means increased privacy and security risks such as illegal robocalls or scam calls posing a threat to enterprises and how they communicate with customers. Robocalls have become a rampant issue and have been responsible for destroying trust in calls and negative impacts to businesses in countries across the globe. Fortunately, recent developments have put operators one step closer to stomping out illegal calls, and this is where Neustar steps in to ease the burden.

As a global information services and technology company, Neustar is responsible for leading the market in responsible identity resolution.

Jonjie Sena, the Senior Director of Product Marketing, spearheads Neustar's go-to-market strategy for the company's portfolio of trusted communications solutions. With a career spanning more than 20 years, Sena has been responsible for driving the development and launch of innovative solutions for communications service providers and enterprises around the world.

"We provide the data and technology that enables trusted connections between companies and people at the moments that matter most. Our various solutions enhance, optimize and secure the experience and effectiveness across multiple channels, including phone calls, messaging, social networks, websites, videos, and even TV," Sena explained. Neustar offers industry-leading solutions in Marketing, Risk, Communications, and Security that responsibly connect data on people, devices, and locations, continuously corroborated through billions of transactions. Neustar serves more than 8,000 clients worldwide, including over 800 communication service providers (CSPs), and 60 of the Fortune 100.

When it comes to protecting and securing the way businesses connect with customers through calls, Sena believes that CSPs/operators are in a unique position to accurately identify illegal robocalls and put an end to this issue. "By utilizing advanced call analytics and identity resolution and verification in the call authentication process, CSPs can detect, block, and reduce unlawful robocalls and caller ID spoofing. Our robocall mitigation solution uses advanced call analytics to compute per-call fraud scores based on a broad range of authoritative data sources," he said.

He further added that in the US alone, consumers receive more than 2000 robocalls a second. Not only are these calls considered a nuisance, they are also an avenue for financial scams, costing consumers and businesses alike. "In 2018, an estimated $10.5 billion USD was lost to call scams. Fraudsters are continually creating new and sophisticated schemes, creating a scenario where voice calls are no longer trusted. Over 70% of consumers will not answer their phone if they don't recognize the caller's name or number. We think this needs to change."

As mentioned previously, immense worldwide interconnectivity has indirectly created an avenue for security risks, something that Sena explained has increased exponentially since the Internet's formative years in the late 90s when the industry was still young and working to get the Session Initiation Protocol (SIP) based applications to support services such as voice over IP (VoIP). "One of the problems with VoIP calls is that the caller's 'from' phone number can be changed at will. When this is done to intentionally misrepresent who the call is coming from, it's called spoofing. Spoofing has become a huge problem because it means fraudsters can impersonate credit card companies, government agencies, or whoever else they want to pretend to be."

The problem has become so severe that consumers are reluctant to pick up their phone regardless of who is calling, and this, in turn, is affecting legitimate businesses that need to reach their customers. "Doctors can't reach their patients; schools can't contact parents; and so on. Most of us have had times when we've missed important calls because we didn't recognize the caller, and this is what we're trying to solve," Sena said.

With all these challenges ahead, Sena is determined to approach each and every one of them with a solution based on the needs of its diverse customer base. "Neustar provides Trusted Call Solutions to a diverse base of CSPs in North America, including tier-one operators, cable providers, mobile and smaller rural carriers. We tailor our solutions to meet the unique needs of each of these groups of customers," he explained. In the case of smaller rural carriers, robocall mitigation analytics and call authentication can still be implemented to paralyse the stream of illegal robocalls and spoofing over their networks.

In terms of business relationships, Neustar is committed to building strategic partnerships with some of the biggest and most well-known brands in order to enhance their service performance to better provide for their mutual customers; Google, Facebook and Amazon Web Services being some of the many partners that Neustar has collaborated with. "This is really a reflection that in today's market, particularly in the identity space, a collaborative ecosystem is required to deliver the most effective solutions, and I believe this is mutually beneficial. Through these relationships, our partners and customers have the opportunity to gain access to our broad portfolio of industry-leading technologies and solutions to help grow and guard their business." TR

Telecoms sector will recover despite COVID-19 impact on revenues

As the world continues to grapple with the deadly consequences of the COVID-19 pandemic, the tech and telecoms industries have been dealt a massive blow as telecom operators struggle to seize control over what could only be an inevitable decline in its revenue for 2020.

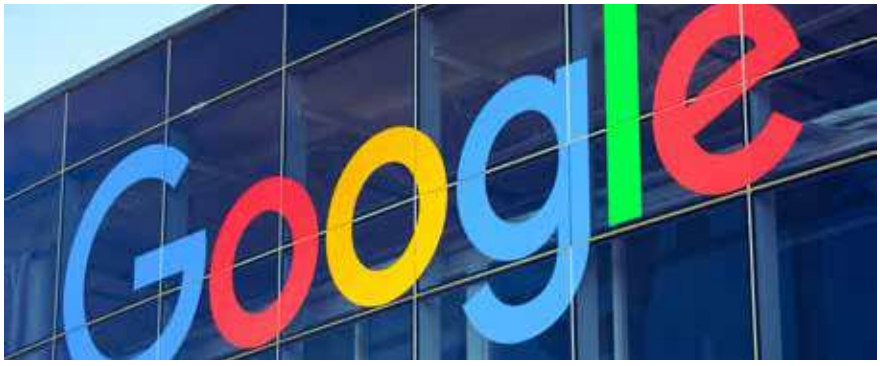
According to a report by Analysys Mason, the impact of the pandemic is expected to result in the sharp decline of telecom operator revenues by 3.4%, a world away from its pre-COVID-19 estimated growth of 0.7% at the dawn of the new year. Despite these concerning figures, telecoms has always been considered a robust and adaptable sector, so much so that it has also been predicted that it will bounce back stronger than before in 2021. Reports estimate the industry will be back on its feet with a year-on-year revenue increase of 0.8%, owing to increased demand in consumer broadband.

As mentioned previously, the resilience of the telecoms sector is largely due to its emphasis on remote working and entertainment which will undoubtedly result in the successful performance of fixed broadband services. Working from home or WFH has fast become the new buzzword in a COVID-19 era and is now considered the lifeblood of the tech and telecoms industries; a fact that will not disappear or simply be ignored once all this is over. As such, authorities have now realised the invaluable role of the telecoms sector in society and have implemented protective measures in order to protect these priceless assets to ensure business continuation in all aspects of life, especially those in healthcare and emergency services.

Even with this probable silver lining, it is important to note that analysis of the COVID-19 impact on various industries, specifically telecoms, is highly variable and would depend greatly on the progression of the pandemic. It would be safe to assume that the quarter affected the worst would be 2Q 2020, when the GDP would be expected to decrease by 11%. However, market output should begin to rise again in 3Q 2020 and would have returned to where it was initially in 4Q 2019 by the end of next year.

Rupert Wood, Research Director and co-author of the report said, "Telecoms should stay healthier than almost any industry in this crisis. Telecoms should show some of the strongest post-crisis investment, in part because cash flow is more resilient in the telecoms sector than it is most others, and because some governments will emphasise 5G and fibre in stimulus packages." TR

Google, Reliance collaboration eyes development of affordable 4G/5G smartphones



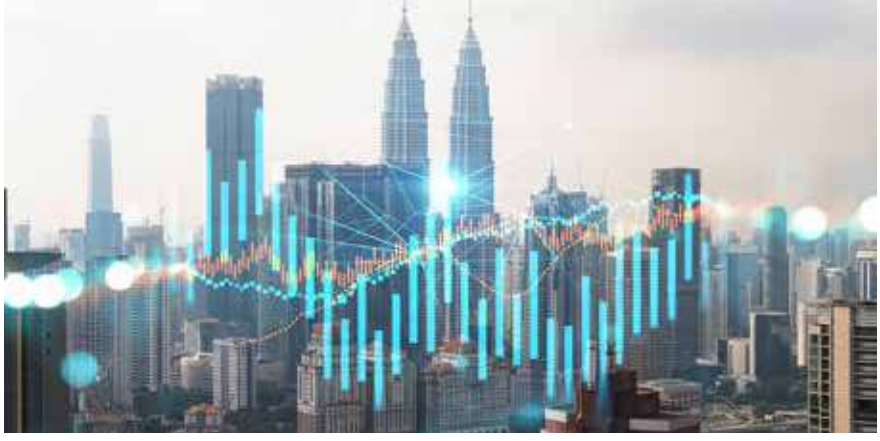
Google and India's Reliance conglomerate have entered a strategic partnership to develop an entry-level smartphone aimed at providing fast internet access to the country's 1.3 billion people, the Silicon Valley giant said.

The two firms will also develop "an Android-based smartphone operating system", Reliance's owner, Mukesh Ambani, told shareholders at the company's annual general meeting, emphasizing that, "India is at the doorstep of (the) 5G era."

He added, "We believe we can design an entry-level 4G... or even 5G smartphone for a fraction of its current cost.
To power such a value-engineered smartphone, we also need an equally value-engineered operating system... and such an operating system must be designed from the ground up."

Ambani earlier announced that Google had agreed to buy a USD$4.5 billion stake in Reliance's digital unit Jio Platforms.

Pandemic aftermath results in slow growth for Malaysian mobile services



The mobile services revenue in Malaysia is poised to grow at a sluggish compound annual growth rate (CAGR) of 0.1% during 2019-2024, from US$5.1bn in 2019 to US$5.4bn in 2024, after registering a major drop in the market revenues in 2020 due to the COVID-19 outbreak, according to GlobalData, a leading data and analytics company.

GlobalData's Malaysia Telecom Operators Country Intelligence Report highlights that the COVID-19 pandemic will have a significant impact on mobile service revenues in 2020. Aggregate mobile services revenues will witness a decline of 6.5% year-on-year in 2020, in line with decline in the mobile average revenue per user (ARPU), with operators offering discounts and free mobile data services to support users during the crisis.

Deepa Dhingra, telecom analyst at GlobalData, says, "The mobile data segment will see its revenues increase at a CAGR of 2.9% over the 2019-2024 period, driven by the steady growth in adoption of higher ARPU postpaid plans. On the other hand, revenues from mobile voice and mobile messaging segments will continue to decline at CAGR of 4.5% and 7.9%, respectively, over 2019-2024."

"4G will remain the leading mobile technology through the forecast period 2019-2024, driven by continued investments on 4G network enhancements by operators such as Celcom, Digi Telecommunications and Maxis. With all the major mobile service providers preparing for 5G network, GlobalData expects 5G to be commercially launched in 2021."

Digi led the mobile services market in 2019, closely followed by Maxis. GlobalData expects Maxis to become the mobile market leader in 2020 and will remain as market leader through 2024, driven by its strong focus on the postpaid segment. Moreover, Digi's focus on network modernization to accelerate the 5G roll-out will help improve its market share in the mobile services market space in Malaysia.

Ooredoo spearheads adoption of versatile digital workplace

In a pilot initiative aiming to adopt and support a more agile digital culture, Ooredoo Group has extended its Work-From-Home procedures, allowing employees whose work doesn't require them to physically be in the office to continue working remotely until the end of 2020.

The company is one of the first in the region to make such a decision, paving the way to an innovative working environment that could reshape the contemporary workplace. Ooredoo Group employees and contractors will have the option to agree more flexible working arrangements from home or the office, subject to individual agreement and at management discretion.

As for the Group's operating companies around the world, each will have flexibility to test more localised working arrangements in a way that works best for them and in line with the regulations and directions of the countries in which they operate.

Based on key lessons learned in the recent period, the Group management team believes that this "experiment" will foster the creation of a more agile and modern work culture. As a leader in technology and telecommunications, the Group aims to leverage the insights of the recent period into a competitive advantage.

Sheikh Saud Bin Nasser Al Thani, group chief executive officer, Ooredoo, said, "Amid the COVID-19 situation, we are presented with a real opportunity for taking our digital transformation journey to a whole new level, which will see our company leverage digital solutions to ultimately adopt a more holistic digital culture. This will transform the organisation and how we work. If colleagues found the combination of working off-site and socially distancing a challenge at first, we have emerged from this disruption empowered, able to get things done as a team – even when not sharing the same physical space, and even more dynamic. I'm both very excited and optimistic about the coming period."

Ooredoo Group has led the way among regional tech companies by providing a supportive environment for colleagues working from home. As business returns to normal, these new workplace relationships can be repurposed to strengthen the enterprise in its ability to meet the needs of its customers and the societies they live in.

While the company will seek to incorporate and build upon the potential for improved work practices discerned in recent months, it will continue to operate within official public health guidelines, against a backdrop of rigorous emergency and business continuity planning. This will allow for changes of direction should the medical situation change.

"All this requires commitment, responsibility, and accountability — but given the positive experience of the past few months, I'm convinced that together we can further transform the Ooredoo culture," reflected Sheikh Saud Bin Nasser Al Thani.

Enforced changes saw hundreds of staff members working from home since March — an unprecedented scenario which can now be built upon leading to a positive outcome. Ooredoo is now testing these exciting new ways of working going forward, amid the economic and medical uncertainties accompanying the novel coronavirus COVID-19 pandemic.

Nokia, Sri Lanka Telecom partnership boosts acceleration of fibre network nationwide

Sri Lanka Telecom PLC (SLT), one of the leading telecom service providers in Sri Lanka, will deploy a fiber-to-the-home (FTTH) network based on Nokia's fiber technology. Supporting its accelerated fiber initiative, the deployment enables SLT to bring new, high-speed broadband services to more than 200,000 enterprise and residential users across the country.

SLT is rapidly enhancing its broadband footprint in Sri Lanka to better respond to growing ultra-broadband demand from customersi. With Nokia's fiber solution, SLT can provide customers with high symmetrical download and upload speeds along with new enhanced broadband services supported by next generation XGS-PON technology. The solution will future proof SLT's network by enabling it to evolve to virtualization and Software Defined Access Networks (SDAN) by software upgrade.

Kiththi Perera, chief executive officer at Sri Lanka Telecom PLC, said, "We are pleased to partner with Nokia to bring unparalleled data speeds to our enterprise and residential users. By fully utilizing the fiber-technology, we are looking to expand our customer offerings and provide access to a platitude of broadband-based services. Together SLT and Nokia will continue working towards the ultimate goal of improving broadband connectivity in Sri Lanka."

Upendra Samaratunge, Managing Director at Nokia Sri Lanka & Maldives, said, "We are excited to support SLT's fiber initiative and provide the tools, resources and expertise that the company needs to deliver enhanced broadband access to customers. Our fiber solutions and XGS-PON technology will help SLT build a future-ready network capable of catering to ever-growing data demands."

Tripartite union of giants to make smart cities a reality

Sunway Berhad (Sunway), Celcom Axiata Berhad (Celcom) and Huawei Technologies (Malaysia) Sdn. Bhd. (Huawei) sealed a memorandum of understanding (MoU) to explore Malaysia's first tripartite collaboration towards advancing smart township solutions encompassing Internet of Things (IoT) and Artificial Intelligence (AI), with the fifth-generation (5G) connectivity.

The MoU aims to explore the potential for Celcom and Huawei to be the 5G technology enabler for Sunway Group. Sunway City Kuala Lumpur will be the "launch pad" of this ground-breaking partnership.

All three parties will explore the possibility to facilitate and support one another within the digital eco-system to promote technological adoption to enrich people's lives.

The proposed collaboration will see the development of smart solutions in the areas of public safety and security, telehealth, e-learning, hospitality, leisure and retail experience using the latest telecommunications technology as they become available for Sunway City Kuala Lumpur, Malaysia's model smart sustainable city, as well as other existing and upcoming developments of Sunway. The tripartite collaboration will also contribute towards achieving sustainable development for our nation.

As 5G connectivity will drive optimum adoption of IR4.0 solutions for smart township, the three parties involved will potentially develop an architectural design, use cases and deploy projects based on the latest technological standard for cellular networks for Sunway City Kuala Lumpur.

"We are proud to partner with Celcom, as the leading telco with widest network coverage in the country, and Huawei, one of the global leaders in 5G applications, on this first-of-a-kind tripartite partnership to advance 5G technology for Sunway City Kuala Lumpur," said Dato' Chew Chee Kin, president of Sunway Group.

"We envisage Sunway City Kuala Lumpur to be Malaysia's model smart sustainable city where a host of communities live, work, play, learn in a safe, healthy and connected environment," he added.

"After more than a decade working together, we are proud to take the partnership with Sunway Group to the next level. This collaboration will be the perfect platform for Celcom to demonstrate how technology could provide a firm foundation for a holistic smart township, and further improve lives of the community," said Idham Nawawi, chief executive officer of Celcom Axiata.

The proposed collaboration will boost our technological capacity building, and immense potential in bringing innovative products and services, while creating a 'win-win-win' situation to benefit the industry, rakyat and achieve the nation's digital aspirations," Idham added.

Celcom has been cementing its position as a digital enabler within the nation's digital ecosystem, propelling towards becoming an integrated multi-access, multimedia services and Internet of Things solutions provider, in line with the evolving technologies and consumer behaviour.

Being Malaysia's mobile operator with the widest network coverage, Celcom boasts a 93% 4G population coverage together with 83% for 4G LTE-A. Celcom continues to strive in expanding its network to empower all communities, both urban and rural throughout the nation, with seamless connectivity.

Since presenting Malaysia's first 5G trial in 2017, Celcom's network is ready to transition towards 5G, paving the way to accomplish the objective of the tri-partite collaboration.

Meanwhile, Michael Yuan, chief executive officer of Huawei Malaysia said, "The world is moving rapidly towards a fully connected and digital era, and it is important that a conglomerate like Sunway Group understands the importance of digital transformation and continues to embrace the digital shift. As a leader in ICT solutions, we are committed to our partners in providing secure, reliable, and sustainable services to help them grow in an intelligent world."

Sunway and its solution partners, on the other hand, will have the opportunity to be part of Celcom's Centre of Digital Excellence ("CODE"), in testing telecommunications technology and potentially further developing used cases essential for Sunway's envisioned smart solutions, particularly within Sunway City Kuala Lumpur.

"With this collaboration, we hope to position Sunway City Kuala Lumpur as one of Asia's model smart and sustainable cities," added Dato' Chew.

Huawei experiences 13.1% revenue increase in H1 2020

Huawei has announced its financial results for the first half of 2020 which showed a 13.1% increase year-on-year and a net profit margin of 9.2%.

The tech giant generated CNY454 billion in revenue throughout the first half of the year. As for their carrier, consumer and enterprise business, they achieved CNY159.6 billion, CNY255.8 billion and CNY36.3 billion.

As countries across the world have been dealing with the COVID-19 pandemic as best they can, ICT has become absolutely essential to combatting the virus and containing its spread. Not only that, but it has also become an engine for economic recovery.

Huawei has been at the forefront of innovation, namely during this period which has been characterized by economic uncertainty. They have been key enablers in helping many industries maintain stable network operations, support efforts to contain the spread of the virus, accelerate digital transformation and reopen economies.

AI startup joins Spark program as major industry game-changer

X0PA AI, a Singapore headquartered startup founded with the mission to make hiring a scientific process through the use of Artificial Intelligence (AI), proudly enrolled in the SG:D Spark program, recognizing it as game-changers in the industry. X0PA was recently also recognized by IDC as an AI-automation Innovator 2019 for APAC.

X0PA AI is an AI Software as a Service (SaaS) platform that aims to save significant time and cost in hiring while ensuring accuracy of choices. X0PA AI aims to achieve the highest level of objectivity in hiring, while enhancing retention, loyalty and person to job and organization fit. X0PA combines advanced algorithms, predictive analytics, natural language processing, video assessments and robotic process automation to scale the recruiting process. X0PA is a strategic partner of Microsoft and the company has developed cloud-based tools and products to enhance the hiring and selection processes for government, academia and enterprises.

The SG:D Spark Program by the Infocomm Media Development Authority of Singapore (IMDA), addresses the key challenges and supports the growth of promising Singapore-based startups through government tools as well as a vibrant, collaborative ecosystem and network. Companies will need to undergo a stringent due diligence process comprising both technical as well as financial, to prove that they are qualified to be a part of the SG:D Spark community.

"We are pleased to have X0PA AI come on board our SG:D Spark program. We see great potential in their platform where they combined ethical AI and natural language processing to automate and support the hiring process for Government agencies and enterprises", said Mr Edwin Low, director of innovation & tech ecosystem, Infocomm Media Development Authority of Singapore.

Ms Nina Alag Suri, CEO and co-founder of X0PA AI comments, "Being enrolled in IMDA's SG:D Spark program is a very proud milestone for X0PA. To be recognized as innovators, we will continue down the path of innovation to develop more solutions to keep improving the hiring landscape for businesses and academia. We are excited about the potential that we can achieve through this support by IMDA and the SG:D Spark Community".

The company recently also closed its Pre-Series A funding round of USD1.5 million, part equity and part convertible note.

SES launches free-to-air satellite channel to combat COVID-19

Millions of households across Africa, Europe, and Asia-Pacific will be able to access a free-to-air TV channel via SES satellites dedicated to delivering reliable, informative content about COVID-19. The channel — Fight COVID-19 — broadcasts content that is aimed at providing underserved and rural communities with critical information about how to limit the spread of the virus.

The content is provided by trusted organizations such as UNICEF and AFP as well as global EdTech social enterprise Potential.com. The content aims to impartially inform TV viewers about identifying COVID-19 symptoms, the recovery process, and how to manage the effects of a global pandemic and social distancing, such as managing a household, children, or mental health. SES welcomes additional content providers from international and regional organizations to contribute to the COVID-19 channel.

The channel is broadcast free-to-air from SES's satellite fleet and is available in the following regions:

• ASTRA 4A at 5 degrees East for Sub-Saharan Africa and Ukraine

• ASTRA 2F at 28.2 degrees East for West Africa

• NSS-12 at 57 degrees East for Ethiopia and adjacent countries

• SES-9 at 108.2 degrees East for the Philippines

"Our lives have been disrupted by COVID-19 in the last few months, and unfortunately, it doesn't seem to be going away anytime soon. Through the global reach of satellite, we are in a position to contribute our resources wisely to help provide important information to vulnerable communities," said Steve Collar, CEO of SES. "We have been really fortunate to be able to collaborate with UNICEF, AFP, and Potential.com, who are willing to contribute their content for this good cause. Together, we hope to reach a wide group of audiences with reliable and trustworthy content and do our part in helping slow the spread of COVID-19."

Bai Yang, Vice President of ZTE Corporation, leader of Global Marketing & Solution Department in pan-Asia Pacific region

ZTE: Strong partnerships are at the heart of digital transformation

With 5G deployment fast becoming a reality in many parts of the world, mobile operators are scrambling to get their hands on the latest products and solutions that will catapult their businesses to greater heights. Advancing right alongside this 21st century digital phenomenon is ZTE, who is not only leading the way towards a 100% software-based, end to end mobile network infrastructure solutions, but also smashing through traditional telco methods and welcoming a new generation of continued innovation and market proliferation.

Telecom Review Asia Pacific sat down with Mr Bai Yang, Vice President of ZTE Corporation, leader of Global Marketing & Solution Department in pan-Asia Pacific region to discuss his vision for a 5G future.

What is unique about ZTE's approach to 5G deployment?

ZTE is one of only two equipment manufacturers in the world that can provide 5G end-to-end solutions and commercial products. In the Asia Pacific region, ZTE has assisted operators in China to achieve 5G scale commercial use and conducted 5G network test and new business exploration with mainstream operators in Malaysia, Myanmar, Indonesia, Thailand and many other countries.

Through these practices, ZTE has accumulated rich experience and put forward a mature 5G rapid network construction scheme. The first is to "simplify" the technical solution, including the whole scene minimalist site solution based on multi-mode multi frequency multi architecture and full mode maximum capacity BBU platform.

A core network supports 2G, 3G, 4G, 5G and the common of fixed network access at the same time Core scheme, and flexhal bearing network which can effectively reduce power consumption and configuration complexity; the second is to "add intelligence" to the network: add AI and MEC functions; the third is to "separate" the network, virtualize a physical network into multiple virtual networks, build a core open platform, shorten business online time and reduce operation and maintenance costs; the last is to multiply 5G features and massive vertical industries , leading to the matrix revolution of 5G business model.

Seeing that the region is made up of socio-economically diverse countries, what types of solutions have been introduced to cater to these specifications?

Firstly, 5G mainstream band 3.5GHz has been used in many countries in the Asia Pacific region. For the countires where 3.5GHz cannot be obtained, ZTE has launched a series of customized 5G AAU products, which can meet the network construction needs of different operators in 700MHz, 2.6GHz and other frequency bands.

Secondly, the Asia Pacific region is densely populated and the demand for network capacity is growing explosively. ZTE's mass MIMO products have been deployed for many years, and have been proved to be more than 6~8times higher than the throughput of 4G network cell.. This user brings the ultimate experience.

Additionally, some operators also have a large demand for 4G expansion. ZTE's wireless and core network products can support 2G, 3G, 4G, 5G access at the same time, and support NSA/SA dual-mode. The dynamic spectrum sharing scheme can support the flexible allocation of spectrum in 4G and 5G networks, realize the smooth evolution of 4G networks to 5G, and protect the investment of operators.

In order to save 5G investment, operators try to share infrastructure such as co built transmission and site, or further seek M&A to reduce market competition. ZTE's RAN sharing scheme has been commercially validated by China Telecom and China Unicom, and it is a practical solution that can significantly reduce CAPEX and OPEX in the process of network infrastructure sharing and network consolidation.

Lastly, many traditional operators are transforming to full-service operators to improve profitability. ZTE's 5G core and 5G optical access product Titan can be compatible with wireless broadband and fixed broadband access at the same time,

support seamless switching of user equipment at the network level, and realize fixed mobile integration.

What kinds of challenges can you foresee when it comes to driving digital transformation in Asia Pacific?

The digital transformation of operators is not only to provide digital communication services, but also to build and integrate into a new digital ecosystem and become an enabler of the future digital economic society. In the process of transformation, operators not only need to overcome the shortcomings of the traditional business model, but also need to meet new challenges, such as the re positioning of the ecosystem, operational organization change, talent transformation and so on.

In order to better serve the digital transformation of customers, operators must first solve the problem of insufficient network agility, resource scheduling needs to be more flexible, and the network is easier to expand, so as to support diversified and personalized business innovation. ZTE can provide SDN/NFV network products based on mainstream technology, with communication level reliability and high performance, to help operators with network agile transformation.

Operators in the Asia Pacific region are in different stages of digital transformation. Some operators have not completed the digital transformation of their own operation, so they have some challenges to deal with the digital transformation of the society. ZTE has rich experience in its own digital transformation. It can provide large-scale operators with national data center, ICT PaaS, distributed database and other basic software, which can help operators cope with their own digital transformation.

In the process of business development, operators need to constantly accumulate experience and improve the ability to integrate the ecological chain, so as to provide customers with the best technology, the lowest cost and the best delivery solutions. ZTE, as a long-term strategic partner of operators, is willing to work closely with Asia Pacific operators to provide the best solution for customers' digital transformation based on its own accumulation of video capabilities, AI capabilities, basic software and equipment development.

How closely do you work with customers in order to bring 5G to the respective markets?

5G has been integrated into the key capabilities in the industrial field at the beginning of its definition. On the basis of building ubiquitous communication, it is built with AI enhancement, evolutionary perception and control intelligence to comprehensively improve the collection, transmission, processing and application level of information, laying a solid foundation for the continuous optimization cycle of operation innovation, product service innovation and mode innovation of enterprises and society.

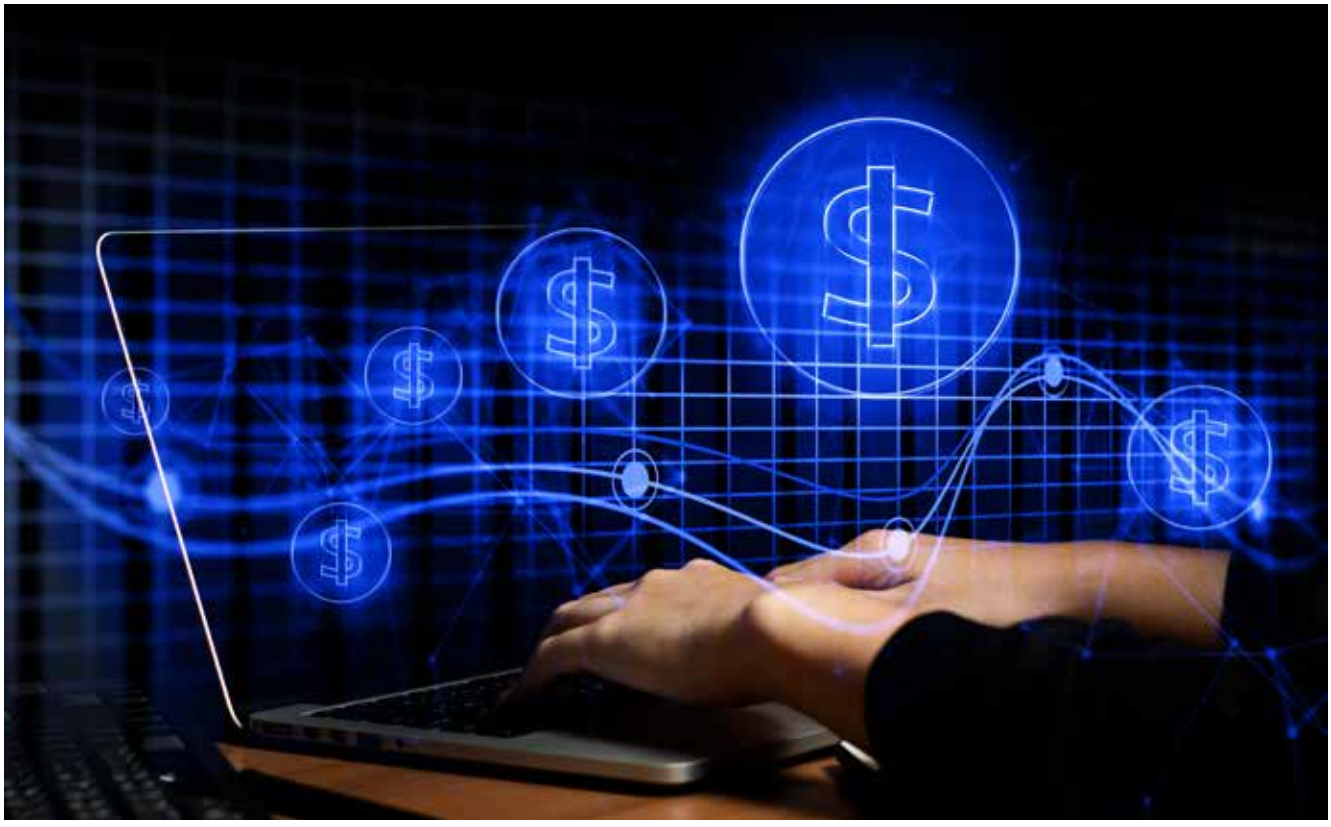
In the age of 5G, customers' demands are characterized by individuation, customization and polymorphism. Operators and equipment manufacturers are trying to explore the industry rules and demand characteristics. It is expected that in the future, operators will build an open and powerful middle platform, integrate resources, and provide relevant capabilities to ecological partners and markets.

We have many 5G partners in the Pan Asia Pacific Region, such as Smartfren, Telkom and Telkomsel in Indonesia, Umobile, Webe and Digi in Malaysia, Ooredoo and Mytel in Myanmar, Kivystar in Ukraine , True and AIS in Thailand, Bharti Airtel and VIL in India, TP in Pakistan, Megafon in Russia and A1 in Belarus. Our role as we see it is to verify new technologies and from that develop new business through strong partnerships.

ZTE has formed in-depth collaborations with more than 70 operators around the world. With its extensive experiences in the field of Massive MIMO and continuous innovation in 5G algorithms, ZTE has been improving 5G commercial network performance and building quality networks for users to enjoy the uninterrupted high speed and low latency internet experience.

As a proactive and leading contributor to new 5G applications, ZTE has been collaborating with global operators to optimize the 5G vertical industry with its end-to-end 5G SA solutions. Moving forward, ZTE will continue leveraging its end-to-end NSA & SA dual-mode products and leading Massive MIMO technology to help operators build the best networks with ultimate user experience and services. TR

ZTE, as a long-term strategic partner of operators, is willing to work closely with Asia Pacific operators to provide the best solution for customers' digital transformation



Telecoms access in Asia Pacific: A gateway to poverty reduction

In the past decade, Asia Pacific has achieved tremendous economic progress. Many of the countries in this region have surpassed expectations and dominated a diverse range of industries, specifically tech and telecommunications. Despite its immense success and continued growth in those two fields, the region is still battling one of its most pressing issues; poverty.

According to the World Bank, 33% of those living below the poverty line of US$1.9 a day in 2018 belong to South Asia, while 9% are from East Asia and the Pacific. Although these numbers have significantly improved in the past couple of years, there is no doubt that increased telecoms access, education and the building of vital ICT infrastructure can greatly transform the socio-economic landscape and help break the cycle of poverty.

The beginning of the new millennium saw a shift in the mindsets of policymakers who were now thoroughly convinced of the key role that telecommunications and the ICT industry as a whole played in economic advancement, enabling better access to healthcare and education services and creating new sources of income for the poorer population. Additionally, the most evident contribution by the telecoms sector within a country

can be measured by its value. As an example, telecoms service providers have contributed more than USD$ 15 billion to the economies of Malaysia, Thailand, Pakistan, Myanmar and Bangladesh; a number that has continued to increase year after year.

A look at the social aspect of telecoms access will highlight the unprecedented speed at which the internet has revolutionised our society through the wide usage of mobile internet. In terms of health, the adoption and deployment of telecoms technologies greatly reduced medical treatment and healthcare costs, making it easier to expand health services to poorer communities. Social participation thanks to the rise in mobile internet services has helped advance social inclusion, allowing for the dissemination of information and news to marginalised or underserved communities. The increased usage of mobile and internet banking services has opened doors to financial services, especially for people living in countries lacking a solid financial infrastructure.

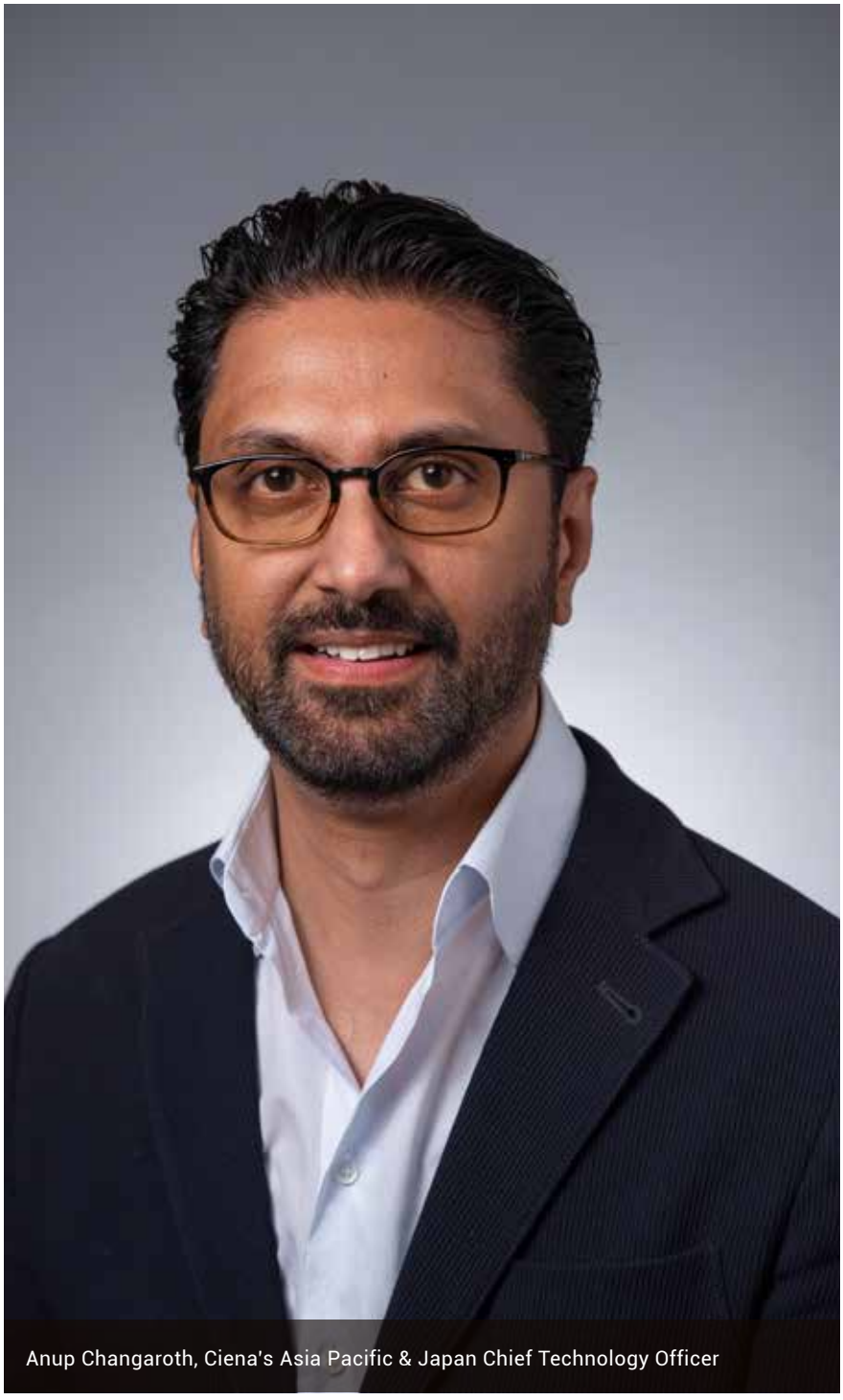
A clear example of how financial inclusion can reduce poverty is by looking at the unbanked population in Myanmar, which accounts for a staggering 80% of the population. In 2016, Telenor Myanmar introduced Wave Bank, in collaboration with Yoma Bank. This service enabled citizens to transfer money securely in small shops across the country, which can then be withdrawn by their family members in similar shops not too far away after a notification is sent to them via mobile. As a result, every transaction that comes through not only allows them to have an additional and growing revenue stream but reduces the chances of unsecure transactions and helps customers keep money in their mobile wallets. By the end of 2018, Wave Money had greatly transformed the lives of more than 7 million citizens in Myanmar, the majority of whom were previously financially excluded.

Just recently in 2020, Yoma Bank and Telenor Myanmar partnered once again to provide unsecured small business loans to Telenor merchants using Yoma Bank's digital SMART Credit Business Product. Rituraj Kalita, Head of Yangon Region and National Channel Head at Telenor Myanmar said of the partnership, "Telenor Myanmar is delighted to partner with Yoma Bank, supporting our channel partners with easy access to funds through a simple and trusted process. Our channel partners' success is important to us as they are instrumental in serving our customers every day, across Myanmar. Together we are empowering societies through both digital and financial inclusion."

As mentioned earlier, telecommunications play a pivotal role in enhancing social inclusion. By facilitating the involvement of people from diverse backgrounds in matters that affect the society they live in, it allows for opportunities to better themselves and a way out of poverty. In some cases, disadvantaged individuals such as those of a particular race, religion, gender or disability, who would otherwise be severely underrepresented in a rapidly changing world, would now have a chance to gain an education and overcome communication hurdles through access to telecoms.

In Pakistan, the issue of low birth registrations has become a socio-economic crisis. Birth registrations are a prerequisite to necessary documents like national ID cards, passports and even for school enrolments. The launch of the Digital Birth Registration in 2019, a joint effort by Telenor Pakistan, UNICEF and the governments of Punjab and Sindh, has managed to overcome this problem by allowing parents to register the birth of their children online using the app on their mobile phones. This resulted in a spike in registrations from 30% to 90% in less than a year.

Muqaddisa Mehreen, a UNICEF Child Protection Specialist in Islamabad said, "The strategy is to link health, education and birth registration services to register as many children as possible, with a focus on those who are under five years of age. The system is promoting transparency, ease of access and provision of services at the doorstep of families, maximizing the impact of resources to improve the lives of the most vulnerable families." TR



Anup Changaroth, Ciena's Asia Pacific & Japan Chief Technology Officer

Ciena: "Open architecture is the ethos of the adaptive network."

As networks continue to evolve and become more complex with the emergence of new technologies, service providers are under immense pressure to revamp and restrategize existing business models in order to participate competitively in the global market. With this in mind, Ciena's primary vision is to help operators not only adapt to the increasing demands of an ever-changing ecosystem, but to flourish and continue to ride the wave of digital transformation.

Telecom Review Asia Pacific secured an exclusive interview with Anup Changaroth, Ciena's Asia Pacific & Japan Chief Technology Officer to talk about the company's global footprint, 5G deployment and the intricacies involved in providing solutions to socio-economically diverse regions.

How important is the Asia Pacific market when it comes to expanding your global footprint?

Ciena serves over 1,500 customers worldwide and operates across more than 10 countries in Asia Pacific, making this one of our most important growth markets. We work with many leading service providers in the region including NTT, KDDI, Rakuten, Telstra, Vodafone, Singtel,

and SK Telecom, as well as internet content providers and large government and vertical utility players including rail transport, finance, and research and development institutions.

Asia is facing phenomenal growth in mobile data traffic, driven by video- centric entertainment, cloud gaming, and IoT. As service providers seek new ways of efficiently delivering a higher quality experience, Ciena is helping operators in the region to significantly increase network capacity and adapt their networks to effectively cater to that demand and prepare for the future.

We address this need by combining automation and intelligence, turning static networks of the past into dynamic and programmable networks of the future that can allocate capacity where it's needed most. We call this the Adaptive Network, and it is vital across Asia Pacific as widespread commercial 5G roll-outs open up new use cases that cannot be left to a best effort network experience and instead require guaranteed performance.

In Japan as an example, many network operators are making changes to prepare ahead of the 2020 Summer Olympics in Tokyo and other advances in AI, IoT and 5G. This has created a significant opportunity for Ciena and makes Japan one of our key regional markets:

1. We've helped deliver an entirely new backbone network for Rakuten, Japan's fourth mobile entrant. Ciena's coherent optical and automation technology enables Rakuten to ensure reliability and scalability across Japan's highest traffic regions and be future-ready for 5G.

2. We've worked closely with several other Japanese operators to enhance their infrastructure. The 2020 Summer Olympics will be an important showcase of what 5G will offer consumers, paving the way for mainstream IoT adoption and the foundation for Japan to become one of the world's leading countries for 5G deployments.

In addition to Japan, markets such as Korea, Singapore, Hong Kong, and Australia are moving quickly towards 5G to support their smart city visions. Ciena's 5G solutions enable them to take the right approach to infrastructure and future network design in order to enable the uninterrupted, reliable and real-time flow of data that smart cities will demand.

Indonesia, Thailand, Vietnam, Philippines, and Malaysia are also an integral part of our strategy. We recently appointed a new leader in Indonesia to help guide digital transformation for operators in that region. As one of Asia Pacific's largest economy, Indonesia's networks are becoming increasingly dynamic, driven by the need to improve end user experiences and desire to support high-bandwidth services like video streaming, online gaming, and other mobile internet applications. We've also made new hires in other southeast Asian markets, helping operators upgrade their network infrastructure for 4G and 5G.

We know that a lot of investments are pouring in when it comes to 5G deployment and expansion. How is Ciena addressing this to give their customers the best services and solutions?

It's important to remember that 5G is much more than just a radio upgrade. It's the next generation of mobile innovation. 5G will lead to huge spikes in data traffic and user expectation, which means significant increase in fiberization across metros, a key strength of Ciena's.

From our customers in Asia, and around the globe, we're hearing the same question: how do we evolve our networks to handle growth in a scalable manner and without the risk of overbuilding and cost overrun, while maintaining a consistent user experience? We believe tackling this problem is a balancing act. It depends on building the right infrastructure layer and putting the right automation in place to guarantee performance, while protecting capacity for high value services and applications.

One key aspect in addition to capacity scale is the requirement for an open approach to managing IP networks, particularly as 5G takes off. Ciena is helping operators reimagine their IP networks in a way that makes it easier and more cost-effective to scale. Our Adaptive IP solution allows operators to pick and choose how to evolve their network based on their unique needs, optimising existing infrastructure while incorporating new technologies and ways of working with openness, scalability, and security.

Ciena's Wavelogic coherent optical technology is an important step. Our new 800G optical solution helps futureproof networks by delivering more capacity per wavelength. The benefit being that operators can better react to unpredictable spikes in demand because 800G technology can route traffic across different paths while still maximising capacity.

We are also seeing growing interest in software automation across a range of customers and applications as AI becomes top of mind for operators. Automation will be a critical enabler to scale their networks while bending down their cost curves. Ciena's Blue Planet is a key product for delivering the scale and efficiency they need to deliver on 5G's potential. Combined with the power of data analytics, our Blue Planet solutions bring intelligent automation to the network. This means provisioning for new services and bandwidth on-demand capabilities can be managed faster and easier by AI rather than relying on human intervention. It also enables vendor-agnostic network slicing and real-time visibility into overall network performance. This is critical for the optimised, automated end-to-end creation of dynamic virtual networks powering new 5G use cases, such as mission critical IoT, which will unlock new revenues for operators.

Our customers turn to us because we are an independent supplier. We give them the ability to pick and choose the right solution for their needs because we support a wide range of radio interfaces. This means customers are not locked into a specific radio vendor, and that's important for building scalable next-generation networks. They can change their radio technology in the future and be safe in the knowledge that their automated and high performing network will remain.

When it comes to Asia Pacific, different socio-economic markets bring about a host of challenges that may need a specific focus. How can Ciena overcome these challenges and are they able to tailor-make solutions based on the complexities of each market?

Asia is a diverse region for a variety of reasons, not least socio-economic differences. Vietnam is investing in fiber networks to support industry 4.0. Singapore and Hong Kong are striving to become smart cities with large scale Data Center buildouts, while smartphone penetration in India has spiked demand for video streaming and mobile gaming. If we look at how these trends translate into network impact, though, we spot one major commonality: a demand for more.

Delivering on this depends on a digital transformation in networking. This is driven by an open, modular, and scalable network design that allows operators to select the right best-of-breed products for their needs. This is how they'll meet performance requirements. It's the route operators must take to realise the greater network agility and real-time insights required to tackle the pressure points in their specific markets.

Open architecture is the ethos of the adaptive network that's at the heart of Ciena's approach to help our customers scale their networks and meet demand cost effectively.

Looking specifically at emerging technologies like IoT, cloud computing, or AI, how has Ciena transformed its own business model to adopt and employ these technologies globally?

The impact of any new technology comes from how it is integrated, and the change that is made for the benefit of the end user, which is why digital transformation and change management go hand in hand. Ciena has become a company that leads by example with a focus on innovation, taking advantage of emerging technologies in order to better improve the products that serve our customers.

For example, Ciena will become data centre free this year. This means we won't have a corporate data centre anymore. Instead, everything we do will be in the cloud. We're also taking a new approach to our wide area network across the world. By using our own hardware and Blue Planet technology, we will be able to see, inspect, and change traffic across the WAN in real time, adjusting to demand on the fly.

Consider this in the context of the cellular landscape: advances in cloud gaming, live streaming, and the many other use cases that are emerging as a result of commercial 5G roll outs, have changed what's expected from mobile connectivity. It's a prolific adjustment, particularly in Asia Pacific which has become a region of mobility. Getting this right means starting with the user experience and looking at the network changes that must be made to accommodate these use cases. Working from the inside out means we can ensure our products enable our customers to deal with what's coming down the line as new technologies and innovations take hold. TR

> Asia is facing phenomenal growth in mobile data traffic, driven by video-centric entertainment, cloud gaming, and IoT

5G: The Asian Experience

The fourth industrial revolution has arrived, bringing with it a digital cache of untapped potential ranging from artificial intelligence (AI) to virtual reality (VR). Companies, enterprises and institutions across multiple sectors are now gunning to become the first within their industries to adopt, implement and fully utilize these emerging technologies that come with such rapid global digitisation. In addition to AI and VR, the proliferation of new technologies like the Internet of Things (IoT), big data, blockchain and biometrics are just some of the emerging game changers that have taken the world, particularly Asia Pacific, by storm.

Out of all the new technologies that will undoubtedly change our lives, the fifth-generation network or 5G is the most crucial. 5G is essentially the lifeline that connects all emerging technologies, allowing them to work and perform their specific functions seamlessly. Without 5G, we cannot even begin to visualise let alone build a societal ecosystem that allows for the creation of smart cities, the development of telehealth or robotic surgery, machine-type communications and a myriad of other sustainable solutions that can help improve the quality of life for communities around the world.

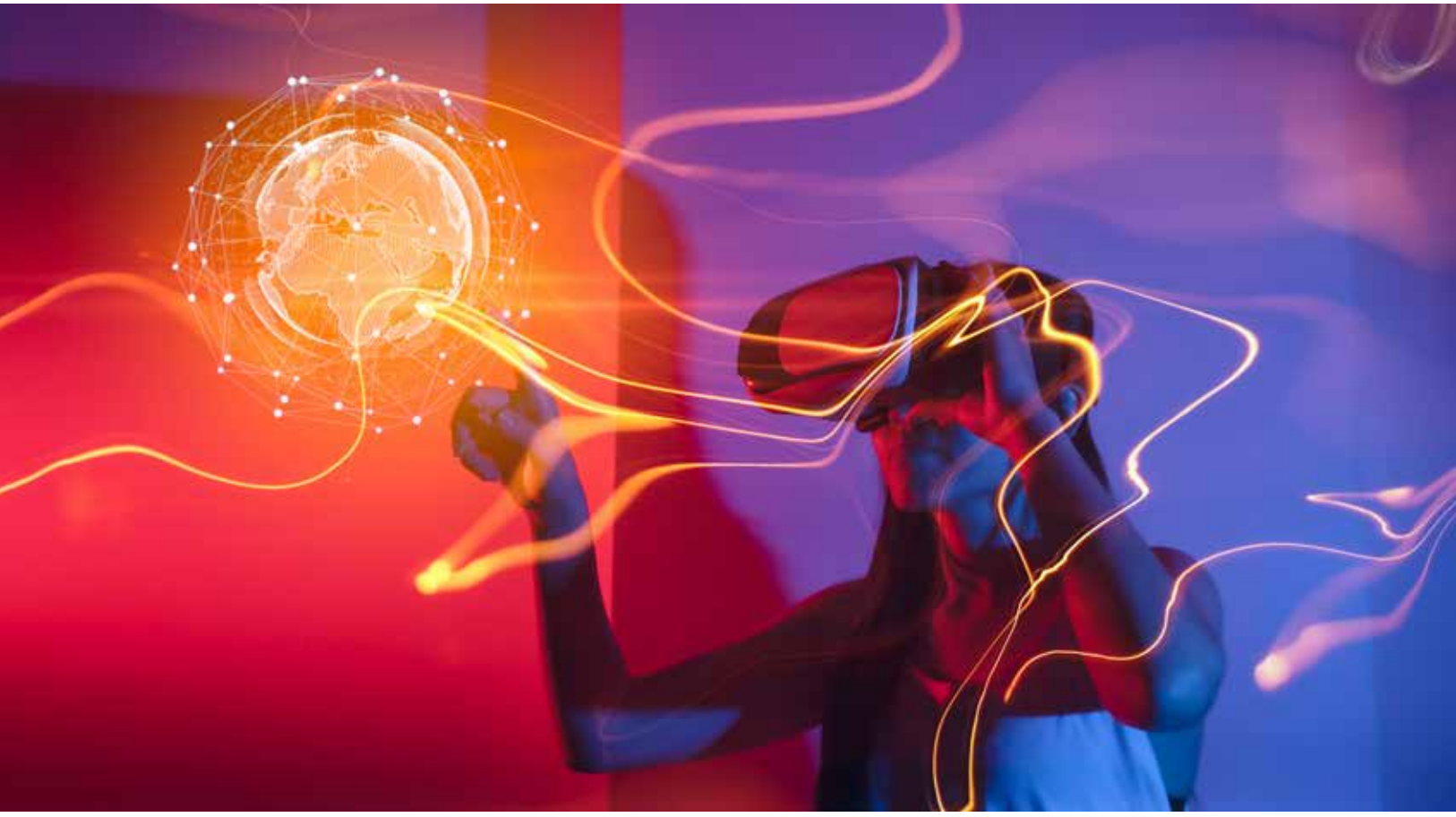
As it stands, 5G will build upon the 4G/LTE networks and thus provide end-users with higher Internet speeds, higher reliability and a much quicker response to information dissemination. These features will inevitably become the bedrock of which future 5G services are able to carry out their individual operations in an efficient and timely manner. The current 4G/LTE networks, while still able to deliver high quality and advanced wireless network services, would not have the capacity to support instantaneous cloud services, communicate with drones and robots, or improve vehicle-to-everything (V2X) services. It is expected that there will be more than 40 billion connected devices by 2025, and 50 billion by 2030, all of which will require a connection with huge capacity. This is where the role of 5G comes into force.

As an evolutionary technology, 5G will be able to do all the things that 4G can do; and it will even do better. With that being said, there's no rush to say goodbye to 4G just yet. It will coexist with 5G well into the 2030s and together they will form the backbone of future mobile networks. As an example, when a connection is established, the device will connect to the both the 4G and 5G networks to provide control signalling and a faster data connection respectively. The eventual deployment of 5G worldwide would mean that users will very soon be able to experience 100 gigabits per second in terms of data speed, which is 1000 times faster than 4G.

When we look at the Asia Pacific region, the 5G frontrunners have already made it clear to the rest of the world that not only do they have the infrastructure to support this new network, but the pace at which it is growing is unprecedented, something we have not seen before with the previous generations of networks. These frontrunners are poised to become leaders in 5G adoption and deployment. As of January 2020, South Korea has already successfully rolled out 5G to 85 cities, with many owing its rapid victory to the country's three carriers who worked closely to bring 5G into the public sphere; SK Telecom, LG Uplus, and KT Corp. The three operators were instrumental in launching the country's first 5G networks in April 2019, which led to a handful of users scrambling to access the new superfast wireless technology. In its efforts to further establish itself as the global leader in 5G, South Korea announced plans to invest $26 billion to build its 5G ecosystem.

In Japan, NTT DOCOMO, the country's largest wireless carrier, has been trialling 5G since 2010 and did an initial pre-commercial launch for the technology in September last year. The operator officially launched 5G services in March 2020, with expectations for 4.1 Gbps in June as the current maximum data rate is at 3.4 Gbps. Rakuten plans to rollout 5G this year and KDDI launched its network on March 26 this year.

> 5G is essentially the lifeline that connects all emerging technologies, allowing them to work and perform their specific functions seamlessly



One of the key players in the 5G race is without question China, where its 5G technology was rolled out in more than 50 cities at the beginning of the year. Prior to this, the country's three major operators, China Mobile, China Telecom and China Unicom had launched 5G networks in late 2019. Based on an assessment conducted by the European Parliament, the Ministry of Internal Affairs and Communications (MIC) of China has promised a whopping $300 million for the growth of 5G and other future technologies.

In spite of its early success, China was faced with an insurmountable public relations crisis when US President Trump issued a trade ban barring US companies from partnering with Chinese tech companies, namely Huawei, as they had been accused of cyber espionage on behalf of the Chinese government. However, no solid proof has ever come to light since. Many industry experts criticised President Trump's decision, stating that the trade ban seems to be part of a much broader issue.

In reality, Huawei is currently one of the strongest players in the 5G ecosystem. It may be that the US is imposing all these restrictions on Huawei as a way to stifle its expansion. Strangely enough, American whistleblower Edward Snowden revealed that there was clear evidence that the US government had been engaged in hacking and spying activities in the cyberspace, as opposed to Huawei's "cyber espionage".

As for India, according to the minister of the Department of Telecommunications, it is set to launch 5G this year. "When the world will rollout 5G in 2020, I believe India will be at par with them," said the minister, Manoj Sinha. In fact, according to Vodafone Idea Limited, one of the country's largest operators, it already began testing 5G in 2017.

In Singapore, it completed its first outdoor pilot, involving Nokia and StarHub, in November 2018. The government has said that 5G will go live in the country this year. The Info-communications Media Development Authority (IMDA) has said that they plan to allocate millimeter bands which will be "sufficient for at least two nationwide 5G networks."

As we have witnessed, 5G has the power to bring about tremendous benefits and opportunities in ways we could only dream of until now. While the Asia Pacific region is recognised as a global player in the development and innovation of 5G technology, it is imperative that the region takes into consideration the plethora of challenges that come with the rapid deployment and commercialisation of 5G. Asian governments need to work together to ensure that a solid 5G ecosystem, complemented by shared collaborative principles, is established for the betterment of society in the future. TR

Cybersecurity: The Southeast Asian dilemma

The 21st century is currently witnessing a technological renaissance unlike anything it has ever experienced before. The proliferation of new technologies like 5G network, Internet of Things (IoT), big data, blockchain and virtual and augmented reality are just some of the emerging game changers that will undoubtedly change our world in more ways than we can imagine. In terms of digital innovation and technological foresight, Asia has proven itself to be at the top of its class. Despite its rapidly growing digital economy, the many advantages that could be reaped by the region may potentially be overshadowed by the rising concerns of cybersecurity threats. In other words, the greater the success of the region's digital economy, the greater the exposure to increasingly harmful cybersecurity breaches.

According to a report by the CNBC, the digital economy of Southeast Asia is predicted to hit US$ 200 billion by 2025. In fact, ASEAN members are more likely to add US$ 1 trillion to its GDP in the next decade or so. However, Southeast Asian nations are more at risk of facing challenges relating to cybercrimes and attacks. This issue could be attributed to a few reasons; firstly, the region, which is made up of emerging economies with differing socio-political landscapes, lack regulations and rules pertaining to data messages or electronic signatures; secondly, no specific legislation exists relating to the protection of consumers, intellectual property, networks or personal data; and finally, there are inadequate or almost no laws that can prosecute cybercrimes in an appropriate manner.

The high rate of internet penetration in the region in the last few years have made it easier for cyberattacks to occur, resulting in system failure and severe data breaches. The internet penetration rate in the Asia Pacific region jumped from 26% in 2010 to almost 50% in 2014. Some of the major cybercriminal activities that are prevalent in this region are software piracy, malware threats, social engineering and financial fraud, among others. Due to its unsecure and relatively weak infrastructure, ASEAN countries- specifically Vietnam, Philippines, Indonesia and Singapore – have become a hubs for the initiation of these attacks. One example of such an incident was the hijacking of two of Vietnam's largest airports in 2016 by a Chinese hacking group known as 1937CN. The group managed to infiltrate the flight information screens and sound systems resulting in the broadcasting of anti-Vietnamese and Philippines slogans.

In Indonesia, cyberattacks are a daily occurrence with more than 50,000 cases and, after Vietnam, the country has a higher chance of being the target of cybersecurity breaches. Between the years 2010 and 2013, Indonesia experienced a staggering 3.9 million cases of cyberattacks and overtook China in terms of severity by the end of 2013.

More recently in 2018, Indonesia suffered 12.9 million cyberattacks, with many industry experts forecasting the inevitable increase of such crimes as the region undergoes digital transformation as part of the fourth industrial revolution. Based on Aon Asia's 2019 Cyber Security Risk report, "the greatest challenge organizations will face is simply keeping up with and staying informed about the evolving cyber risk landscape." This means that companies should do their best in deploying both preventative and remedial security measures as the likelihood of cybersecurity breaches in this day and age are inevitable, and as such, precautions need to be taken.

The regional director for commercial risk solutions at Aon Asia, Andrew Mahony said, "We're looking at companies that collect large amounts of personal customer data and risk

suffering significant losses if their systems go offline…Indonesia will see waves of vulnerabilities and exploits directed at smartphones instead of traditional desktop computers."

In June of 2018, Singapore was dealt with what is now known as "the most serious breach of personal data" in the country's history. The 2018 SingHealth data breach incident resulted in the illegal procurement of non-medical personal information from 1.5 million patients, while records of outpatient dispensed medicines were stolen from 160,000 patients. Several politicians, including Prime Minister Lee Hsien Loong, were also affected as their personal data was equally targeted.

In the era of 5G, it is imperative to protect data security as global interconnectedness becomes more and more of a reality. For ASEAN nations especially, there is an urgent need to develop a robust and impenetrable cybersecurity policy that would be responsible for improving cyber norms within their states. Additionally, collaborative efforts between cybersecurity policy academics and civil society are also needed to support governments working to build these cybersecurity networks. TR

Big Data: Asia's newest socio-economic ally

Out of all the new technologies that will undoubtedly change our lives, Big Data is the most crucial and in-demand field that not only allows us to harness incredible amounts of data at any given time, but helps us collect, curate and analyse specific aspects of that data that can be used to leverage actionable insight and ameliorate real-time decision making challenges. In Asia and the Pacific, organisations have slowly but surely begun venturing into this unchartered territory of data analytics. Although there is still much to do in terms of full-scale implementation and taking advantage of analytics maturity, several Asian countries have already started employing Big Data to oversee social/economic indicators and enhance the distribution of public goods and services.

An example of this is applying Big Data to enable more robust, efficient and accurate data profiling and progress of the United Nations' Sustainable Development Goals (SDG). This initiative was established in September 2015 by the United Nations General Assembly as a way of designing a "blueprint to achieve a better and more sustainable future for all."

In 2017, Bangladesh and the World Bank Group signed a $113 million financing contract to revamp the country's weather forecasting and hydrological information services. This move will greatly improve early disaster warning signals and allow rural communities to gain access to information relating to weather and water uncertainties. For a country like Bangladesh, which has suffered immensely for decades as a result of flash floods, droughts and other natural disasters, this initiative alleviates the burden of dealing with the stress of planning and preparing for uncertain climate changes.

World Bank Country Director for Bangladesh, Bhutan, and Nepal, Qimiao Fan said, "With Bangladesh often exposed to extreme weather events, the lack of reliable forecasting and information on weather can cost lives and hurt the productivity of key sectors, such as agriculture, which contributes to about 16 % of GDP, and employs 45 % of the population. By ensuring reliable and systematic weather and climate information, this project will strengthen disaster preparedness, as well as help farmers better adjust to weather variability at the farm level, and thus improve productivity."

Besides proving to be a valuable asset for predicting and providing detailed analyses for disaster management, Big Data has also found itself incredibly useful when it

comes to examining public opinions and awareness on a specific subject using social media data. In Indonesia, UNICEF has employed Big Data within the context of social media in understanding public misperceptions about vaccines and vaccine-preventable diseases. Misinformation and the spreading of incorrect data has led to severely decreased vaccine coverage and high dropout rates, causing incomplete immunisation of patients which dangerously impacts preventable disease control and eradication efforts. In order to find a solution to this worrying issue, Pulse Lab Jakarta teamed up with the WHO, UNICEF, Ministry of Health and Ministry of National Development Planning to monitor Twitter conversations on immunisation and help public health practitioners gain a clearer insight into public opinion and awareness on the topic.

As such, between January 2012 and December 2013, the project successfully extracted 88,368 relevant tweets posted by the public in the Bahasa Indonesia language. The study not only highlighted the different levels of public concern regarding immunisation, but also allowed analysts to use the filtered real-time information to complement pre-existing knowledge and data on the issue. In addition to immunisation, Pulse Lab Jakarta also organised a similar project that engaged Big Data within a social media framework - the discrimination of women in the workplace. Using the same methodology, the initiative was able to extract relevant Twitter conversations and present analysts with a range of feasibility topics such as perceptions regarding appropriateness, burdens of being working women with children and discriminatory job hiring practices.

No Asian nation better exemplifies the efficient implementation, practice and analysis of Big Data than China. It comes as no surprise that China, with a population of almost 2 billion people and one of the major players in the current technological renaissance, would need Big Data to help manage and organise all aspects of its enormous administrative infrastructure. Many of China's richest companies like Alibaba, Baidu and JD.com are all readily embracing Big Data as a way to engage closely with their customer base and their needs using advanced data analytics. Alibaba has recently created an 800-person data platform division team to analyse competitive strategies and sales, although monetising said data would take some time.

On the other hand, Baidu, also known as China's Google, launched Beijing Big Data Lab which will focus on procuring information and insights from online searches and other services. It would later use this data in multiple industries such as social services, machine learning, healthcare, predictive analysis and others. A clear example of this is Baidu's partnership with the United Nations Development Program (UNDP) to create an e-waste light app that enables end users to better manage the safe and proper disposal of their old or unused electronic equipment.

Partnerships and programs like this not only provide technical and field experts from both sides to formulate and implement solutions using Big Data, but information such as this can potentially drive innovation within a nation and ultimately serve the country's economic and social ecosystem better. TR

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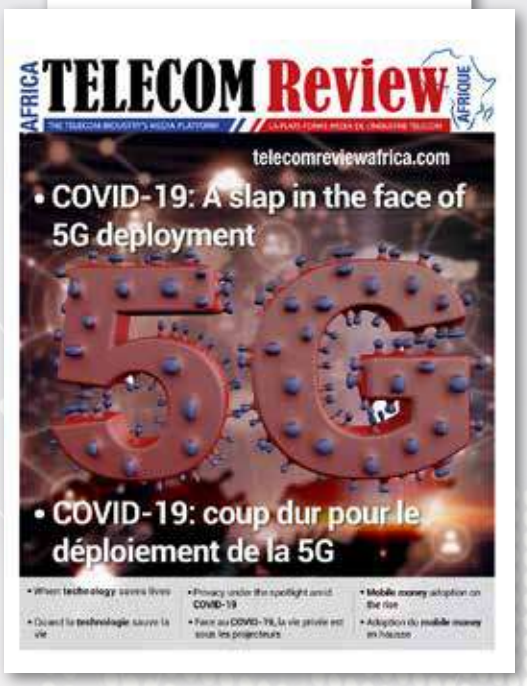

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