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Tech and Transformation:

Indosat Empowers Indonesia Through Digital Innovation

Vikram Sinha,
President Director and CEO
Indosat Ooredoo Hutchison

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ChatGPT Gains Web Browsing Functionality

ChatGPT now has the ability to browse the web for real-time info; these enhanced capabilities are currently available to 'Plus' and 'Enterprise' users, with wider access planned.

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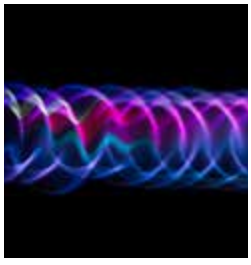

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Vikram Sinha,
President Director and CEO
Indosat Ooredoo Hutchison

Tech and Transformation: Indosat Empowers Indonesia Through Digital Innovation

The telco industry around the world has been undergoing a revolution. In Asia, Indosat Ooredoo Hutchison (IOH or Indosat) is at the forefront of this revolution, transforming from a conventional telco to an innovation-driven technology company. This transition is being led by a series of strategic pillars that aim not just to adapt to the digital age, but also to actively shape and empower the future of Indonesia.

In an exclusive interview with Telecom Review Asia, Vikram Sinha, President Director and CEO, IOH, delves into how IOH supports Indonesia in achieving its full potential which is consistent with the role that the company plays in expanding the digital economy of the country, subsequently driving its development.

What are the key driving forces and strategies guiding IOH's transformation from a traditional telco to an innovation-driven techco?

With the ambition to foster a transformative journey, we at Indosat Ooredoo Hutchison, have set our sights on a greater goal: Empowering Indonesia. The post-merger phase has propelled us into a phase of profound metamorphosis, marking a shift from mere integration to a complete transformation mindset. Our strategies have undergone a comprehensive overhaul, leading us to identify several pillars that have emerged as the cornerstone of our transformation:

The first pillar, 'Empowering Indonesia,' embodies our commitment to serve the burgeoning digital economy of the nation, underscoring our pivotal role in driving its progress.

The second pillar, underscores our dedication to delivering a seamless and exceptional experience for all stakeholders, including partners, employees, and society at large. Our recent establishment of the Indosat Marvelous Xperience (MX) Center in July 2023 stands as a testament to our resolve to cultivate a collaborative environment for the co-creation of innovation and excellence, thereby contributing to the fortification of Indonesia's digital ecosystem.

The third pillar, our innovation engine, highlights our commitment to embracing cutting-edge technologies such as data analytics, AI, and cloud computing; catalyzing a robust investment influx from global technology partners.

Our focus on nurturing the next generation of leaders, equipped with digital proficiencies, represents the fourth pillar, ensuring the perpetuation of our transformational mission and fortifying our competitive edge in an increasingly tech-centric landscape.

Lastly, the spirit of 'Gotong Royong' or an authentic Indonesian term for 'mutual cooperation', has led us to cultivate partnerships with leading global technology giants to

The first pillar, 'Empowering Indonesia,' embodies our commitment to serve the burgeoning digital economy of the nation, underscoring our pivotal role in driving its progress

> One of our biggest post-merger focuses is expanding our network infrastructure to the rural area, including Eastern Indonesia, which promises to unlock a new cohort of digital consumers and local entrepreneurs

work hand-in-hand in unlocking the nation's infinite possibilities. This collaborative spirit was prominently showcased at our recent Empowering Indonesia Forum – a convergence of strategic partners aimed at fostering collaborative initiatives for Indonesia's economic growth.

How is this transition crucial for advancing the growth and development of Indonesia in the coming years?

Indonesia's trajectory towards becoming the world's fourth-largest economy by 2050, as outlined in our 'Empowering Indonesia Report 2023,' highlights the pivotal role our transformational journey can play in the nation's growth. The vast potential for expansion in Indonesia's digital economy, projected to reach IDR 3.2 trillion by 2027, driven by the rapid surge in e-commerce, fintech, mobility, and digital media, necessitates our transformative efforts to bridge the urban-rural digital divide.

Indonesia is not only in Java, Jakarta, or Bali, there are so many potentials outside Java that, right now, we are focusing on. By investing in the expansion of our 4G network and partnering with notable infrastructure and digital service providers, we aim to accelerate the nation's access to connectivity, thus accelerating Indonesia's digital transformation. One of our biggest post-merger focuses is expanding our network infrastructure to the rural area, including Eastern Indonesia, which promises to unlock a new cohort of digital consumers and local entrepreneurs, thereby fostering inclusive growth and development for the community at large.

How is this transformative journey impacting the overall customer experience, with a specific focus on small and medium-sized enterprises and rural communities in Indonesia?

Indosat's transformation journey so far is on-track. We completed the integration of existing sites and decommissioning of redundant coverage sites ahead of plan. Right now, we focus on expanding

our coverage and we have significantly enhanced the overall customer experience post-merger. The marked improvement in customer satisfaction metrics, reflected in the CSAT and NPS scores of IM3 and Tri, is a testament to our relentless efforts in expanding coverage and connectivity.

This enhanced connectivity has facilitated the growth of digital services among the previously underserved rural population, by empowering approximately 60 million unbanked rural residents. Furthermore, our collaborative efforts with global technology leaders attracted significant investment to Indonesia, leading to the wider reach of sustainability programs expansion, hence contributing to the sustainable growth of the digital ecosystem in Indonesia.

What pivotal role does IOH aim to fulfill in the process of empowering Indonesia, and how do you plan to address the digital disparities and bridge the connectivity gaps?
At the heart of our mission lies the empowerment of Indonesia's digital economy through the provision of robust mobile broadband connectivity. Our strategic investments in enhancing network quality and performance serve as the foundation of Indonesia's digital transformation, contributing to the improvement of productivity levels and improved standards of living across the nation.

Aside from our commitment to improve our network footprint across Indonesia. We have been contributing to creating digital talents across the country through IDCamp – an online coding scholarship program. Since 2019, we have been empowering 182.543 digital talents through provided courses. We also partnered with ITU and Cisco to offer a wider range of courses, including cyber security.

Can you share any early signs of success or milestones achieved since IOH embarked on this transition?
Indosat is delighted to share that we reported robust, operational

> At the heart of our mission lies the empowerment of Indonesia's digital economy through the provision of robust mobile broadband connectivity

> Indosat market capitalization has surged, and our share price has experienced a substantial uptake, attesting to our strengthened market position and investor confidence

performance in the first nine months of 2023. This is confirming that we are on track to deliver our post-merger synergy value promise, which is around USD 300-400 million over 4 years. We have sustained our revenue growth momentum with an 8.5% increase YoY to IDR 37.5 trillion and, importantly, our normalized EBITDA is growing more than 2x in revenue, increasing by 21.7% to IDR 17.5 trillion. We have also managed to deliver a consistent net profit of IDR 942 billion this quarter bringing the 9M-23 normalized net profit to IDR 2.2 trillion. This is our 11th consecutive quarter of generating a strong, normalized net profit.

Some of the other highlights for the first nine months of 2023, is our EBITDA margin which increased by 5.1 percentage points to 46.7%, while we have added 0.8 million subscribers compared to last year, with our ARPU growing 2.5% compared to the prior year. Our own app is also seeing good traction as we have seen the number of monthly active users increase by 9 million so far this year.

Indosat market capitalization has surged, and our share price has experienced a substantial uptake, attesting to our strengthened market position and investor confidence. Moreover, we saw growing confidence from our strategic partners to collaborate with us and create bigger values for the business and community.

Our continued growth momentum has been underpinned by our commitment to delivering a marvelous experience and simple, affordable, products to customers, together with the expansion of our network into underserved rural communities, particularly in Eastern Indonesia.

Looking ahead, what are IOH's long-term aspirations and vision regarding digital transformation and its contributions to the empowerment of Indonesia in the years to come?
Our commitment to sustainability

and digital empowerment remains unwavering as we endeavor to extend mobile connectivity across every corner of Indonesia. In conjunction with our CSR (Corporate Social Responsibility) programs focused on women empowerment, digital literacy, and environmental conservation, we aim to foster a comprehensive social impact that transcends mere connectivity.

The expansion of our IDCamp program and the establishment of the Indosat MX Center stands as a testament to our enduring commitment to fostering digital talent and promoting digital innovation. Our steadfast adherence to Environmental, Social, and Governance (ESG) principles serves as the guiding force underlying our long-term vision, ensuring sustainable and responsible growth within Indonesia's telecommunications landscape. TR

> Our steadfast adherence to Environmental, Social, and Governance (ESG) principles serves as the guiding force underlying our long-term vision

Mr. Mar Vin Foo, Experienced expert in designing and consulting for smart cities

Pioneering Smart Cities and Sustainability in Asia

In the rapidly changing world of smart cities and digital transformation, one person is leading the way in innovation, vision and progress. Mr. Mar Vin Foo is an experienced expert in designing and consulting for smart cities. He is making a significant impact with his projects and various entrepreneurial ventures.

In a recent online interview with Telecom Review Asia, Mr. Foo shared insights into his noteworthy projects, his approach to collaborating with international partners and his outlook for a sustainable and interconnected future in Asia.

Cultural Intelligence and Connectivity

Mr. Foo's extensive background in smart city design and consultation has placed him as a leader in the industry. He effectively assembles international teams to execute projects that foster technological advancement and cultural understanding. One of Mr. Foo's key strengths lies in his ability to connect with people from diverse cultural backgrounds. When asked about his approach to working with international partners, he highlighted the importance of empathy and cultural awareness. Understanding the nuances of different cultures, customs and communication styles is essential to building meaningful relationships. Mr. Foo explained, for example, that in Asia, indirect communication is often favored to avoid causing offense, whereas Western counterparts may prefer directness. By adapting to these preferences, Mr. Foo ensures smoother and more effective cross-cultural collaborations.

Asia's rapid urbanization and digital transformation present unique challenges and opportunities. According to Mr. Foo, it's crucial to consider factors such as sustainability, personal wellness and cultural context when undertaking smart city projects. He stressed the importance of recognizing the impact of technological changes on people as well as their roles in these projects. Balancing advice and support with respect for existing routines

is essential for successful digital transformations.

Furthermore, Mr. Foo underscored the critical need for sustainability and environmental consciousness. He called for a comprehensive understanding of the ecosystem, emphasizing the interplay of technology, culture, people, sustainability and personal wellness. He believes that the current climate crisis requires a more thoughtful and responsible approach to technological advancements, ensuring they benefit both society and the planet.

A Diversified Entrepreneur

Mr. Foo's entrepreneurial spirit goes beyond smart cities. His wide-ranging ventures, including a tourism startup, exemplify his adaptability and forward-thinking approach. In the aftermath of the pandemic, he recognized an opportunity to revive the tourism industry while promoting sustainability and environmental awareness. His tourism venture aims to connect people with nature, fostering a deeper appreciation for the environment.

As an entrepreneur and consultant, Mr. Foo is excited about the interconnected future of different industries. He pointed to generative AI as an example of how technology is bridging gaps between traditionally separate fields, such as creative photography and AI-powered image generation. He emphasizes the need for interdisciplinary understanding and encourages feedback from consumers and end-users to continually improve system implementations.

Mr. Foo is committed to raising awareness and knowledge about the smart city sector. He uses platforms like LinkedIn to share his expertise and stories related to sustainability, technology and personal wellness. He believes that these narratives can reach a broad audience and ignite an interest in technology, ultimately bridging the gap between those who are tech-savvy and those who remain less informed.

A Message of Empowerment

Mr. Foo emphasized the power of technology to elevate human consciousness and enhance our lives. He believes that the convenience and

empowerment offered by technology can enable people to pursue their passions and achieve self-actualization. By embracing tech solutions that improve the world and protect our natural resources, he envisions a brighter future for all.

Mr. Foo's extensive experience and holistic approach to smart cities and sustainability make him a trailblazer in the field. His vision for an interconnected and sustainable world in Asia is poised to shape the future of smart cities and digital transformation for generations to come.

"I've been in tech for 20 years, and it has always been my interest to understand human behavior. And again, people form the biggest variable in an equation for success in terms of digital transformation — so by being able to understand tech to apply to operational business use cases.

"That is Marvin Foo's advantage; that is Marvin Foo's value too. I would say, [to] stakeholders [and] partners around the world, we can come together to embark on meaningful projects, including smart cities, to actually make sure that we get everything right, and we make sure every dollar is well spent, and we reap the benefits for everyone to come in future years," he concluded. TR

His vision for an interconnected and sustainable world in Asia is poised to shape the future of smart cities and digital transformation for generations to come

By Brian Lavallée, Senior Director, Submarine Network Solutions, Ciena

Diving Into the Future: The Evolution of Sustainable Submarine Networks

How energy efficiency, reduced carbon footprints and an optimized submarine cable lifecycle contribute to sustainability

Some may think that most of the world's connectivity takes place via satellites — that when you send a text or download a file, there is an intricate web of signals and connections taking place far overhead. In reality, across the globe, more than 400 submarine cables lie on seabeds, carrying over 99% of all intercontinental communications traffic. These submarine cables are the backbone of the Internet, and as more and more of the world demands faster, more reliable connectivity, demand — and utter dependence — on these cables will only grow. In fact, the submarine cable system market in the Asia Pacific (APAC) is expected to grow to US$546.78 million by 2028. Governments across the region are already doubling down on submarine cables. Singapore, for instance, aims to double its submarine cable landing sites by 2023 as part of its Digital Connectivity Blueprint.

But this rapid growth does not come without caveats. For submarine cables to transport data successfully over transpacific routes, optical amplifiers are spaced every 80 kilometers, approximately, to boost optical signal power. Submarine Line Terminal Equipment (SLTE), situated on land, houses modems that transmit and receive information over submarine cable networks. Undersea optical amplifiers and terrestrial SLTE are electrically powered, creating a carbon footprint to be optimized.

Clearly, submarine cables are the vascular network of intercontinental connectivity across the globe. And as the world grows more connected, submarine cable networks will only increase in scale and importance. So, what can be done to ensure this growth happens responsibly and sustainably?

Carbon Footprint Cannot Scale Linearly With Bandwidth Growth

According to TeleGeography, global international bandwidth growth has reached 23% in 2023. In Asia, this growth has been faster than the global average, increasing by 32%. With no Plan B on the horizon to replace submarine cable networks, the industry must continually innovate to meet the unique challenges of submarine networks and their much longer distances. The carbon footprint of submarine cable networks that address this ongoing growth in bandwidth demand simply cannot scale linearly in terms of electrical consumption from social, economic and environmental perspectives. Instead, bandwidth must outpace energy demands, meaning that every submarine cable must provide much more capacity than the energy it consumes.

For the telco industry, this can be addressed from three main angles: energy efficiency, carbon footprint and lifecycle.

1. **Energy Efficiency**

To ensure that global bandwidth growth doesn't linearly scale with the electrical energy required to power submarine networks that carry this telecom traffic, we must "bend the curve," so the incurred carbon footprint grows at a slower rate than its associated bandwidth. However, simply "bending" this curve may not be sufficient if the goal is to reduce the total energy consumed by submarine cable networks. If the energy consumption curve isn't bent at a higher rate than total bandwidth growth, the carbon footprint will continue to increase over time, albeit at a slower pace.

Ongoing SLTE and undersea wet plant technology advances continue unabated, with each new generation providing improved energy efficiency alongside bandwidth improvements to address ongoing growth in demand. New submarine cables based on Spatial Division Multiplexing (SDM) are being deployed, offering significant improvements in electrical energy consumption per transmitted bit by enabling total information-carrying cable capacities well into the hundreds of terabits per second. This capacity is orders of magnitude greater than the first submarine cables based on EDFA optical amplification and DWDM technologies.

2. **Carbon Footprint**

The carbon footprint of any submarine cable network will include the manufacturing, installation, operation, maintenance and retirement lifecycle phases. The operating phase, in particular, involves the ongoing electrical energy consumption of the end-to-end submarine cable network. By using the latest semiconductor technology, significant reductions in electrical energy consumption are achievable.

3. **Lifecycle**

Upgrading existing submarine cables is the best and easiest method to extend their life, and this practice has been happening for over a decade since revolutionary new coherent optical transmission technology was adopted and adapted from terrestrial networks to submarine cable networks. Initially, it allowed submarine cable operators to upgrade existing 10 Gb/s channels to 40 Gb/s channels rapidly and cost-effectively, with no changes required to the existing wet plant. This shift led to massive increases in the total information-carrying capacities of submarine cables that significantly surpassed the original design total capacities based on IMDD (Intensity Modulation Direct Detect) optical transmission technology, which essentially turned light on and off to represent digital ones (light on) and zeros (light off).

The timing of coherent detection optical transmission was perfect because IMDD optical transmission reached its limits — the total submarine cable capacity was fixed just as the Internet adoption rates surged worldwide. This demand would've created undersea network bandwidth bottlenecks. Each new generation of coherent optical transmission technology results in ongoing increases in total submarine cable bandwidth, albeit less and less as we reach the Shannon Capacity Limit. To "sidestep" this limit, new SDM wet plants are being deployed, improving the lifecycle of undersea assets by enabling unprecedented total capacities in the hundreds of terabits per second.

Electrical Energy Consumption: A Critical Design Goal

Continual SLTE innovation has significantly improved the spectral efficiency of submarine cable networks by enabling more capacity over the same submarine fiber. This structure means that to improve spectral and electrical energy efficiency over time, technological innovation must occur in the SLTE. This approach will provide reductions in the cost per transmitted bit and savings in electrical energy per bit for a reduced carbon footprint per bit.

The benefit of continually driving down the electrical energy consumption of submarine cable networks has shifted from reducing operating expenditures around electrical energy consumption to saving the planet by reducing carbon footprints. While both are critically important, the latter demands particular attention given our climate change realities. After all, sustainability is not a nice-to-have; it's a necessity, as the health of our planet depends on it.

There's no "Plan B" for critical submarine network infrastructure because no other known network technology can cost-effectively replace the vast amounts of data submarine cable networks carry between continents on a similar scale. These space-based network constellations will complement, but not replace, submarine cable networks. Consequently, existing submarine cable network technology must continue to evolve. TR

David Turkington, Head of Technology APAC, GSMA

APAC's Dynamic Technology Landscape and Future Trends

During the FutureNet 2023 conference, held on October 18-19 at Marina Bay Sands, Singapore, Telecom Review Asia had the privilege of interviewing David Turkington, the Head of Technology APAC at GSMA. Turkington provided valuable insights into the technology landscape in the Asia-Pacific region, highlighting its diversity in terms of distance, population and technological advancement.

Can you provide an overview of the technology landscape in the APAC region?
The Asia-Pacific region is incredibly diverse in terms of distance, population size and technological progress. Some countries like South Korea, Singapore and Japan are already well ahead in terms of advancement. On the other hand, developing nations such as Bangladesh and Pakistan have ambitious goals. However, the technological playing field is becoming more equal now. It won't be long before everyone catches up, but it requires financial investment. The main challenge for APAC is ensuring that sufficient funding flows in to support network development.

How do you bridge the gap between the farthest areas?
We're currently involved in several studies, one of which focuses on addressing the investment gap in building and utilizing communication networks. This involves ensuring that networks are not only constructed but also effectively used. One notable issue we've identified is the "usage gap" in certain countries where the mobile broadband infrastructure is in place, but people are not making use of it. To tackle this challenge, we're exploring various factors behind it, such as the financial capability of individuals to afford new smartphones for accessing these services, including mobile internet. Our efforts are geared towards developing more affordable phone options and bridging the gap in basic digital skills to increase digital inclusion and to support network operators to enhance their revenue sources, enabling them to further invest in network development. To find out more, you can refer to The State of Mobile Internet Connectivity Report 2023.

What are the key opportunities and challenges in the region?
The key areas of focus are ensuring wide network coverage and making smartphones more affordable. We're also looking at implementing advanced technology solutions, which will initially undergo testing in places like Singapore and South Korea, before being adopted on a larger scale in countries like India and Bangladesh. Over time, these cost-effective technologies will become widespread in networks worldwide. It's worth noting that India, in particular, aims to be a leader in 6G technology. The competitive landscape in this field has evolved significantly, with information being readily accessible to everyone. Additionally, innovations like open RAN are emerging, making it easier for operators to use base stations from various vendors; reducing costs, and allowing for more customization. This opens up exciting opportunities within the industry.

Can you tell us about the role of autonomous operations and how it enables future telcos?
I believe that as networks become more complex, automation becomes necessary to effectively manage this complexity. However, I have concerns about whether we are adding more complexity in order to solve existing complexity. Nonetheless, I believe that automation will simplify tasks and make them more efficient. For instance, repetitive actions like enabling new users on the network can be done with just one click or even non-touch, such as inputting a number with a SIM card. This will make things easier, reduce errors, and enhance security. It will also reduce costs and improve overall efficiency. Automation will allow individuals to accomplish more than what is currently possible. This focus on increasing efficiency is crucial in my opinion.

What emerging technologies do you believe will have the greatest impact in the APAC in the next five years?
In my opinion, network virtualization has a great impact within the region. This is beneficial because it allows for the reuse of standard hardware, which ultimately lowers equipment costs. It also enhances scalability, as we can easily add more servers and instances to accommodate increased traffic. In addition, AI is a hot topic that cannot be ignored. Its impact on the business world will be substantial, not only in terms of technology and mobile networks, but also in industries like banking. AI can be utilized to detect fraud in banking systems or identify leaks in a water utility by monitoring user usage. With the abundant data we can gather, there are still ample opportunities for improved efficiency and drawing meaningful insights through AI to benefit the network. TR

The key areas of focus are ensuring wide network coverage and making smartphones more affordable

Irish Salandanan-Almeida, Chief Privacy Officer, Globe Group

Empowering Customers: How Globe Prioritizes Data Privacy Initiatives

The importance of data privacy has been a significant priority in recent and ongoing technology developments. The implementation of stringent data protection procedures is key as the number of interactions between individuals, organizations and online platforms continues to grow. In the Philippines, the Globe Group has been a pioneer in the enactment of data privacy regulations in accordance with the Data Privacy Act of 2012. In an exclusive interview with Telecom Review Asia, Irish Salandanan-Almeida, chief privacy officer at Globe Group, shared how the company develops and executes data privacy measures while prioritizing the welfare of consumers.

Can you provide an overview of the current data privacy landscape in the Philippines and in Asia?

The Philippines was actually one of the first countries in the ASEAN region to have a dedicated data privacy law, which is the Data Privacy Act of 2012. Starting in 2016, when the implementing rules and regulations of that law were issued, the government started to strictly implement and enforce the law, and the companies had to comply with it.

We might already have a good law in place, but the pandemic and the accelerated shift to digital services also increased the volume and complexity of financial crimes. These are spam and scam messages, such as phishing links and calls from scammers. These fraudulent activities often target our customers, especially those left jobless during the pandemic, and so they are also the most vulnerable to these types of scams.

The government's response was to pass the SIM Registration Act, which requires the registration of all SIM cards, whether they're postpaid or prepaid. The goal is for fraudsters and other cybercriminals to be deterred because they can no longer hide behind the cloak of anonymity. The SIM registration database is absolutely confidential, and the data can only be disclosed upon the issuance of a court order or a subpoena, removing the danger or risk that the data can be used for other purposes. Even internally with Globe employees, it remains absolutely confidential and separate from all other databases.

Globe successfully implemented SIM registration and attained the highest number of registrations, securing our place as the mobile leader in the Philippines.

The privacy regulator in the Philippines, the National Privacy Commission, has also been very active in working with their stakeholders. The government and the private sector are working hand-in-hand to comply with the requirements of the Data Privacy Act. In recent years, the NPC has been releasing circulars on administrative fines for data privacy violations. They are currently working on releasing circulars

on deceptive design patterns [based] on consent and legitimate interest, which would help a lot of companies comply with the Data Privacy Act.

Moreover, Globe is also an active member of the Commission's Data Privacy Council. We regularly participate in public consultations to raise awareness among the different sectors when it comes to data privacy.

How do you ensure that Globe's data protection measures meet regulatory requirements and sustain customers' trust?

We have an awareness campaign under the umbrella of our #MakeITsafePH campaign as well as our digital thumbprint program. The goal of both programs is to educate customers and the Filipino public in general about online safety and how to become responsible digital citizens.

We have developed a book together with Canvas, a non-profit organization that promotes children's literacy through art. We also worked with Google to develop this book, supported by the National Privacy Commission. It's a fun activity book that educates children about the importance of personal information or personal data and what they can do to protect it.

We also believe that increased government and private sector collaboration is critical, so we signed a memorandum of understanding with the NPC to collaborate on awareness efforts. Since the most pressing issue at the moment is really spam, scams and all of these fraudulent schemes, the MoU's primary objective is to raise awareness about fraudulent schemes and how our customers can protect themselves.

Furthermore, we're the only telco to have a stop-spam portal on our Globe website where customers can report spam and scam messages. As soon as our customers report these messages to us, our security operations center, which is open 24/7, receives them. They would then investigate and confirm whether it was indeed a spam or scam message, and block or deactivate the numbers behind it accordingly. If it's from another telco, they report it to the other telcos. Another thing that is unique to Globe is that we block all text messages with clickable links through keyword filters. I think this is something that our customers have been really happy about because it significantly lessened the spam and scam messages they received even before the implementation of the SIM Registration Act.

What are the challenges you've encountered in enforcing these data privacy practices in an ever-changing business landscape?

Because Globe is a telco, we collect tons of customer information on a daily basis, given that we currently have over 90 million customers. The challenge is always to protect this information and comply with the requirements of the law. We developed a privacy and security risk assessment that is very specific to Globe but also in accordance with the requirements of the Data Privacy Act. This includes a privacy impact assessment to make sure that, in all projects and initiatives, Globe is compliant with the law. We also have a security design review, vulnerability assessment and penetration testing that's more focused on the cybersecurity side of all of our platforms and systems.

We go beyond checklist compliance by making sure that, [with] all the projects and programs that involve personal data, Globe adheres to the data privacy principles of transparency, legitimate purpose and proportionality. At Globe, we believe that privacy adds business value, and we try to instill in all of our employees the importance of privacy.

Other companies tend to think that privacy is scary or that it is a showstopper because it will prevent them from collecting customer data. But we've tried to change that type of thinking and let our employees know that it's something that will make our customers want to choose Globe over others and want to trust our company more.

The company is also in the midst of transforming from a telco to a techco or a technology company; the business environment is extremely fast-paced. We have very complex use cases, so we take a policy-based approach rather than a strictly legal approach where everything is black and white, since a lot of the use cases don't fall squarely within the law. We continue to collaborate with the NPC and other stakeholders when we make decisions and when we pursue projects and initiatives. We prioritize our consumers above all, and Globe is really committed to the country's economic recovery despite the pandemic. The company is really pushing to ensure that digital adoption continues and is not hampered by all of these fraudsters or cybercriminals that are trying to erode customer trust and digital services.

What are your goals and vision for Globe's data privacy efforts in the coming years?

We envision the Globe Group to be a leader in data privacy, not just in the Philippines but across the globe. We make sure that we are up to date when it comes to best practices globally. We are also members of the International Association of Privacy Professionals, so we try to stay ahead of the trends in data privacy.

Furthermore, we established a Globe Group Privacy Council back in 2019 with the objective of calibrating privacy and security practices across the Globe Group. The group has been continuously growing. We support our developing portfolio of companies to meet the standards we've set as one Globe Group since some of the privacy and cybersecurity requirements are a bit more challenging to comply with for startups. Globe supports all of the subsidiaries as well.

The council meets quarterly to exchange best practices and to be updated on developments across our industries. The Globe Group currently spans a lot of industries, from telco, which is Globe Telecom, to fintech, health tech and startups, among others.

We are also part of a much larger group — that's the Ayala Group of Companies. This year, Globe was appointed as the chair of the Ayala Group Data Privacy Council. We also meet quarterly to discuss updates aligned with the member company's progress when it comes to compliance, data privacy and sharing use cases. We also discuss how to conduct privacy impact assessments and vendor risk assessments. TR

Frédéric Schepens, CEO, Bayobab

Bayobab. Connecting Africa

Inspired by Africa's 'Tree of Life', Bayobab (formerly MTN GlobalConnect) is committed to providing Africa with next-gen digital solutions across its vast regions. With a foundation rooted in partnerships and a vision marked by ambitious and bold initiatives, Bayobab has successfully merged its rich heritage with its forward-looking aspirations.

Like the roots of the baobab tree that merge to form a single trunk, Bayobab is connecting Africa by converging strategic, global, and local partnerships to work in harmony. Ultimately, Bayobab sees connectivity and possibility.

Bayobab: Transforming Innovation into Business Value

The Bayobab narrative takes inspiration from Africa's majestic Adansonia digitata tree. Just as the baobab tree can grow to monumental sizes and thrive for millennia, the brand embodies a commitment to enduring vision and long-term investments.

Symbolized by the baobab tree, the brand's roots and expansive branches represent the foundational pillars of the business: Bayobab Fibre and Bayobab Communication Platforms. These pillars serve as the bedrock of its operations, propelling it forward with strength and resilience.

Bayobab's influence extends through the delivery of tens of thousands of terabytes of data via its central communication platforms. Bayobab Fibre acts as the digital gateway to Africa, reinforcing its ecosystem by forging connections with GSMs and their extensive subscriber networks. This distinctive business model sets it apart, positioning Bayobab as the exclusive company dedicated to providing digital solutions at both ends of the connectivity spectrum.

Bayobab: Firmly Rooted in Partnership

Collaborations are defining moments, and Bayobab has built its legacy on attracting like-minded partners. It has strategically aligned with global industry leaders, cementing its reputation as a trusted collaborator in the digital landscape.

Bayobab's recent partnership with Africa50, an affiliate of the African Development Bank, is of great significance. The partnership represents a significant investment of up to USD 320 million in the

development of a pan-African terrestrial fibre network known as Project East2West. The initiative intends to roll out proprietary fibre across ten countries from 2023 to 2025, bridging Africa's connectivity gap and promoting inter-regional exchanges, while meeting the rising data demands of its customers.

Bayobab is poised to continue shaping Africa's digital landscape, forging meaningful partnerships, and inspiring creative solutions to further connect the continent.

Bayobab: Transforming Africa's Digital Landscape

Bayobab is increasing its influence across the African continent to strategically position itself as the most significant African carrier on a mission to connect Africa.

This transformation journey mirrors Bayobab's unwavering dedication to achieving the strategic goal of deploying 135,000 kilometers of proprietary fibre. Presently, it has already laid down 112,000 kilometers of fibre and is committed to further investments in advancing this initiative.

To foster stronger connections with stakeholders in various regions, Bayobab has established local offices. In line with its business strategy, it has expanded operations into eight key African nations: Kenya, Ghana, Zambia, Nigeria, Uganda, Côte d'Ivoire, South Africa, and the Central African Republic. Furthermore, each of its FibreCos are actively enhancing their roles to harness distinct business potential within Bayobab's broader expansion strategies.

Bayobab: Strategic Expansion

Bayobab established a significant partnership with the Central African Republic (CAR) government to manage the national fibre infrastructure, securing the CAR PPP License—a substantial achievement. CAR was strategically selected based on the most efficient routing option to establish a full link between East and West Africa, playing a crucial role in expanding existing fibre routes and creating new routes to connect various parts of the continent. Bayobab believes that Africa's connectivity relies on strategic partnerships to foster innovation, expand the African digital economy, and impact growth in the countries where it operates.

This public-private partnership leverages the strengths of the public and private sectors simultaneously, paving the way for the expansion of access to connectivity to underserved populations. The partnership between Bayobab and the CAR Government also plays a key role in enabling one of the Project East2West projected routes.

Bayobab also earned an International Network License in Zambia and obtained a National Long-Distance Operator License in Nigeria. The license empowers Bayobab Zambia to seamlessly transport fibre capacity between neighbouring nations. This supports the company's ability to connect people and businesses, and fuels innovation, collaboration, and economic growth in the region.

This milestone marks a significant breakthrough for Bayobab Zambia, opening new doors and strengthening its position in transforming Zambia into the digital hub of Southern Africa. With a population exceeding 19 million, the connectivity landscape in Zambia continues to undergo significant digital transformations that plays a role in shaping how the country accesses information, conducts business and engages in various aspects of modern life.

Nigeria is regarded as Africa's largest ICT market with about 82% of the continent's telecoms subscribers and 29% of internet usage on the continent. Nigeria's connectivity landscape has undergone remarkable growth, altering how its population accesses information, conducts business and engages globally.

With a population exceeding 200 million, as reported by GSMA Intelligence, the adoption of digital services by governments, businesses, and consumers is fundamentally reshaping daily life in Nigeria. Mobile technology is playing an instrumental role in the nation's economy, where mobile broadband is the predominant means of internet access, unlocking a realm of new possibilities. The ensuing surge in digital services, ranging from the realms of mobile financial solutions to dynamic e-learning platforms, has ushered in a revolution, influencing the way Nigerians engage with essential services, consequently fuelling an escalated demand for data. Bayobab Nigeria will play a pivotal role in fortifying the nation's digital infrastructure.

Bayobab is on a mission to connect Africa while creating business value through strategic partnerships and deliberate expansion plans, significantly shaping the evolution of Africa's digital landscape. TR

> Like the roots of the baobab tree that merge to form a single trunk, Bayobab is connecting Africa by converging strategic, global, and local partnerships to work in harmony

Sam Keys-Toyer, Head of Business and Portfolio Development, Managed Network Services, Ericsson

From Data-Driven Solutions to Intent-Based Operations

During the FutureNet 2023 conference, held at Marina Bay Sands in Singapore on October 18-19, 2023, Telecom Review Asia had the privilege of interviewing Sam Keys-Toyer, Head of Business and Portfolio Development, Managed Network Services at Ericsson, to delve into the key challenges facing service providers in implementing data-driven solutions in their telecom networks. Keys-Toyer offered valuable insights into Ericsson's forward-thinking approach and its contributions to the evolving landscape of telecom networks.

What are the key challenges that service providers face when implementing data-driven solutions in their telecom networks?

The key challenge that providers face when implementing data-driven solutions in their telecom networks is the need to focus on their data strategy and consider how their business processes need to evolve to achieve desired digital business outcomes. Up-Skilling the organization in telecoms network engineering and data proficiency is important in this process. Once these foundational steps are in place, providers can explore techniques such as automation, machine learning, advanced AI, and analytics to enhance their processes and become fully data-driven. Based on previous experiences with service providers globally, we can say that this approach can lead to achieving results relatively quickly.

How does Ericsson employ data-driven strategies to enhance energy efficiency and sustainability in increasingly data-intensive telecom networks?

There are various ways that the company focuses on energy efficiency across its products and services. One example is virtual drive testing, where Ericsson can optimize networks without physically driving around and wasting fuel. We also have energy-saving features in our products and solutions and use AI to shut down unnecessary services and optimize the usage of power across the radio site without impacting customer experience. Ericsson are using data-driven processes to remotely fix issues and prevent unnecessary site maintenance trips, saving time and energy. This approach has seen a global reduction of site visits by 12% in the last year and taking into account all the initiatives described above, can save in the range of 5 tons of carbon dioxide per site, per year, offering significant energy-saving opportunities.

As the industry moves towards 5G and beyond, how does Ericsson support its clients in managing next generation networks?

Ericsson offers a range of operational support systems (OSS) products and network management products for 5G environments. Ericsson also provide services for rolling out, deploying, planning, optimizing, operating and maintaining 5G networks. The focus is on digitalization and using data effectively to improve accuracy, efficiency, and speed of service delivery. The adoption of 5G is faster in Asia compared to other areas, making it a trailblazer in monetizing and utilizing 5G in industry 4.0. Ericsson aims to support this by offering services that bring capabilities to market faster, ensuring a superior customer experience, and lowering the cost of ownership. Ericsson also prioritizes sustainability by reducing its carbon footprint in network environments and manufacturing equipment.

What is Ericsson's vision for intent-based operations?

Intent-based and autonomous networks are crucial for the evolution of network infrastructure. The purpose of intents is to simplify how services are defined and operated on a network. The goal is to have machine autonomy in managing networks, especially as new services are introduced in a 5G environment. This will help manage service complexity and variation. The use of intents is part of the autonomous journey towards a simplified and closed-loop environment, allowing for almost zero-touch or autonomous operation of services. However, the challenge lies in ensuring that machine reasoning can replicate human capabilities in managing conflicts and compromises. Building confidence in network operations will be a gradual process.

In the context of operational transformation, how does the shift from data-driven to intent-driven operations improve the telecom network's ability to address varying service demands within 'The Matrix' of telecom networks?

The main difference between a data-driven approach and intent-based operations is that the former allows for autonomy and works well in scenarios with limited-service variation and geographical differences. However, intent-based operations aim to handle more service variation and guarantee specific service level agreements (SLAs), especially in the business-to-consumer context. In intent-based operations, customers may require services for a short period of time, such as a television company needing quality service for a specific event. Intent-based operations involves translating customer requirements into a specific service template in the network, while ensuring it does not conflict with other services in the same area. This approach relies on machine reasoning to manage conflicts and automatically predict demands and manage the relevant resources. TR

“Intent-based and autonomous networks are crucial for the evolution of network infrastructure. The purpose of intents is to simplify how services are defined and operated on a network”

AR and VR and the New Dawn in Asia-Pacific Tourism

The Asia-Pacific region is welcoming innovative technologies to improve cultural experiences for travelers and tourists. Augmented Reality (AR) and Virtual Reality (VR) are being utilized to showcase the diverse cultures of this region, creating immersive and enriching tourism experiences.

Asia Pacific's varied landscapes, fascinating history and vibrant social fabric have long attracted travelers in search of extraordinary and memorable experiences. The integration of new technologies into the travel industry is revolutionizing the way tourists interact with these colorful destinations, resulting in a more immersive and culturally enriching experience.

Understanding the Impact of AR and VR in Asia-Pacific

The development of AR and VR technologies has played a significant role in satisfying these touristic expectations. Such technologies offer a unique combination of information and experience that can greatly enhance a tourist's journey.

For instance, Google has developed a solution to overcome language barriers with its Google Translate features. The company has created an AR app that can instantly translate printed text in 27 languages. This app can be used to assist with ordering food in restaurants or navigating a city like a local. And this is just the beginning of such advancements in this field. There are now more tools available, including AR tourism apps, that provide interactive and real-time guides to enhance the travel experience.

Whether it's an AR-guided historical tour or a VR-powered virtual exploration of natural wonders, travelers now have the opportunity to connect with their surroundings on a deeper level. As they explore the diverse cultures of the Asia-Pacific region, they can enjoy a variety of applications and experiences that provide a rich understanding of the history, art and heritage of each destination.

The Power of AR and VR in Cultural Immersion

As the above examples demonstrate, by showcasing their immersive capabilities, AR and VR technologies have already had a significant impact on the tourism industry. These technologies have proven to be effective in breaking down language barriers and enhancing cultural immersion. And this is just the start.

By wearing AR glasses or VR headsets, tourists can experience a complete transformation of their surroundings. They can explore ancient temples as if they were architects, or witness historical figures come to life — even participate in interactive cultural ceremonies.

Countries like Japan, South Korea and India have been at the forefront of adopting these technologies to revitalize their heritage sites, museums and galleries. This has resulted in a new and captivating way for tourists to engage with these nations' pasts.

The integration of AR and VR into the tourism industry has important economic consequences as well. According to an article by TechSci Research, these technologies not only enhance cultural experiences but also contribute to the growth of revenue in the tourism sector. Travelers are willing to spend more on such immersive experiences, leading both local businesses and governments to invest in AR and VR to attract more tourists and further stimulate the economy.

Challenges and Future Prospects

AR and VR have the potential to greatly transform tourism in the Asia-Pacific region. However, there are some challenges that must be addressed, such as accessibility, affordability and data security. Fortunately, the tourism industry is resilient and adaptable and sees such obstacles not as hindrances but as opportunities for further growth.

The future of AR and VR in Asia-Pacific tourism looks promising. According to Global Market Estimates, the research and consulting firm, the market is expected to experience exponential growth in the years to come.

With travelers driven evermore by technology and always eager to explore new destinations and cultures, AR and VR are becoming essential for enhancing such experiences and explorations in all corners of the globe.

The combination of AR and VR technologies with tourism in the Asia-Pacific region is allowing travelers to connect with destinations more deeply. This integration is improving cultural experiences, boosting economic growth and transforming the way our collective stories are told. With continuing advancements, the merging of technology and travel will continue to grow as an exhilarating adventure — more captivating and enlightening than ever. TR

“AR and VR have the potential to greatly transform tourism in the Asia-Pacific region. However, there are some challenges that must be addressed, such as accessibility, affordability and data security”

Empowering Indonesia: The Impacts of a Successful Merger

Telecom Review Asia recently presented its first-ever webinar titled "Empowering Indonesia: The Impacts of a Successful Merger," which brought together distinguished speakers to shed light on the groundbreaking merger of Ooredoo Group and CK Hutchison to form Indosat Ooredoo Hutchison, along with the resulting impact on the dynamic Indonesian telco sector.

Abhishek Srivastava, principal and head of TMT, Arthur D. Little Southeast Asia, served as moderator for the panel, which featured notable speakers Vikram Sinha, President Director & CEO, Indosat Ooredoo Hutchison, and Shaun Collins, executive chairman, CCS Insight, who both provided their expertise and unique and insightful perspectives.

To set the context, Vikram provided some background about Indosat being a well-established brand in Indonesia with a history spanning 56 years. Notably, it was the first company to connect Indonesia to the rest of the world.

Indosat Ooredoo Hutchison (IOH) was formed in January 2022 through a successful merger. Since its inception, the company has seen much progress, including a market valuation increase to $5.1–5.2 billion. More significantly, it has prioritized sustainability and contributed to the country's medium- and long-term growth.

Key Opportunities and Investment Prospects

The first question highlighted how Indonesia is an optimal place to witness such a merger because of the current nature of the country's market, which is one of the largest and most diverse in the world.

Collins pointed out that in any market, scale sells, and the company's influence grows with size. This strategic advantage allows companies to build a tapestry of technologies that benefit the company and the nation, providing above-average returns on investment.

Since 5G is relatively new, Indosat and the Indonesian market have tremendous prospects. Collins highlighted that IOH's operation and client base are large enough to capitalize on 5G technology, propositions and use cases.

Vikram noted that achieving success frequently depends on being in the right location at the right moment. The role of a telco with scale, sustainability and a dedication to providing assistance to the nation becomes very essential. Looking from a global perspective, Indonesia is well positioned to be one of the top 10 economies by the year 2030, driven mostly by rural Indonesia. In the next four years, it is anticipated that there will be 21 million new first-time internet users in rural Indonesia alone.

He further invited investors and partners to investigate the ways in which technology might be utilized to address genuine concerns and ultimately aid people in the country. With the appropriate mindset, this long-term benefit would be considerable. Because of its significant customer base, Indosat is in an advantageous position to navigate this opportunity by efficiently addressing the needs of its customers.

Effects on the Digital Landscape

When asked about the positive effects the merger has for the country's digital landscape, Vikram highlighted that their primary objective has always been to improve the lives of all Indonesians, which is evident in the post-merger observations.

The average revenue per user (ARPU) has been a crucial indicator that demonstrates the influence of the merger, among other things. Following the completion of the merger, the ARPU increased from 8% to 15%. This, in turn, has been a contributing factor to the rise in revenue within the sector. The market had been expanding at a slow pace of 1-2% annually during the last five years before the merger took place. Looking ahead, a compound annual growth rate (CAGR) of five to 6% is expected, which is in line with the robust expansion of the GDP.

Moving beyond the merger and considering the bigger picture, IOH sees the possibilities offered by technologies such as 5G. But there is a significant amount of opportunity in 4G optimization as well. The company is focusing on the construction of rural networks and infrastructure with the goal of ensuring reliable connectivity.

Challenges in Wake of Merger

IOH's merger might have been finalized earlier than expected, but it is not without its challenges. Asked about the hurdles telcos go through during mergers, Collins provided a world view wherein mergers across the globe are marked by challenges, particularly when integrating two large companies.

He explained that mergers can be seen in two dimensions: internal and external. He confided that internal factors may be more important. Combining two large, successful companies with established cultures and delivery methodologies is difficult. The issue is greater in Indonesia, as the people have distinct cultures. Cultural, methodological, and consumer alignments are key to such successful company mergers, which unite two possibly quite distinct techniques under a shared name and objective. The internal job includes developing the organization's identity and tackling simple but important concerns like brand delivery, distribution system management, and tariff policies.

Factors for a Successful Merger

For the fourth question, Vikram was asked about the indicators that contributed to the success of the merger, to which he responded that telcos must balance customer retention and synergy value during a merger. These worries stem from prior mergers that caused consumer losses and early financial hardships.

When faced with these obstacles, Vikram reminded himself about the company's commitment to its customers. This underscored to him the value of people and culture, which are sometimes forgotten when putting so much focus on things other than people. Vikram further emphasized that a merger is more than a financial transaction; it's an opportunity to impact the culture itself.

Pioneering Collaborative Strategies

When asked about IOH's pioneering strategies in their digital transformation journey and their alignment with the "Empowering Indonesia" mission, Vikram revealed that the concept for these strategies emerged during his earlier days while he was dedicated to empowering the youth in Indonesia.

This idea, deeply meaningful to him, was inspired by his experiences in rural Indonesia and is rooted in village culture. It underscores the strength of collective support to achieve more collectively and resonates with Indonesian culture. Vikram and his family, during the challenges of the COVID-19 pandemic in 2020, exemplified this philosophy by extending their help beyond their immediate circle.

Their goal is to collaborate with like-minded partners who share their principles, with the aim of creating a mutually beneficial and profitable partnership. They expect their partners to treat them fairly and contribute to Indonesia, unlocking the full potential of the country.

Vikram emphasized the importance of scale in making a significant impact and achieving the full potential of this vision, expressing his excitement toward this meaningful journey.

Fostering Innovation, Bridging the Digital Divide

In response to the question about how telcos can continue to enhance connectivity and foster innovation, particularly in underserved areas, Collins highlighted the global digital divide as a significant concern. He emphasized ongoing efforts aimed at addressing this issue through the utilization of various technologies and financing options, aligning with the UN's Sustainable Development Goals.

Collins further pointed out that connectivity technologies have evolved significantly with advancements in 5G, 4G, fiber and satellite technologies.

These advancements have extended high-quality broadband and connectivity services to remote regions within Indonesia. He stressed the importance of fostering innovation in network deployment to raise awareness of the transformative potential of telecommunications and internet access, with a focus on creating comprehensive ecosystems that provide an enhanced user experience.

When serving underserved areas, Collins highlighted the need to leverage technology to solve real-world problems, aiming to cater to all 175 million Indonesians through a mix of such technologies, including 4G and satellites. Collaboration with like-minded partners was deemed essential, with a focus on achieving the right unit economics for sustainable growth. He underlined that the scope goes beyond mere connectivity and includes digital upskilling, addressing the digital talent gap and ensuring that the benefits of the digital transformation are accessible to all individuals.

IOH's Vision for Expanding Connectivity and Social Impact

Next up was a question about IOH's future initiatives for expanding its presence and creating a meaningful social impact. Vikram emphasized the company's primary focus on providing exceptional connectivity experiences, not only in urban areas but also in remote regions. Their strategy prioritizes sustaining industry growth by building a solid foundation in essentials like efficient distribution, cost management and operational efficiency.

Financial prudence is seen as key to enabling investments in telecom capital expenditures. Vikram underlined the pivotal role of innovation in their approach, supported by global partners with various innovation labs in Silicon Valley and Jakarta, which foster partnerships to address real challenges.

He further shared their ambitious goal of achieving US$1 billion in digital revenue, constituting a significant part of their total revenue — a target of 15-20% by 2026. Their aim is to form partnerships that deliver value to both the company and Indonesia at large.

Vikram also emphasized the importance of incorporating fiber into their larger strategy, particularly in developed nations where aggressive implementation is feasible. Fiber, he noted, ensures a consistent and reliable broadband experience, and he observed that global operators are increasingly adopting it.

Vikram pointed out that spectrum availability and its efficient usage are game-changers, allowing for innovative approaches to the delivery of connectivity. Their approach encompasses a blend of fiber and fixed wireless access tailored to meet specific regional requirements, ultimately ensuring a seamless transition for customers as they switch between various connectivity solutions.

The company's overarching focus, Vikram explained, is delivering marvelous experience by guaranteeing the seamless operation of technology in the background — achieving the right technology mix to cater to the diverse needs of a country like Indonesia.

Key Trends Shaping Digital Transformation in Indonesia

Looking ahead, Collins highlighted several key trends that will contribute to the advancement of digital transformation in Indonesia. He emphasized the importance of strategic partnerships with entities offering additional value, including cloud services, security and government collaborations, to fully unlock the potential of 5G networks and ensure a return on investment.

Collins underscored the significance of collaboration and scale in the industry, stating that larger organizations are better equipped to negotiate and collaborate with industry leaders, ultimately offering value to partners.

He also pointed out that flexibility and agility are paramount in adapting to the rapidly evolving telecommunications landscape, which is being driven by technologies like machine learning and IoT. This evolution is leading to the emergence of innovative technologies such as open RAN and core virtualization.

The convergence of computing and connectivity was dually noted as a significant trend, with Collins emphasizing the importance of making the right technology choices. He also stressed that sustainability remains a top priority, as large telcos have a significant economic and environmental impact. Therefore, a responsible approach to long-term goals, along with a focus on people integration and learning from past experiences, is critical for success in this ever-evolving industry.

Poll Questions

To cap off the webinar, Moderator Abhishek Srivastava posed four poll questions to the viewers, and the panelists gave their takes on each topic.

The audience was first asked what they thought was most essential for a successful merger. 50% responded that "customer experience management" is most important, 24% saw "strong leadership" as most vital and 13% held that "network integration" and "integrating workplace culture" are the most important factors for a merger to be successful.

For the second question, the audience was asked to choose which area is vital to digital transformation. The results showed 34% agreeing that having a strong cloud infrastructure is essential. A third question was about which aspects telcos should focus on to improve brand image, in which 78% of the audience answered "improved customer service and coverage," while the remaining 22% answered "sustainable practices."

The last question focused on the initiative Indonesia has to take in order to boost its digital economy. The poll results showed that 82% think "expanding coverage to underserved areas" should be the main priority, while 12% believe that Indonesia should "invest more in 5G." The remaining 6% think that Indonesia should "advance digital literacy." TR

Ethical Hacking Booming in the Indian Subcontinent

The Indian subcontinent appears to be the epicenter of ethical hacking, a profession whereby hackers are hired by organizations to hunt for vulnerabilities in their IT systems.

The Ethical Hacking Pioneer: Bugcrowd

US-based company, Bugcrowd, operates an online platform through which it matches ethical hackers with clients seeking to have their systems probed. The company claims to have around 650,000 hackers on the platform.

Bugcrowd was founded in Australia in 2012 but moved its headquarters to the US, San Francisco, and is now supported by several venture capitalists. Core to the company's operations is its Security Knowledge Platform which matches hackers with customers. When a client matches with a hacker through Bugcrowd, they agree to a fee structure for each vulnerability discovered, based on its severity.

Recently, Bugcrowd conducted a survey of its hacker community and released a report titled "Inside the Mind of a Hacker." According to the report, the top five countries represented in its hacker community, in order, are India, Bangladesh, the United States, Pakistan, and Nepal. Most of its hackers are young with 57 percent between the ages of 18 and 24, with only two percent being over 45.

The company's CEO, Dave Gerry, conveyed during a press conference in Melbourne, which was held to coincide with the Australian Cyber Conference, that hackers in the Bugcrowd community have a wide spectrum of involvement. He said, "Some are doing it on nights and weekends and earning a few thousand dollars a year, all the way up to folks that are pulling in close to a million or over a million dollars a year."

The Value of Crowdsourced Ethical Hacking

Dave Fairman, Chief Information Officer (CIO) for APAC at the cybersecurity company Netskope and an advisor to the Bugcrowd board, whose company is also a Bugcrowd customer, addressed the press conference. He highlighted the value of crowdsourced ethical hacking as "the ability to be able to build out a capability that has literally thousands of analysts or hackers actively probing your systems to identify vulnerabilities."

He added: "In a technology company, in a financial institution that's undergoing an extensive digital transformation, it's very, very hard to keep pace and identify every vulnerability. To build an internal capability, a traditional pen testing team, a thorough vulnerability management function is really, really tough. And you have limited budget, you have limited resources. A platform like Bugcrowd allows you to scale at pace extremely cost efficiently."

Do Financial Incentives Serve as a Motivation for Bugcrowd Hackers?

One client, Everest VPN, made headlines when it offered a 100,000 USD reward to any hacker who could find vulnerabilities in its VPN server that would result in leaking the real IP addresses of clients or the ability to monitor user traffic. At the time, in August 2022, it was the highest reward offered through Bugcrowd.

However, of the hackers responding to Bugcrowd's survey, 75 percent identified non-financial factors as their main motivation to hack. Four percent said their income was much better than expected and 23 percent, slightly better.

Bugcrowd Ethical Hacker Demographics

The Bugcrowd hacker community is almost entirely male with only four percent identifying as female. This figure has decreased since 2020 when a similar survey found the figure to be six percent.

Only five percent of hackers are under 18 but this number has doubled in a year and Bugcrowd expects the figure to keep rising, partly as a result of increased accessibility to hacking resources, with a report stating that, "Using internet resources to learn how to hack has never been easier."

Bugcrowd itself is a provider of such resources and says they are an avenue through which many hackers join the Bugcrowd community. It operates the Bugcrowd University, which offers free online training in ethical hacking techniques. TR

By Stuart Corner

> According to the report, the top five countries represented in its hacker community, in order, are India, Bangladesh, the United States, Pakistan, and Nepal.

Huawei Ensures High-speed Railway Safety and Efficiency in Indonesia

Indonesia has officially entered the high-speed railway era with the launch of The WHOOSH, Indonesia's Jakarta–Bandung high-speed railway. The railway cuts Jakarta-Bandung travel time from 3.5 hours to 40 minutes, boosting economic development along the route. Huawei has partnered with China Railway Signal & Communication (CRSC) and China Telecom to build a dedicated railway network for the WHOOSH which provides reliable technical support for intelligent, safe and efficient train operations through real-time train communications, control and dispatching.

The WHOOSH Leverages Huawei's Advanced Technology

This first high-speed railway in Southeast Asia, which may reach 350 km/h, spans 142.3 kilometers between Indonesia's capital, Jakarta, and tourist destination, Bandung. This marks the first project beyond China to utilize China's high-speed railway system, encompassing all components of the industry value chain.

The trains are equipped with the Chinese Train Control System Level 3 (CTCS-3). The train control system needs a stable, dependable, dedicated communications network with high security, huge bandwidth, and simple O&M due to the trains' high speed and short departure intervals. This ensures train safety, efficiency and speed.

Lai Chaosen, Vice President of Huawei Indonesia, explained that WHOOSH's train-to-ground wireless network leverages Huawei's well-established technology and advanced interleaving techniques to ensure seamless coverage. The network ensures robust train control signal transmission and intelligent scheduling with 99.99% availability.

The data network uses Huawei's next-generation data communications equipment, which guarantees 100% secure networks through native hard pipes. Every link is protected by redundancy. Each redundancy switchover can be completed within just 35 ms.

The WHOOSH Pioneers China's Global Rail Expansion Strategy

Liu Jieping, CRSC's Deputy Chief Engineer of the Jakarta–Bandung Project, explained that the launch of the WHOOSH represents a major landmark in China's global expansion strategy for high-speed railways. The train-to-ground wireless network, transmission network, data network and other system solutions provided by Huawei have built a high-quality, dedicated, communications network for the WHOOSH, and provided reliable technical support for safe and efficient train operations.

ZTE Unveils Game-Changing ZXA10 C600E

ZTE Corporation, a global leader in information and communication technology solutions, has introduced the ZXA10 C600E, a new Tbit-level deterministic all-optical access platform in Paris, France. This platform is expected to drive innovation in FTTx services and contribute to the growth of global optical fiber technology.

Designed for Large-scale Energy Efficiency

The ZXA10 C600E is designed for large-scale 50G PON deployment and offers ultra-high bandwidth, determinism, openness, and energy efficiency. It is compatible with line cards from the ZXA10 C600/C650/C620 series, making network deployment and resource allocation easier. With an impressive 1Tbps bandwidth per slot, the ZXA10 C600E delivers 2.5 times the industry average.

This high bandwidth capacity allows for non-blocking forwarding of 50G PON, 10G PON, and GPON Combo services, and enables a smooth transition from GPON to 10G PON and even 50G PON. The ZXA10 C600E utilizes an IP+TDM dual-plane architecture, which ensures precise handling of general IP packets and guarantees deterministic latency and jitter.

Energy efficiency is a priority for the ZXA10 C600E, achieved through a combination of multi-level measures, traffic prediction and technical optimization. These efforts result in reduced energy consumption, contributing to the development of sustainable FTTx networks.

Harnessing Low-latency Technologies

It incorporates innovative hard pipe slicing and low-latency technologies, providing deterministic bandwidth, latency, and jitter for enterprise campuses. The ZXA10 C600E embraces openness by using the standard NETCONF/YANG protocol, which supports the management and interconnection of third-party SDN controllers and EMS. It also facilitates SDN and NFV for SDN evolution and virtualization deployment.

ZTE: A Technological Innovation Leader

ZTE is a technical leader in the optical access field and is dedicated to enhancing its capabilities, driving technological innovation, and providing high-quality solutions, products, and services to customers worldwide. ZTE's FTTx solutions have been successfully deployed by over 300 operators in more than 100 countries, and the company holds the second position in global market share for FTTx products, according to Dell'Oro Group.

Huawei, du Unveil World's First 5.5G Villa

At the 2023 Global Mobile Broadband Forum (MBBF), the global tech company Huawei, in collaboration with du, from Emirates Integrated Telecommunications Company (EITC), unveiled the ground-breaking world's first 5G Advanced (5G-A) demonstration villa, an archetype for the future smart home living powered by a staggering10Gbps networks.

Early in March this year, both entities signed an MOU centered on 5G-A technological innovation, application exploration and ecosystem development. This latest reveal stands as a testament to their joint innovation prowess.

The 5G-A villa epitomizes the seamless integration of cutting-edge technologies, offering an unparalleled smart home experience enriched with applications such as naked-eye 3D and XR. As consumers increasingly crave superior experiences, this inspires the evolution of content and applications, subsequently amplifying the demand on network capabilities. To satiate these growing needs, carriers find themselves compelled to amplify their home networks to a remarkable 10Gbps.

Speaking at the launch, Fahad Al Hassawi, the CEO of du commented, "From the beginning of the 5G era, fixed wireless access (FWA) has been a transformative catalyst, empowering us to deliver cutting-edge solutions to our valued customers. As pioneers, we at du are honored to pave the way with such novel innovations. Our enduring partnership with Huawei has been fruitful consistently, and with the introduction of FWA2, we are poised to redefine the boundaries of user experience, offering our subscribers unparalleled internet connectivity indoors."

Echoing this sentiment, Li Peng, Huawei's corporate senior vice president and president of the company's Carrier BG, remarked that "Huawei is excited to launch the 5G-A powered villa at the Home of the Future. The showcase offers a first-hand look at the infinite possibilities that 5G-Advanced technology will bring to future homes and the better network experience that 5G-A will offer mobile users. It is the result of du's continuous pursuit of a better digital experience. This achievement is only the beginning. Moving forward, Huawei will continually support du in its effort to build the best 5G networks, explore the commercial use of 5G-Advanced networks, while championing du's leadership in this transformative era."

5G-A villa sheds light on the boundless potential that deterministic experience technology heralds for the households of tomorrow. Harnessing Huawei's innovative FWA² solution, it illustrates how, in the 5G era, FWA became an operator's powerhouse tool for rapid user expansion. As we transition to 5G-A/5.5G, the FWA² solution, encompassing FWA Pro, FWA Lite, and FWA Biz, promises unparalleled services for discerning customers. Specifically, FWA Pro is engineered to support a phenomenal rate of 10Gbps, thus reimagining the smart home living and unlocking vast business opportunities.

Satellite Technology Empowers Remote Schools in New Zealand

Network for Learning (N4L) has partnered with 2degrees, which was commissioned by the Ministry of Education, to launch the Satellite for Schools program in remote areas of New Zealand, with the goal of reinventing digital learning in the country's most distant schools and kura.

The Satellite for Schools program provides qualified schools and kura with fast and reliable internet connectivity using satellite technology, which addresses the challenges faced by these schools and subsequently improves students' access to digital learning.

As part of N4L's managed network, schools also have access to fully managed, fully funded safety and cybersecurity assistance from N4L's skilled staff. N4L can help keep schools, staff and ākonga safer online by providing filtering, firewalls and DDoS protection, as well as email security and segregated networks.

Larrie Moore, CEO of N4L, said, "All ākonga, no matter where they are or what school they attend, should have access to safer and more reliable internet. This is critical for ensuring young people across Aotearoa have equitable opportunities for learning so they can reach their full potential. This is not only a right but an enabler for educational success. That's why we're doing the hard mahi on the Satellite for Schools program."

In July, the program began with the connection of Okains Bay School on the Banks Peninsula in the Christchurch region. Over 30 other schools in the North and South Islands have been connected to the program since then, with many more scheduled in the near future.

Emma-Kate Greer, chief corporate affairs officer at 2degrees, expressed excitement in their partnership with the Satellite for Schools program, saying, "2degrees is proud to partner on the Satellite for Schools program. Satellite for Schools is a fantastic initiative that's enabling schools and kura in remote areas to have what many of us take for granted every day."

Spark Acquires Adroit to Expand Environmental Monitoring Solutions

Spark New Zealand has signed a conditional agreement to acquire all remaining shares in leading environmental internet of things (IoT) provider Adroit, enhancing its ability to support New Zealand businesses in achieving productivity and sustainability through technology.

Mark Beder, Spark customer director – enterprise and government, noted that the investment shows the company's commitment to investing in high-tech solutions to help New Zealand businesses adapt to an inflationary environment and transition to a low-carbon economy.

"Business and public sector organizations are facing a lot of challenges right now, from escalating costs to labor constraints and the need to reduce environmental impacts. IoT technology enables solutions that address many of these issues, allowing businesses to capture data on the physical and natural environments around them and using that data to inform better decision making. This acquisition will further grow our presence in the market and provide environmental monitoring solutions at scale to meet this increasing demand," Mr. Beder stated.

Over the past few years, Spark has been impressed by Adroit's strong product portfolio and effective delivery of real-time environmental monitoring solutions to New Zealand clients. Adroit has been developing IoT-based real-time environmental monitoring solutions for construction, agribusiness, aquaculture, municipalities and infrastructure. The company also provides insights that improve operational decision-making and meet compliance reporting obligations beyond environmental impact monitoring.

Meanwhile, Spark IoT solutions — collectively monitoring building sites, natural water sources, business equipment, power, water meters and more — have notably reached 1.5 million connections this month.

Blair Stewart, CEO of Adroit, noted that the company has observed an increasing demand for environmental monitoring since businesses became more aware of the benefits and capabilities of such technologies.

"Spark's investment in Adroit last year enabled us to work together to meet customer demand while allowing Adroit to continue to operate as a specialist player. This is the right time for Adroit to join Spark. Both our businesses are passionate about working with customers to create innovative solutions that deliver more sustainable outcomes. Being able to combine the sector expertise, innovation and capability of Adroit with Spark's scale end-to-end offering and strategic focus will be of real benefit for our customers and our people and accelerate Adroit's growth in this exciting market." explained Mr. Stewart.

MEASAT Empowers 600 Remote Schools With High-Speed Satellite Broadband

MEASAT, Malaysia's rural broadband service provider, has announced that it is now connecting nearly 600 school sites in remote areas across the country through its high-speed wireless satellite broadband service, CONNECTme NOW.

This achievement aligns with MEASAT's commitment to improving access to connectivity for education, particularly in underserved rural communities. CONNECTme NOW is a high-speed Wi-Fi hotspot service designed for public use in areas of Malaysia that lack adequate internet access. It allows users to connect to the internet with minimal barriers through competitively priced prepaid access codes. This service does not require long-term contracts and offers more affordable access without high upfront fees.

CONNECTme NOW is particularly beneficial for locations with limited or no terrestrial connectivity. For school sites, it provides fair access and reduces costs per school. The CONNECTme NOW service can allocate bandwidth on demand, ensuring that schools of any size can easily scale up their internet usage without experiencing bandwidth congestion.

The service offers download speeds of up to 100 Mbps per location, benefiting both teachers and students. If a school exceeds its allocated quota, additional bandwidth can be purchased on a per-user basis to meet individual consumption needs.

MEASAT's 24/7 Network Management Center and local distributor network provide support for the CONNECTme NOW service.

HKT Joins e-HKD Pilot Program

HKT Payment was recently part of a cross-industry consortium in the Hong Kong Monetary Authority (HKMA) e-HKD Pilot Program. As an extension of this involvement, the company has invited innovative enterprises from different fields to participate in the "tokenized property-backed secured lending with ring-fenced usage" use case to test the hypothetical e-HKD loan apparatus and provide input to the HKMA.

In this use case, the user interacts with cross-industry consortium participants. User property is tokenized and used to apply for a ring-fenced secured loan. HKT's hypothetical e-HKD wallet pays merchants in healthcare, travel, education and e-commerce with the loan using its programmability.

If the hypothetical e-HKD loan in the use case were to be ring-fenced, this might help enhance credit evaluation and give the user more personalized offers, which would be beneficial to both consumers and merchants.

Ring-fencing the hypothetical e-HKD loan in the use case may help improve credit assessment and provide the user with more personalized offers, again benefiting both consumers and merchants alike.

Monita Leung, CEO, Digital Ventures, HKT, noted, "Consistently at the forefront of technology, HKT, through HKT payment and HKT merchant services, has advocated the development of fintech and the digital economy by supporting the government's Consumption Voucher Scheme, the HKMA's Faster Payment System (FPS) and the recent e-HKD Pilot Program. We strive to collaborate with members of different industries to embrace and apply fintech and explore more payment possibilities. In the event that the HKMA confirms the implementation of e-HKD in [the] future, HKT will be in a position to offer timely support for merchants and broaden the realm of e-HKD payment."

HKT Merchant Services is dedicated to providing innovative one-stop payment services to merchants as well as small and medium-sized businesses. These services include the smart POS system, which supports numerous mainstream payment acceptance methods and complete FPS payment solutions.

Vietnam to Dismantle 2G Networks by 2023, Prioritizing 4G and 5G

Vietnam is planning to phase out its 2G network services by December 2023 in order to develop more advanced telecommunication technologies. The Authority of Telecommunications, under the Ministry of Information and Communications (MIC), has held meetings with telecom service providers in Vietnam, who have committed to disabling 2G-only devices by the end of this year.

The 2G mobile network, which was first introduced in Vietnam in 1993, has become outdated and is unable to meet the growing demands of users or keep up with the advancements in telco services. The complete switch-off is intended to optimize frequency reserves for the development of more modern telecommunication technologies, such as 4G and 5G networks.

The MIC has also provided guidance to telco service providers on creating roadmaps and plans for discontinuing 2G services and assisting users in transitioning to 4G and 5G.

According to data from service providers, there were over 26 million 2G mobile subscriptions at the beginning of 2023, accounting for 20% of the total 126 million mobile subscriptions nationwide. However, this number has decreased to around 23 million as of August this year.

With the shutdown, the MIC aims to reduce the number of 2G mobile subscriptions to approximately 6 million, which is less than 5% of the total, by the end of 2023. The goal is to completely shut down 2G services in 2024. This move follows the footsteps of other countries like Japan in 2011, Singapore in 2017 and China in 2021, which have already phased out their 2G networks.

According to the Global Mobile Suppliers Association, as of October 2022, 142 telco service providers in 56 countries and territories have made plans to discontinue 2G and 3G networks, with 51 of them already shutting down 2G services.

Professor Peter Sachsenmeier, a Fellow of German National Academy of Science and Engineering

Harnessing 5G's Potential: A Call for Stakeholder Collaboration

With regards to the slow roll out of 5G in the European Union (EU) and the transition to 5.5G impacting industries and societies at large, Professor Peter Sachsenmeier, a Fellow of German National Academy of Science and Engineering, shared with Telecom Review his insights during Huawei's Global Mobile Broadband Forum (MBBF) 2023.

When asked about the implications for moving towards Industry 4.0 and the completion of the EU's Digital Decade goals from the relatively slow roll out of 5G, Professor Sachsenmeier pointed out three typical stakeholders who have to work together in realizing the potential of 5G, as well as the evolutionary step towards 5.5G.

"With 5G, we have a new tool. It's an enabler, but it doesn't do magic. You can't wave 5G and then hope that something happens. You have to work on it."

To feel the difference between 5G/5.5G and the previous generations, providers, service creators and the users must work together in developing applications that use the capabilities of the enhanced network.

Defining the stakeholders, providers either offer public 5G service or a company or location-specific 5G private service. On the other hand, service creators are those who build different kinds of things into their work depending on the necessity. Lastly, users consist of both business users or end customers.

In the slow corporate environment, when dealing with a legacy system and then introducing a new system, "unbelievable time and money" are added to the whole process. The professor highlighted the fact that people have running systems for what they do, and find it difficult to transition to something new.

"Grappling with a transition to a more digital existence, they find these digital business models a terrible challenge."

In Europe's scenario, medium-sized companies are challenged to become more digital, and they don't know what it means.

"It's our task to make sure that companies understand and have examples of what we mean to go into more digital world and then if they want to more tightly pack their processes in real-time, with more precise location and network capacity, then 5G and 5.5G are very good answers."

5G-Advanced: Meeting the Demands of Real-World Applications

To the general public, the difference between 5G and 5G-Advanced is not distinct. But when we consider the progress from 2019, the year when 5G was introduced, the transition in the span of four years has been remarkable.

"I think the transition to 5G will be felt, especially if 5G isn't only a technology built on top of existing 4G networks," explained Professor Sachsenmeier.

In IT and communications, the development of self driving cars is evident. This is one of the use cases presented by the professor benefiting from the innovative features of 5G such as lower latency, faster transmission speeds, precise localization and increased capacity.

In every second of a self-driving car's journey, there's a data burst, which, in reality, is beyond the capability of today's data centers to handle. This data burst is driven by in-vehicle data, gathered by modern sensors as well as the communication among other vehicles on the road.

Professor Sachsenmeier rationalized that in 4G, GPS is used, and it has a tendency to become vague. Citing a [self-driving] car's displacement and latency, that can cause an accident, "in 5G-Advanced, we are trying to get to a localization difference of 10 centimeters."

Considering roughly 300,000 cars communicating every second, "we have to think much harder in terms of what's now called edge computing." Edge computing means that a lot of the decision making is taken by sensors, much nearer to the car.

As per the professor, 5G-Advanced still has its limitations such as geographical reach and penetration, but the key in making it work is urging the three stakeholders to create real-world applications.

"From my own technology and working biography, there is a tremendous charm in developing a technology and to fall in love with that technology. The reality is that without the other two stakeholders, that technology is nothing."

The ecosystem is important for the second category – the people who create the services – if we consider services in a very broad way. But customers remain as the most important part.

"In every technology, the best testimonials are from customers. And the most credible testimonials are from customers who tell you about the mistake, and then we rectify the mistake, to serve them better," concluded Professor Sachsenmeier. TR

"To feel the difference between 5G/5.5G and the previous generations, providers, service creators and the users must work together in developing applications that use the capabilities of the enhanced network"

Managing Overload:

How to Effectively Face a Deluge of Big Data

As technology becomes more widely accessible worldwide, copious amounts of data are produced every day. We may find ourselves empowered with the countless possibilities with which to use this data, but sometimes it can be overwhelming when data flows so continuously.

The flood of information can be referred to as "data overload," and it has inevitably become a part of our daily lives. As we struggle with the overabundance of data, the consequences — both positive and negative — are evident in a variety of aspects across industries and businesses.

A study by Oracle and New York Times best-selling author Seth Stephens-Davidowitz revealed that people appear to be drowning in an immense amount of data. The study, which surveyed over 14,000 people in 17 countries, showed the overwhelming concern shared by the majority of respondents: the difficulty of managing the deluge of data, which affects both professional performance and personal well-being.

According to the study, 86% of the people surveyed in Asia Pacific believe that the increase in data volume has turned decision-making into a complex puzzle, complicating matters in previously unimagined ways. Moreover, difficulties in coming up with decisions regarding such an influx of data are not rare occurrences; they are a daily burden for 61% of participants.

Chris Chelliah, senior vice president, technology and customer strategy at Oracle Japan and Asia Pacific, explained, "As businesses expand to serve customers in new ways, the number of data inputs required to get the full picture expands too. Business leaders that make critical decisions ignore that data at their own risk."

While data is a significant tool, it also offers some challenges. Thirty-three percent of the respondents admitted to being unsure about which facts or sources to trust. Even more concerning is the discovery that 71% have completely abandoned a choice at some point because of the sheer volume of data. This should be taken seriously since it could lead to missed opportunities and excessive spending.

Recognizing these challenges is the beginning of finding solutions for them. Companies must have complete trust in their data. Oracle's autonomous data warehouse solves this by providing not only data but also a dependable, always-available data assistant enhanced with machine learning and analytics. Forth Smart, a Thai FinTech firm, is a perfect illustration of how Oracle technology was used to streamline operations.

Cloud computing solutions like Amazon Web Services, Azure and Google Cloud can also provide scalable solutions that can adapt to changing data needs. Organizations may manage the flood of data more efficiently and effectively by using such platforms.

Data lakes and warehouses serve as central repositories for storing and managing massive volumes of organized and unstructured data. A data lake allows enterprises to store raw, unprocessed data, whereas a data warehouse is intended for analytics and reporting. Combining the two enables companies to take a holistic approach to data storage, ensuring accessibility and efficiency. Storage costs, however, might become more prohibitive as data continues to grow. By putting data in a more compact format, compression techniques minimize physical storage needs. This could also eliminate redundant copies of data, saving storage capacity even further. These approaches not only cut expenses but also speed up data retrieval.

Data security and compliance should also be considered when managing large amounts of data because big data often contains sensitive information. Encryption, both in transit and at rest, guarantees that data stays private. Access restrictions and user authentication procedures provide an additional degree of security by restricting access to only authorized individuals. It is equally important to have a strong data governance architecture to ensure compliance with industry requirements and corporate rules. This involves identifying data ownership, putting in place data quality standards and keeping a clear audit trail. Adhering to these standards not only reduces regulatory risks but also promotes a culture of responsible data handling.

Effectively managing the challenges of having big data may differ from company to company. Organizations must take a strategic approach that is geared to their particular demands and growth paths. Companies that proactively address these difficulties will not only benefit from the potential of big data for informed decision-making but will also propel themselves as leaders in the data-driven future. TR

"The flood of information can be referred to as "data overload," and it has inevitably become a part of our daily lives"

The Rise of Hybrid Cloud: A Combined Approach for Best Cloud Solutions

The term "hybrid cloud" refers to using a combination of different cloud computing environments to run applications and store data. This combined model is a much-sought-after and serviceable alternative to the cloud choices to date. In fact, the hybrid cloud model is anticipated to experience unprecedented growth, rising at a compound annual growth rate (CAGR) of 22.8% in the telecom industry until 2030.

Until recently, businesses had to choose between two types of clouds: private clouds and public clouds.

A private cloud is a computing environment in which all computing resources, including servers, storage and networking infrastructure, are used solely by one company or organization. Private clouds can be established within a company's own data centers or data centers operated by a cloud service provider (CSP). Only people from this organization are granted access to its specific cloud services and data.

As the name implies, public clouds are instead open to the public and thus shared among multiple users who access and use the services on a pay-as-you-go basis. These public services are available to anyone with an internet connection.

The Role of Hybrid Cloud in Telecom Infrastructure

The hybrid cloud approach in telecommunications holds that all sensitive data that needs extra security, such as personally identifiable information (PII), billing and payment data, and access credentials, is stored in a private cloud. Telecom companies can then utilize public clouds to store less sensitive data because the latter are more adaptable and scalable in the modern world.

For telecom companies, hybrid cloud solutions have several significant benefits that address various facets of data management and business operations:

No vendor lock-in

Telecom companies can utilize the best services from various cloud providers without being dependent on a single vendor. With the flexibility the hybrid cloud offers, these companies can select the most ideal solutions for their respective needs. This fosters innovation and adaptability throughout their business practices.

Lower overall costs

Adopting the hybrid cloud creates new opportunities for cost savings. A company can continue to benefit from the cloud's scalability and flexibility while also maintaining control over its space. It avoids having to pay for any solutions that it doesn't specifically need while still receiving notable advantages. A hybrid cloud strategy guarantees resource efficiency while upholding high standards of data protection.

Improved scalability and flexibility

Telcos can easily manage a variety of workloads, such as handling unexpected traffic spikes or seasonal changes, because they have the flexibility to scale resources depending on demand. Although enterprises don't typically switch their workloads between cloud providers, they do appreciate the security of being able to do so while choosing particular services from different providers to optimize performance.

Elevated security and data control

Telecom businesses can better manage data agility and improve their overall security posture by controlling data access and storage locations.

With a hybrid cloud model, businesses can combine the power of a public cloud with the security of a private cloud. While it will likely still be necessary to transfer data stored in a private environment to the public cloud for analytics, applications and other purposes, strong encryption techniques can be used to guarantee this data is kept as secure as possible.

With the rise of hybrid cloud computing, telecom businesses are welcoming the ability to seamlessly manage sensitive data security while relying on the increased flexibility and performance that the combined technology brings. After years of choosing exclusively between public and private clouds, the hybrid cloud approach may finally offer the best of both worlds. TR

With a hybrid cloud model, businesses can combine the power of a public cloud with the security of a private cloud.

Leading the Way: How Asia Pacific Drives Public Cloud Growth Worldwide

Organizations around the world have been seeking more efficient, scalable and cost-effective ways to handle the increasing demand for information technology as it continues to evolve. Public cloud computing has emerged as a breakthrough in transforming how organizations and businesses deal with data and applications.

The public cloud serves as an alternative to traditional on-premises IT infrastructures. Public cloud computing consists of third-party providers providing scalable, on-demand IT services to customers via a network connection. It is frequently considered utility computing, in which computing capabilities are given to customers as needed.

In recent years, Asia Pacific has been leading in the adoption of public cloud services (PCS). A recent report by the International Data Corporation shows the expanding market for public cloud services in the region. According to IDC's Worldwide Semiannual Public

Cloud Services Tracker for 2H22, the PCS market in Asia Pacific, excluding Japan and China (APeJC), reached an outstanding $32.5 billion in 2022, representing a year-on-year increase of 25.3%.

The software as a service (SaaS) market maintained its lead, accounting for more than 60% of the entire PCS market share. This segment has proven to be adaptable and simple to implement. The true standout of the year, however, was platform as a service (PaaS), which, although accounting for less than 15% of the entire PCS market share, achieved 45.1% YoY growth. The surge in demand for artificial intelligence platforms, data management software and application platforms fueled the exponential increase of PaaS.

The causes of this growth in Asia lie in the ongoing shift towards digital business models. Businesses are turning to PCS to reduce time-to-market, build data-driven decision-making models, customize and reinvent services, and engage consumers in more dynamic ways. Meanwhile, security and compliance, which were formerly important issues in PCS adoption, have been set aside. Organizations have realized that the public cloud environment may often be more secure and cost-effective than traditional on-premises arrangements.

Global certifications, including industry-specific compliances, have enhanced the security credentials of major PCS providers. This has accelerated PCS implementation, especially in regulated businesses. One example would be in the digital banking sector, where several virtual and traditional banks have resorted to PCS to establish digital banking services while meeting regulatory standards. As a result, finding cloud service providers who adhere to worldwide security standards and laws has become a critical consideration in selecting a vendor.

A lot of factors motivate enterprises to move from on-premises facilities to the public cloud. Among these are diverse workload needs, financial concerns, decreased maintenance costs and enhanced redundancy possibilities. The migration procedure begins with picking a cloud provider and deciding whether to migrate offline or online.

Because of its speed and cost-effectiveness, offline migration, which involves the physical transfer of data using portable devices, is preferred for large data volumes. Online migration over a network connection is appropriate for enterprises with limited data transfer requirements.

The public cloud services market is expected to further grow in the coming years. According to recent Synergy Research Group data, business expenditure on cloud infrastructure services globally reached $65 billion in the second quarter of 2023, a considerable increase of $10 billion over the same time the previous year. Global YoY growth reached 18% over this three-month period, somewhat lower than the previous quarter's 19% and 20% in the fourth quarter of 2022. However, expenditure increased by 3% in Q2 2023 compared to Q1, representing a similar quarter-on-quarter growth rate as the previous year.

Asia Pacific is a significant driver of this growth. Australia, China, India and South Korea recorded YoY expenditure growth rates of over 20% in the second quarter, outpacing worldwide market growth during the same time. These countries have emerged as critical cloud investment engines, demonstrating a high demand for cloud products and services.

According to IDC, the top five public cloud service providers in the region, including Amazon Web Services (AWS), Google, Microsoft, Salesforce and SAP, dominated more than 40% of the market in 2022. Notably, Chinese vendors such as Alibaba Group and Huawei are advancing into Southeast Asia, focusing largely on the infrastructure as a service (IaaS) market but also providing PaaS and SaaS solutions.

Looking ahead, the IDC predicts the global economic situation may have some minor impacts on the PCS market. However, when initiating large-scale cloud initiatives, organizations should focus more on cost efficiency while exercising diligence and care. Automation will take center stage, with technologies such as serverless computing, robotic process automation software and AI/ML tools being used to optimize business and IT operations while lowering costs.

With all these factors in place, the public cloud is poised to continue its growth in the Asia-Pacific region and its precedence around the globe. TR

Public cloud computing consists of third-party providers providing scalable, on-demand IT services to customers via a network connection

China Telecom and ZTE Launch 5G NTN Marine Network

China Telecom, ZTE and SpaceIoT have achieved the first deployment of a 5G non-terrestrial network (NTN) in a marine setting. The successful deployment took place in Zhoushan, Zhejiang Province, an archipelago of islands at the southern mouth of Hangzhou Bay.

This milestone allows for satellite-ground interaction and data transmission in various marine scenarios, enabling real-time monitoring of marine water quality, temperature, and humidity, as well as emergency rescue operations on uninhabited islands.

The system utilizes China's Tiantong mobile communication satellite, along with NTN 5G base stations and terminals, adhering to international standards specified in Release 17 from 3GPP. In marine water quality monitoring, 5G NTN-enabled buoys collect data such as dissolved oxygen levels, water temperature, total dissolved solids (TDS), pH values and location information.

This data is transmitted through 5G NTN networks to a cloud platform for real-time monitoring and analysis. In the uninhabited island monitoring scenario, temperature and humidity data are transmitted to the service platform using 5G NTN IoT terminals for analysis. Additionally, emergency rescue simulations can be conducted using 5G NTN satellite messenger terminals.

A 5G NTN terminal can autonomously transmit location information, and a mobile phone can connect to it via Bluetooth for voice and rescue messages. While still in its early stages, the goal of 5G NTN technology is to seamlessly integrate cellular and satellite communication systems, providing network coverage for sea and remote mountainous areas.

It can meet various application needs, such as short messages, IoT and positioning, and effectively address natural disasters like floods, earthquakes and typhoons.

Nokia and Cybernet Partner to Revolutionize Connectivity in Pakistan

Nokia and Pakistan's largest fixed-line provider, Cybernet, launched the country's first 600Gbps per wavelength DWDM network today. This network lets Cybernet create a high-capacity, durable network that can cater to even the most demanding clients. This new optical network connects Cybernet's key metro sites and increases network capacity to meet Pakistan's expanding consumer and enterprise demand for fast, high-quality internet services.

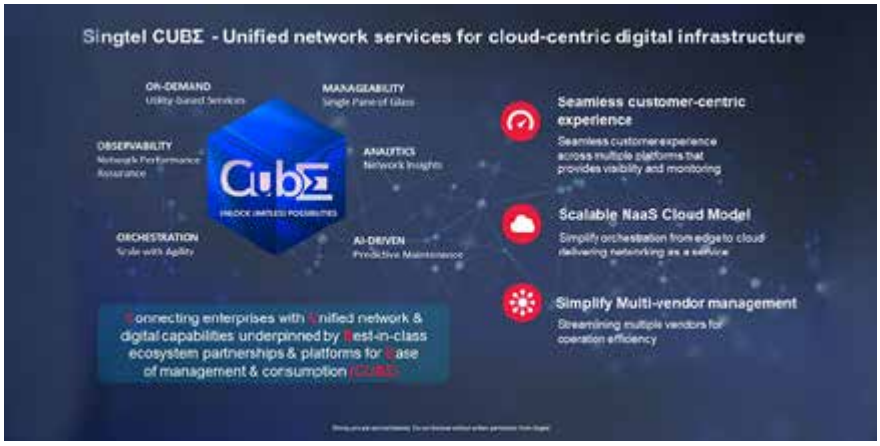
Cybernet is offering its advanced IXP platform powered by the Nokia 7750 SR and 7250 IXR routers to its global peering community members through its international points of presence (POPs) in MC-1 in Barka, Oman; MRS-2 in Marseille, France; SmartHub in Fujairah, UAE; and SG1 in Singapore. This platform maximizes connectivity capacity for present and future demands. Internet, EVPN and MPLS services with high QoS are available at Cybernet's international POPs.

"Using Nokia's innovative in-house PSE-Vs chipset with super-coherent optical engines allows us to connect our main sites while also giving us headroom to grow our capacity efficiently and cost-effectively. Through our partnership with Nokia, we can meet our customers' increasing demand for the best connectivity services while also enabling them to benefit from the latest innovations within optical technology," explained Maroof Ali Shahani, chief operating officer of Cybernet.

Cybernet worked with Nokia to construct a future-proof optical network capable of over 600 Gbps per lambda to ensure its clients can access its high-speed services. This boosts the speed and capacity of its national metro network. Cybernet can increase its network capacity to 28 Tbs using Nokia's PSS 1830 optical transport platform, servicing Pakistani broadband and corporate clients.

Furthermore, Cybernet successfully deployed Nokia's flexgrid-based integrated ROADM architecture. This implementation helps the company optimize and expand its optical network and improves operational efficiency with Nokia WaveSuite, allowing for low latency, high quality and a better user experience for customers.

Singtel Unveils Singtel CUBΣ to Transform Digital Infrastructure



Singtel has launched Singtel CUBΣ, a unified suite of network solutions and services to revolutionize business digital infrastructure. Singtel CUBΣ uses a Network-as-a-Service (NaaS) model to simplify service subscription and administration across different suppliers via a single digital interface. This comprehensive solution helps businesses operate smarter and more efficiently.

Mr. Lim Seng Kong, managing director, Enterprise, Singtel Singapore, stressed the need for digital infrastructure flexibility for the digital transformation of organizations. He noted that Singtel CUBΣ simplifies business connection management from edge to cloud with a singular solution.

"With Singtel CUBΣ, our customers can seamlessly access an ecosystem of best-in-class solutions and providers, review and scale up their network services rapidly and dynamically, in a matter of minutes, through a single touchpoint. This NaaS approach to enterprise networking will set the right foundation for future innovation opportunities as enterprises seek to build a more robust and effective digital infrastructure."

According to IDC's Network as a Service report, 80% of global decision-makers understand digital infrastructure's importance in achieving corporate goals. The research also indicates that using technologies and partners to bridge skills shortages and plan technology rollout to adapt to the emerging digital economy may save organizations up to 15% in operating expenses.

Enterprises may have more control over cloud-based, SD WAN and managed network services with Singtel CUBΣ. On-demand, usage-based pricing in NaaS reduces upfront capital expenditure and boosts efficiency and cost savings.

Self-service features and centralized management make it easy for organizations to administer subscription services on the site. This simplifies virtualized network deployment and speeds failure detection, isolation and service restoration using AI, automation and predictive analytics.

Surbana Jurong's focus on delivering advanced solutions for the creation of sustainable and liveable spaces requires the adoption of new technologies like those offered within Singtel CUBΣ.

Robi Launches Interactive Business Messaging in Bangladesh

Robi Axiata Limited (Robi), the leading digital service provider in Bangladesh, has deployed Rich Business Messaging (RBM), a Google messaging service that lets businesses send rich, interactive messages to consumers—a first in the country.

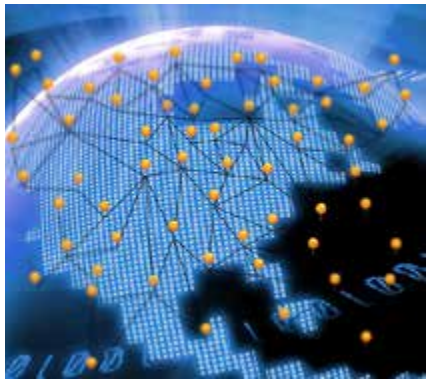
RBM messages may be more interesting than SMS messages since they can incorporate text, photos, videos, buttons and other interactive components. Customers are more likely to read RBM messages than SMS messages due to their visual appeal.

By providing interactive messaging, product catalogs and seamless appointment booking, RBM helps businesses connect with customers more personally. Businesses may improve customer service by providing real-time communication channels.

Robi's managing director and CEO, Rajeev Sethi, expressed his excitement for the launch, stating, "Compared to basic SMS messages, Google RBM elevates communication to a whole new level with the use of dynamic visual support. With the highest penetration of smartphone devices (60%+) in the industry, Robi is in a commanding position to truly revolutionize the way businesses communicate with their customers through the introduction of RBM service. We are immensely proud to be the first mobile operator in Bangladesh to offer this uniquely innovative service."

The carrier has to verify the sender, making RBM a secure platform. Therefore, clients are unlikely to fall victim to digital fraud. Additionally, it gives data on how successfully RBM serves the organizations using it. Currently, RBM is only available to Android users using Google messaging.

Softbank Unveils IoT Initiative Across 19 APAC Markets



SoftBank Corp., the telecommunications subsidiary of SoftBank Group Corp., has announced plans to expand its global IoT business in the Asia-Pacific (APAC) region starting in October 2023.

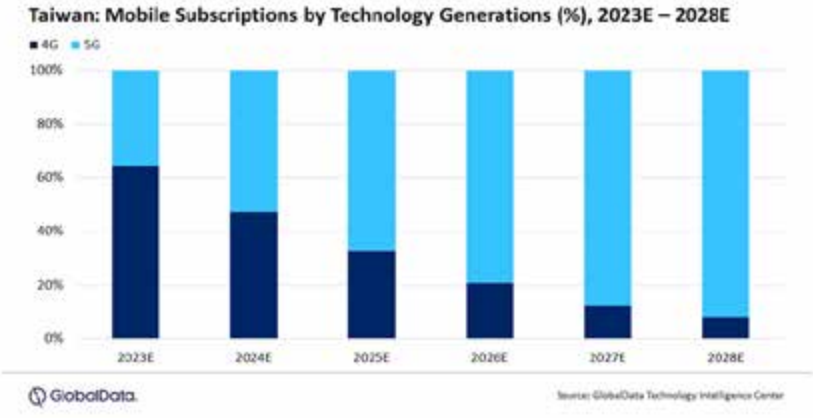
This expansion will cover 19 countries and regions and will focus on marketing IoT services, particularly the 1NCE IoT Flat Rate from German company 1NCE GmbH, to enterprise customers. 1NCE offers managed connectivity services for low-bandwidth IoT applications and has developed a disruptive pricing model for IoT connectivity called the 1NCE IoT Lifetime Flat Rate.

SoftBank aims to acquire two million 1NCE IoT Flat Rate connections in APAC and other regions by the end of the 2025 fiscal year. SoftBank became an equity stakeholder in 1NCE GmbH in April 2022 and signed an exclusive agreement to market the 1NCE IoT Flat Rate in 19 APAC markets.

The 1NCE IoT Flat Rate is available at a remarkably low price and allows customers to roam on 1NCE's global network at no additional cost. To support this expansion, SoftBank will quadruple its IoT salesforce, launch an online IoT shop in partnership with 1NCE, and strengthen its advertising and marketing efforts in the region.

SoftBank will also leverage its existing locations in APAC and its IoT platform to propose solutions for smart meters and further expand its global IoT business. Additionally, SoftBank will establish a support framework to address industry-specific challenges in different countries and regions.

Taiwan Mobile Communications Market Projected to Grow Through 2028, According to GlobalData



Leading data and analytics company, GlobalData, has forecasted Taiwan's mobile service revenue to expand at a compound annual growth rate (CAGR) of 5.3% from $6.2 billion in 2023 to $8.0 billion in 2028, fueled by increasing mobile data adoption.

As per the Taiwan mobile broadband forecast by GlobalData (Q3 2023), there is an anticipated decline in mobile voice service revenue. It is expected to contract at a compound annual growth rate (CAGR) of 1.3% from 2023 to 2028. This decline is attributed to the decreasing Average Revenue Per User (ARPU) for voice services, which is influenced by users' inclination toward OTT/ internet-based communication platforms.

In contrast, mobile data service revenue will grow at a CAGR of 7.3% over the same time due to the introduction of higher ARPU-5G services.

The Impact of Online Entertainment on Monthly Data Consumption

The rising consumption of high-bandwidth online entertainment and social media content on smartphones is expected to boost monthly mobile data usage from 31 GB in 2023 to 47.3 GB in 2028.

Kantipudi Pradeepthi, telecom analyst at GlobalData, explained, "4G services will account for a majority share of total mobile subscriptions in 2023. However, 5G subscriptions will surpass that of 4G in 2024 and go on to account for over 90% of the total mobile subscriptions share in 2028, mainly due to increasing availability and adoption of 5G-enabled smartphones and the ongoing 5G network expansions by operators."

Taiwan's Mobile Service Market Split

As of 2023, Chunghwa dominates Taiwan's mobile services market, followed by Taiwan Mobile and Far EasTone. Due to its 5G network expansion and focus on accelerating 5G service adoption by offering flexible pricing plans and diversified mobile value-added services like music, movie, TV and cloud gaming, Chunghwa is expected to lead through 2028.

ZTE and iForte Promote Telecom Energy Innovation to Support Indonesia's Network Infrastructure

ZTE Corporation, a global leader in information and communication technology solutions has partnered with PT iForte Solusi Infotek in boosting telecom energy innovation to sustain network infrastructure development in Indonesia.

Present at the signing of the memorandum of agreement at the ZTE headquarters in Shenzhen, China, were Handoko Siputro, Director of Procurement at PT iForte Solusi Infotek, and Richard Liang Weiqi, President Director of PT ZTE, Indonesia. Executives from both companies, including, Ferdinandus Aming Santoso, CEO and President Director of iForte and Protelindo Group, and Mei Zhonghua, SVP of ZTE also witnessed the ceremony.

An Innovative and Sustainable Partnership

The partnership aims to encourage innovation and sustainable development in Indonesia's network infrastructure market with power supply and battery initiatives as the key focus. This also marks ZTE and iForte's proactive research of network energy and future strategic cooperation.

Richard Liang Weiqi also expressed his confidence in the partnership, saying, "ZTE has taken iForte as the strategic partner since the beginning of cooperation. The signing of this cooperation memorandum will further enhance our partnership in the Indonesian network market. ZTE will support iForte with mutual trust and grow prosperously with iForte."

This collaboration signifies the beginning of ZTE and iForte's deeper collaboration to promote telecom energy innovation in Indonesia. Through collaboration, both parties will bolster the country's network infrastructure sustainability.

LG Sets New Record for 6G Data Transmission and Reception

LG Electronics, in partnership with LG U+, successfully tested the wireless transmission and reception of 6G terahertz (THz) data across a 500-meter distance in LG Sciencepark in Magok, Seoul. This is the farthest distance recorded in any 6G test conducted in an outdoor, metropolitan setting to date.

This accomplishment follows LG's prior breakthrough in 2022, when the company wirelessly transmitted and received 6G THz data over a distance of 320 meters outside at the Fraunhofer Heinrich-Hertz Institute in Berlin, Germany. The collaboration with Fraunhofer resulted in the creation of core equipment for 6G transmission and reception, which improved performance by more than 50%.

The recent test has verified 6G's usefulness in numerous real-world communication scenarios, including building-to-building, building-to-ground terminal and ground-to-ground terminal communications, paving the way for the commercialization of 6G THz communications.

The evolution from 5G to 6G promises significantly improved data rates, ultra-low latency, high-reliability data transfer and communication integration with artificial intelligence (AI) and sensor technologies. LG sees superior 6G capabilities as critical for future companies such as autonomous driving and mobility solutions, the metaverse, smart homes and smart factories.

"We will continue to cooperate with research institutions and tech companies and conduct our own advanced R&D to dominate 6G standard technology and solidify our technological leadership in this important field," said Dr. Kim Byoung-hoon, CTO and executive vice president of LG Electronics.

While discussions on 6G network standardization are expected to begin in 2025, with commercialization scheduled for 2029, LG's consistent investment in R&D, strategic partnerships and successful technology demonstrations positions the company as a leader in the global transition to 6G.

Telecom's Evolving Role in Shaping the Asia-Pacific Entertainment Industry

The Asia-Pacific region has always been a hub of innovation and change, and its entertainment industry has been no different. With technology advancing quickly and a growing desire for digital content, the entertainment scene in Asia Pacific has undergone a significant transformation. The telecom sector is at the center of this change, playing a crucial role in shaping the future of entertainment throughout Asia Pacific.

The Booming Entertainment Industry

The Asia-Pacific entertainment industry has been on an upward trajectory in recent years. According to a report, the online media and entertainment market in the Asia-Pacific region is experiencing notable growth due to increasing internet penetration in emerging economies like India and Vietnam. Additionally, the offline media and entertainment industry in the region, including amusement parks and trade shows, is expanding as well.

The market is divided into online and offline platforms, with the online platform projected to grow significantly

thanks to the demand for video streaming and online gaming. China currently dominates the market, but India is expected to show considerable growth due to rising internet penetration.

Major players in the market include Alibaba Pictures Group, Eros International Media Ltd., Fantawild Holdings Inc., Sony Corp., Netflix Inc. and Apple Inc., who are contributing to the market's growth through various strategies like mergers and acquisitions and technological development.

The market's expansion is attributed to various factors, including increasing disposable income, changing consumer preferences and rapid urbanization.

Moreover, a report from Mordor Intelligence underscores the rise of digital media consumption in Asia Pacific. The Asia-Pacific media and entertainment market is expected to grow from US$1.23 trillion in 2023 to US$1.55 trillion by 2028, with a compound annual growth rate of 4.77%. Such expansion is largely driven by the increasing demand for seamless communication, digital entertainment and wireless networks.

Viewers are preferring smart TVs and OTT streaming platforms for high-quality content. And in support, big studios are using advanced digital technology for communication and investing more in promotional activities.

As with most sectors of society, the film industry was adversely affected by the pandemic, as production and consumption require unavoidable gatherings of people. But in a surprising turn, the COVID-19 pandemic has led to increased adoption of online video streaming services, significantly affecting media consumption habits.

The Convergence of Telecom and Entertainment

Telecom companies have recognized the immense potential of the entertainment industry in Asia Pacific and are actively seeking ways to capitalize on it. The convergence of telecom, media and entertainment is reshaping the industry's landscape.

More than ever, telecom giants are acquiring or partnering with content creators and distributors to provide a seamless entertainment experience to their customers.

One of the key ways in which telecom companies are contributing to the entertainment industry is by investing in high-speed internet infrastructure. The expansion of 5G networks is enabling faster and more reliable connectivity, making it easier for consumers to access and stream high-quality content. This infrastructure development is critical in a region as vast and diverse as Asia Pacific.

The Rise of OTT Platforms

The OTT (over-the-top) market in the Asia-Pacific region is projected to continue growing. It is estimated that revenues will reach US$52 billion in 2028, which is a 56% increase from the US$33 billion recorded in 2022. This substantial growth is fueled by the growing number of people using the internet, better infrastructure and the increasing popularity of smartphones and smart devices in the region.

Furthermore, the rapid growth of OTT platforms in the Asia-Pacific market can be attributed to multiple factors. Firstly, international streaming platforms like Netflix, Amazon Prime Video and Disney+ have expanded their presence in the region by offering localized content and competitive pricing strategies.

Secondly, local streaming platforms in countries like China, India and Japan — platforms such as iQiyi, Hotstar and Rakuten TV — are gaining popularity by providing a diverse range of content targeted at regional audiences.

Thirdly, those government initiatives that invest in infrastructure development are key to supporting the expansion of OTT services. Additionally, the growing middle class in the region has increased the demand for quality content. And technological advancements like the widespread adoption of 4G and 5G networks and affordable smartphones have ultimately made it easier for these consumers to access OTT content.

Given such factors, telecom companies are recognizing the opportunity to bundle their services with popular OTT platforms, creating enticing packages for their customers. This strategy not only boosts customer loyalty but also helps telecom companies differentiate themselves in a competitive market.

The Future of Telecom and the Entertainment Industry

As the telecom, media and entertainment sectors continue to converge, the Asia-Pacific region is poised to become a global entertainment powerhouse. With the right strategies and investments, telecom companies have the opportunity to not only shape the future of entertainment but also reap the rewards of a burgeoning market.

In this dynamic landscape, the synergy between telecom and entertainment in Asia Pacific promises a thrilling future for consumers and stakeholders alike. TR

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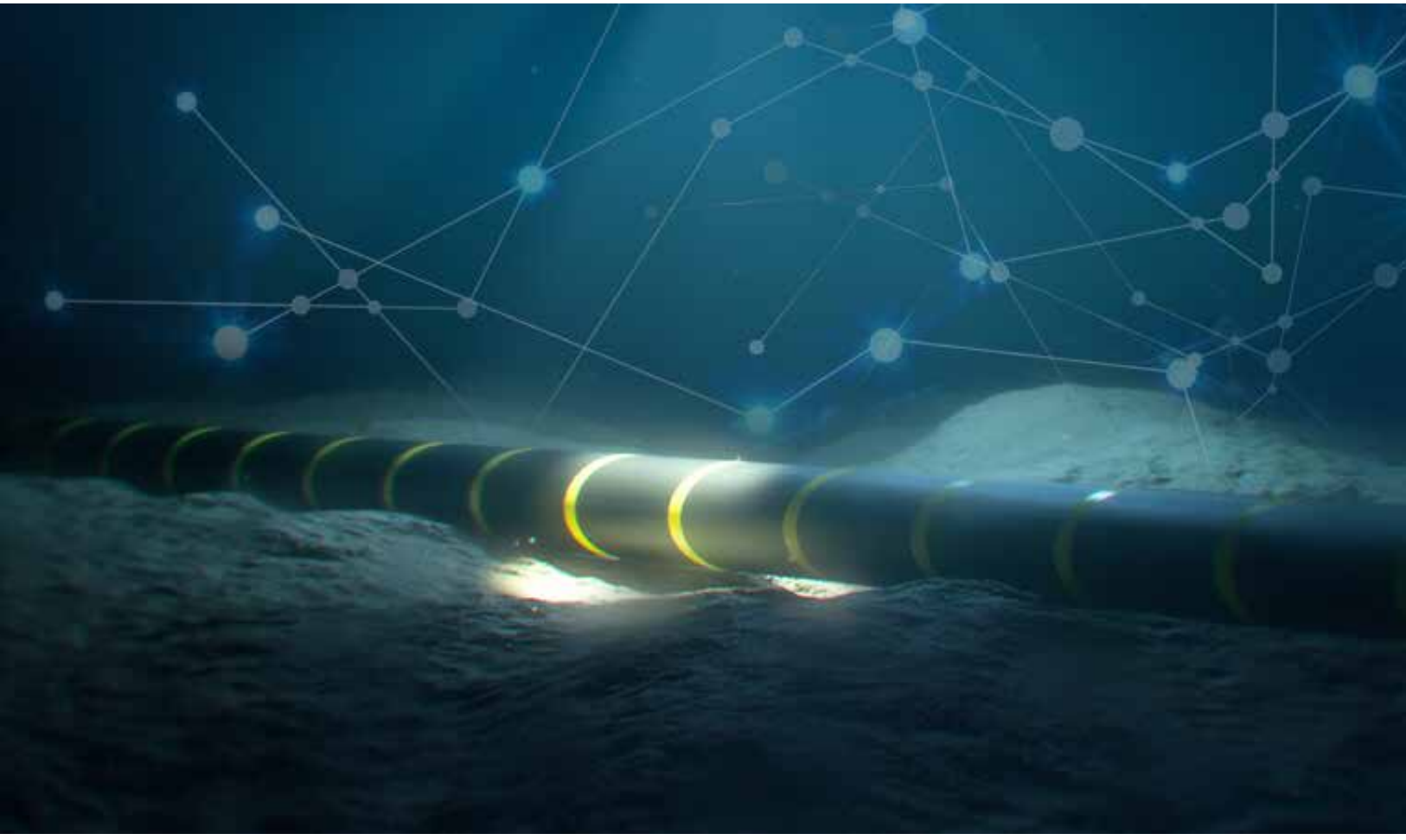


Forging the Future: How Submarine Cables Lay the Groundwork for Digital Transformation in Asia

Communicating with people all over the world has become so convenient that it's sometimes taken for granted. Instant messages, high-definition video calls and high-speed internet applications have become such a necessity that almost everyone seeks access to them. Behind this technological advancement is a massive and sophisticated network of underwater cables responsible for making all this run smoothly. These crisscrossing subsea cables have transformed the way we interact, share information and do business on a global scale.

The idea of deploying underwater cables for communication dates back to the 1850s. The first successful transatlantic cable was built between Canada and Ireland in 1858. This momentous accomplishment lowered the time needed to send communications over the Atlantic Ocean. However, the original cable had technical difficulties, failed after just a few weeks and was eventually abandoned. The first permanently successful transatlantic cable was built in 1866, while another, partially laid in 1865, was finished the same year.

Today, there are about 1.4 million kilometers of underwater cables that are in service, according to TeleGeography. Some cables are short, such as the 131-kilometer CeltixConnect cable between Ireland and the United Kingdom. Others are extremely long, such as the 20,000-km Asia-America Gateway cable.

The Asia-Pacific Cable Network (APCN) was one of the first and most significant breakthroughs in submarine cable infrastructure in Asia. This system, which started its service in 1997, connected many Asian countries, including Japan, South Korea, Taiwan, Hong Kong, the Philippines, Thailand, Indonesia and Malaysia. It was critical to improving international connections inside Asia and laying the groundwork for future expansion.

Submarine cables are often owned by consortiums of telcos that work together to fund these costly projects. In recent years, web companies such as Google, Facebook, Microsoft and Amazon have surpassed traditional Internet providers in investing in their own subsea cables.

Submarine cables have also contributed to the advancement of telcos in India. Several critical international submarine cable networks have established landing points in the country's coastal towns. According to the Observer Research Foundation, India has 17 undersea cables ending at 14 different cable landing points in five cities, including Mumbai, Chennai, Cochin, Tuticorin and Trivandrum. By 2025, India is expected to build even more cable links.

According to TeleGeography, despite significant expansion over the next five years, India's predicted demand for connections is greater than its planned supply. Between 2021 and 2028, India's utilized international bandwidth is expected to grow at a compounded annual growth rate of 38%. India has ideal demographic, economic and geographic advantages, which make it a potential global leader in submarine cable networks.

Meanwhile, submarine cables have promoted regional collaboration and accelerated economic progress not only within the Association of Southeast Asian Nations (ASEAN) but around the globe. One good example is the Asia-Africa-Europe-1 (AAE-1) undersea cable, which connects Southeast Asian nations like Singapore, Hong Kong, Malaysia, Thailand, Cambodia and Vietnam to the Middle East and Europe. This connectivity has opened new options for businesses, allowing them to smoothly engage in global trade and commerce.

China has also set out on an ambitious mission to spread its digital presence beyond its borders. As part of its Belt and Road Initiative (BRI), the country launched the "Digital Silk Road" project, aimed at building a massive infrastructure network, including underwater cables, to connect China with the rest of Asia, Europe and Africa.

China's investment in underwater cables has given it more influence in Asia's telco industry. Projects such as the Pakistan and East Africa Connecting Europe (PEACE) cable have not only enhanced China's connectivity but have also positioned the country as an essential player in determining the region's digital future.

The transformation of global communication in Asia — a transformation largely facilitated by submarine cables — is an ongoing journey. As technology advances, so do the needs for higher bandwidth, reduced latency and improved reliability.

The introduction of 5G technology, the growth of IoT devices and the emergence of edge computing are all elements pushing the continuous expansion and development of Asian undersea cable systems. As a result, increasingly ambitious initiatives to address these demands can be expected in the coming years. TR

“The introduction of 5G technology, the growth of IoT devices and the emergence of edge computing are all elements pushing the continuous expansion and development of Asian undersea cable systems”

Steady Climb: The Factors Behind Growing Data Center Demand in China

China's booming data center ecosystem has played a significant role in the country's quick and steady rise towards becoming a global technological powerhouse.

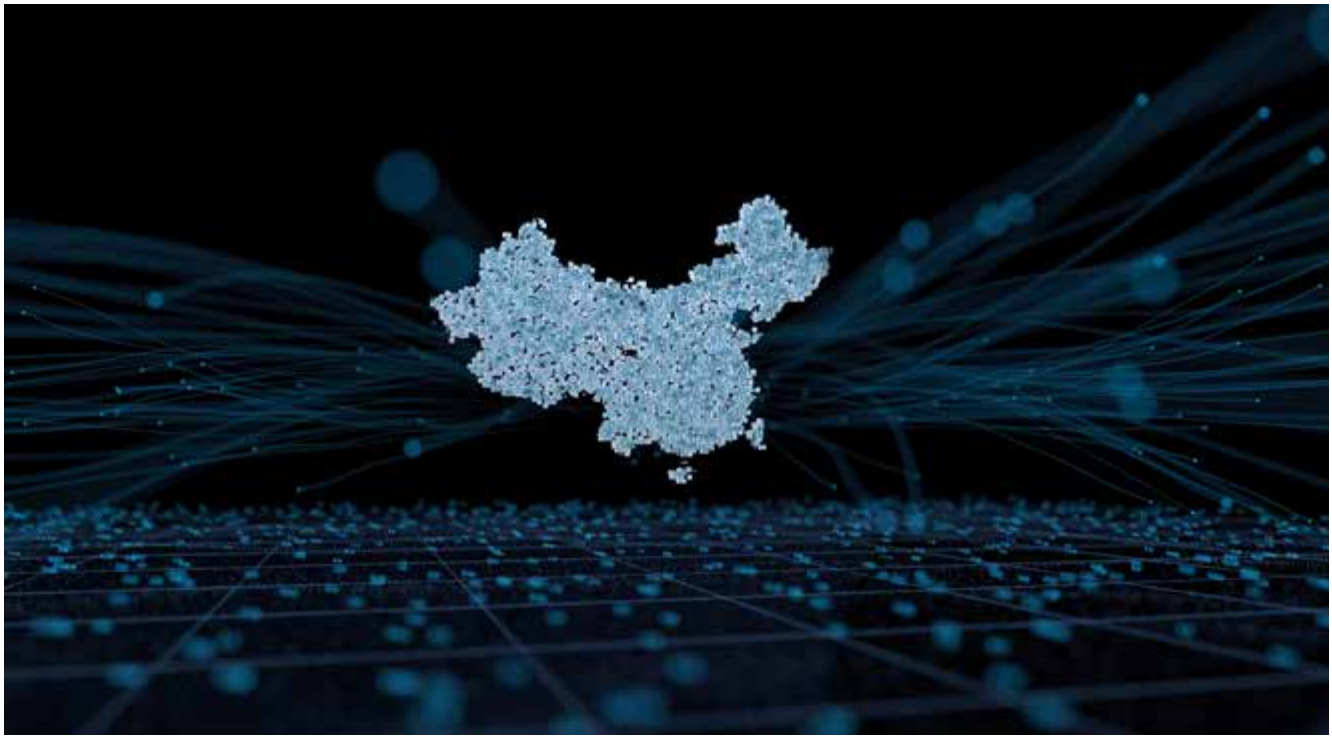
A recent report by analysts at Mordor Intelligence shows a compound annual growth rate (CAGR) of 35.57% over the forecast period (2023-2028). It is anticipated that the size of the China Internet Data Center Market will increase from $64.01 billion in 2023 to $293.15 billion by 2028. The key players in the China data center market include China Telecom Corporation Ltd., Chindata Group Holdings Ltd., Equinix, Inc., Space DC Pte Ltd. and Zenlayer Inc.

The COVID-19 pandemic heightened this demand as data consumption increased during lockdown. Strict quarantine regulations in China, like in many other countries worldwide, caused many people to rely on online shopping, among other essential daily activities. Mordor Intelligence claims that as more people connected remotely for both business and entertainment purposes at home, the online market also experienced tremendous growth. It is believed that video streaming, e-commerce, games and other sectors will maintain their post-pandemic strength in the Chinese market, and the associated surge in data usage is expected to continue.

Factors Influencing China's Data Center Market

Adoption of cloud computing

Cloud computing improves the efficiency of data processing on multiple compute and storage systems, where availability is



performed over the internet. The adoption of cloud computing has also remarkably changed the way businesses operate by providing scalability and flexibility.

As time progresses and technology advances, more organizations and businesses are moving to the cloud to more easily access data, improve collaboration and reduce costs. To this end, data centers have become an integral part of the business model. Data centers act as the foundation for cloud services, allowing for the smooth deployment and administration of virtualized environments.

Development of the Internet of Things
The Internet of Things (IoT) is a collection of physical devices that can send and receive data between each other without any human input.

IoT is all about connecting devices, sensors and systems that share data and allow people to monitor and analyze it in real-time. It's common knowledge that China is leading the way in transforming traditional cities into smart cities and traditional industries into smart factories. In this context, the number of IoT devices is sure to keep growing.

The Chinese industrial IoT market is estimated to be worth $55.76 billion in 2023. The more IoT devices there are, the greater the reliance on data centers for proper data storage, processing and analysis.

Increased usage of mobile devices
The growing popularity of mobile devices is yet another reason that data centers are in high demand. Mobile devices produce massive amounts of data that must be processed and stored somewhere. Many use mobile phones for e-commerce, entertainment and finance tasks. This surge in digital transactions, communication and interactions has resulted in an unprecedented amount of data being generated. As companies strive to streamline their operations and strengthen their customer experience, they will inevitably need the robust infrastructure that data centers provide.

As the world moves towards a data-centric future, data centers will continue to lead the way in technological innovation, enabling businesses and individuals to unlock the power of data for growth and innovation. With the assistance of several key partners, China is poised to become one of the major players in the international data center ecosystem, a position that will be supported by the continued development of a secure and cost-effective data center market in the country. TR

> It is anticipated that the size of the China Internet Data Center Market will increase from $64.01 billion in 2023 to $293.15 billion by 2028

5.5G (5G-A) Emerges as the Future of Mobile Communications

The evolution of mobile communications technologies has seen a new generation appear roughly every 10 years, with half-generation technologies emerging every five years. Each generation introduces key, iconic technologies, such as TDMA and CDMA for 2G and 3G and OFDM, MIMO and SDR for 4G. 5G has introduced massive MIMO, polar code and URLLC as its key technologies as well.

Chief Marketing Officer of Huawei Carrier BG, Dr. Philip Song, has stated at GSMA's M360 APAC 2023 that the pursuit of technological progress will continue, and the company's efforts to explore are already underway with a focus on 2030 as the delivery goal.

In the interim, 5.5G (5G-A) is being viewed as a favorable option due to allowing networks to evolve step by step. 5.5G (5G-A) turns uncertainty into certainty, creating an optimal business choice. And 5.5G (5G-A) technologies (such as RTBC, UCBC, …) have been explored and verified.

Furthermore, Dr. Song explained that Huawei's ELAA technology have proven to be effective solutions for improving coverage in the 6 GHz and mmWave frequency band, "which is important for the deployment of 5.5G (5G-A)," he specified.

A successful field test in Chengdu, China, demonstrated that the coverage of the 6 GHz band can be greatly enhanced, similar to that of the 3.5 GHz band. Additionally, in Hangzhou, China, Huawei effectively tackled the challenges presented by the millimeter wave band and achieved a downlink peak rate of 10 Gbps and exceeded expectations in terms of mobility experience in a large-scale continuous networking scenario, thanks to ELAA and intelligent beam management.

Industry digitalization places a greater demand on uplink rates compared to downlink rates. Huawei has made advancements in uplink technology.

Dr. Song stated that they have decoupled uplink and downlink to realize multi-band convergence and high uplink rates. These innovative solutions have been tested in various scenarios, like coal mining and manufacturing. The solutions can support up to 1 Gbps uplink rates, enabling capabilities such as HD video backhaul, remote control and quality inspections.

In one example — a coal mine in China — Huawei utilized the entire 700 MHz band for uplink video backhaul. This enabled real-time viewing of smooth videos from over 100 operation areas underground, improving safety and efficiency.

5.5G (5G-A) Passive IoT technology combines cellular networks and passive tags, offering advantages like passiveness, wide coverage, low cost and positioning support. It can be used in various industries, such as smart warehousing, production management, logistics and retail. The market for carriers in this field is expected to grow from 10 billion to 100 billion connections in the coming years.

In recent tests, Passive IoT achieved a maximum coverage of 235 meters, which is 10 times greater than RFID technology. Additionally, it can transmit sensor data like temperature and humidity. This technology is being tested with industry partners in Qingdao, China, and has already been implemented in material supply management and logistics tracking, significantly improving efficiency in both.

Manufacturing automation has stricter network requirements compared to remote-controlled machines like cranes at ports. It needs low latency (less than 10 ms) and high reliability (five or six nines). To meet these demands, a Chinese carrier collaborated with Huawei and other industry partners to develop the first 5.5G (5G-A) flexible trial production line.

Moreover, innovative technologies were employed, including dual-fed and selective receiving and deterministic uplink and downlink scheduling, to establish a highly deterministic network connection that supports high concurrency. This enables carrier networks to meet the real-time production control needs of enterprises and expands their market opportunities.

"Release 18, the first 3GPP standard for 5.5G (5G-A), is expected to be frozen in the first half of 2024.We are preparing for the 5.5G (5G-A) era and are ready to collaborate with global carriers and partners to realize the true value of 5.5G (5G-A) together," noted Dr. Song.

He additionally stated that they aim to advance technologies and establish a prosperous ecosystem to enable more individuals and industries to embrace digitalization.

"The ultimate goal is to unlock the full potential and benefits of 5.5G (5G-A)," Dr. Song concluded. TR

Industry digitalization places a greater demand on uplink rates compared to downlink rates. Huawei has made advancements in uplink technology

Boundless Potential: Unlocking the Digital Transformation of Businesses in Asia

The continuous progress and development of digital technology have together become a revolutionary force across the world, improving how countries engage with each other, conduct trade and provide public services. Connectivity, financial inclusion and access to commerce have all been significantly improved as a result of rapid advancements in digital technology.

The quick development of digital technology has been a driving force behind success in the Asia-Pacific region, helping to reduce societal challenges and promote inclusivity in the process. The shift toward the use of digital platforms has not only accelerated the rate of economic expansion but has also made key services more accessible.

According to the Asian Development Bank, one significant outcome of the digital revolution in Asia has been to lessen the barriers that prevent enterprises from breaking into new markets. Smaller businesses are finding new opportunities for expansion as digital technologies become easier to use. This is helping to create a more level playing field in the business world. Not only have advancements in digital technology helped to reduce inequality, but they have also helped to boost the productive capacity of economies, which has led to increased economic efficiency and development.

An InfoBrief by Lenovo and AMD, titled "CIO Technology Playbook 2023," predicts that by 2027, businesses in Asia will derive 43% of their incomes from digitally linked goods, services and customer experiences. This forecast is based on the responses of more than 900 regional CIOs and IT leaders.

The study also reveals that macroeconomic factors will be the most important to CIOs in 2023. With 53% of respondents noting "high inflation" as their main present concern and 50% choosing "high energy prices" and "escalating raw material prices," it's evident that economic uncertainty is at the forefront in the minds of strategic planners.

The study also suggests the most important investments that businesses should be making as they look to speed up their digital transformation in 2023. These key strategic expenditures include digital infrastructure, automation and consumer protection. People strongly agree that the old IT infrastructure needs to be updated, and a focus on hybrid or multi-cloud systems may point us forward through such change. Since most companies choose to keep a large part of their mission-critical workloads on existing hardware, software platforms and private cloud infrastructure, such hybrid solutions may prove optimal in the coming two to three years.

A recent report by IDC showcases how quickly life science (LS) businesses in Asia Pacific are becoming digital. The report shows a landscape of innovation and the impressive progress made by LS companies, with a focus on how they have used generative AI tools for digital transformation (DX) projects.

The IDC study says that most life sciences companies in Asia Pacific have chosen innovation as the main thing that will drive their future efforts. The fact that two out of five companies are using generative AI tools to power their digital transformation projects makes this strategic shift toward innovation even more clear. This new way of doing things shows that the industry is serious about keeping on the cutting edge of technological progress.

Digitalization has also played a critical role in advancing regional and global economic integration, in line with the Sustainable Development Goals (SDGs). The advent of digital technology has had a significant impact on SDG 9, which focuses on developing resilient infrastructure, encouraging equitable and sustainable industrialization, and fostering innovation.

The road to digital transformation holds great potential as well as some notable challenges. The transformation process itself can be slowed by regulatory obstacles, particularly in those businesses that are already highly regulated. With this in mind, the governments of Asia are intent on finding a middle ground between fostering innovation and protecting consumer rights.

In addition, there is an urgent need to address the shortage of digital talent. Businesses today are in a battle to attract and keep the best and brightest minds, especially in high-demand fields like data science, artificial intelligence and cybersecurity. The challenge is daunting, but businesses are facing it with vigor and determination.

The digital transformation journey of businesses in Asia is more than a technological evolution; it is a continuous approach to reshaping and revolutionizing industries. Spurred on by their data-driven successes, businesses are navigating the challenges, seizing the opportunities and redefining themselves for a digital future. TR

"The quick development of digital technology has been a driving force behind success in the Asia-Pacific region, helping to reduce societal challenges and promote inclusivity in the process. The shift toward the use of digital platforms has not only accelerated the rate of economic expansion but has also made key services more accessible"

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