# 5G in Action in Asia Pacific

**How Asia Pacific industries are unlocking the power of 5G connectivity**

JULY 2022

5G

## About the GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

We invite you to find out more at gsma.com

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## About the GSMA Asia Pacific

Headquartered in Hong Kong, the GSMA Asia Pacific coordinates the efforts of the GSMA and its members to monitor relevant policy and legislative developments in the region, identify priorities for the mobile industry, and develop and communicate consensus positions on these priorities. It represents the GSMA's views and initiatives at regional institution meetings, regional communities and events, with offices in Hong Kong and New Delhi. It also convenes the industry-leading Mobile 360 Series in the Asia Pacific.

## About the GSMA APAC 5G Industry Community

Launched at the Mobile 360 Asia Pacific 2021, the APAC 5G Industry Community is a forum for people to learn and advocate 5G benefits to industries and enterprises. The Community has been designed for stakeholders across the value chain including government and agencies, industry associations, mobile network providers, enterprises and industry players, solution providers, analysts, and consultants.

It serves as a collaboration platform to support 5G industry innovation, application and business opportunities, and to unlock the power of 5G connectivity so that people, industries and society thrive.

## 5G in Action in Asia Pacific
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# FOREWORD

Between 2022 and 2025, mobile operators in the Asia Pacific region are set to invest US$227 billion in 5G deployments[1]. That is an enormous amount of money, and the impact will be profound. These new networks are enabling exciting new services for consumers, while also helping to transform industry and manufacturing, and drive economic growth.

As the region looks to bounce back from the pandemic, connectivity will be crucial to rebuilding Asia-Pacific's economies and making them more resilient to future shocks. 5G networks, cloud services, edge computing, artificial intelligence (AI), big data and the Internet of Things will all play a key role in realising the full potential of a post-pandemic digital economy.

On an economic level alone, the positive impact of new 5G networks will be huge. The GSMA forecasts that by 2030, 5G will contribute US$960 billion in global GDP[2].  As this report shows, key industries, such as manufacturing, logistics and healthcare, are using 5G to enable digital transformation and achieve high levels of automation and responsiveness.

The GSMA's APAC 5G Industry Community is helping the ecosystem to deliver on this promise and realise the full potential of 5G networks to benefit society. We formed the Community after surveying more than 800 attendees at the APAC 5G Industry Forum last year. More than 80% of the respondents, which included government agencies, analysts, consultants, industry associations, mobile operators, enterprises, and solution providers,supported the concept of an industry community to co-operate on 5G industry innovation, transformation, application and business opportunities.

The APAC 5G Industry Community was launched at the APAC 5G Industry Summit in the Mobile 360 Asia Pacific Conference in October 2021. The APAC 5G Industry Community is steered by 12 contributing members - AIS, Axiata, depa, DHL, Globe, Huawei, Kominfo, Maxis, MDEC, Schneider Electric, Telkomsel and, Viettel.Since the launch, the Community has grown to encompass more than 650 organisational members from more than 30 countries.

The Community has formed three industry interest groups: (i) Manufacturing, (ii) Ports, Logistics & Transportation, and (iii) Healthcare. These groups run workshops to help members understand pioneering 5G

innovation in various industries, and evaluate the opportunities and challenges from a technological, policy and ecosystem perspective. We have already hosted six workshops, reaching more than 1,700 participants. I am delighted to say the feedback from all community members has been very positive.

The Community's vibrancy reflects the strong interest in 5G across both the public and private sectors in Asia Pacific.  We expect that interest to grow further in 2022, as 5G coverage expands and the deployment of core 5G networks begins in earnest.

[1]Source: The GSMA Mobile Economy 2022 report
[2]Source: The GSMA Mobile Economy 2022 report

**Julian Gorman,**
Head of APAC, GSMA

**GSMA 5G Case Studies**

# 5G BRINGS AUTONOMOUS ROBOTS TO LIFE

AIS's private 5G network enables robots to transport goods across manufacturing plants

TARA — Thai Automation and Robotics Association

AIS Business 5G — Your Trusted Smart Digital Partner

APAC 5G INDUSTRY COMMUNITY

**FEBRUARY 2022**

# AIS'S PRIVATE 5G NETWORK ENABLES ROBOTS TO TRANSPORT GOODS ACROSS MANUFACTURING PLANTS

**Operator partner:** AIS & Thai Automation and Robotics Association ● **Technologies:** 5G ● **Country:** Thailand

Industrial and logistics robots have generally been confined to one small patch of the factory floor. Not any more. In Thailand, mobile operator AIS is using 5G connectivity to give robots the freedom to roam around manufacturing plants. This technology is being applied first in an electrode manufacturing plant run by Yawata Electrode (Thailand) Co., Ltd. in Nakhon Ratchasima.

The complex production process for welding electrodes involves moving raw materials, semi-completed goods and finished products between production floors. Ideally, autonomous robots would transport these goods around the plant. That requires the robots to be supported by secure wire-less connections that are stable, low latency, and capable of providing full coverage inside the factory.

To meet that need, AIS Business is working with the Thai Automation and Robotics Association[1] (TARA) and Thai Automation System Integrators (ASI) to develop 5G solutions and platforms to support autonomous robots within production plants.

Yawata Electrode has successfully deployed an autonomous robot solution developed by AIS in conjunction with Lertvilai and Sons Co., Ltd., a long-standing supplier of industrial robots. The plant, covered by a private 5G network supplied by AIS, is using two autonomous mobile robots to increase its goods transportation efficiency by 23.6%. In the near future, it plans to deploy more robots to further increase production capacity.

Autonomous mobile robots are one of several 5G solutions and platforms AIS is developing to enable manufacturers to harness digital technologies to transform their operations. Its factory-specific 5G private network offering can support network slicing to enable the customer to configure the connectivity to meet the needs of specific applications.

"The 5G private network platform gives the network the properties to support the specific needs of applications, such as speed and low latency," explains Tanapong Ittisakulchai, Chief Enterprise Business Officer at AIS 5G Business. "This custom network design keeps data connections private, despite it being a wireless network. The result is flexible data transfers that are low latency and exceptionally high data security."

AIS says its 5G private network meets all of the electrode plant's wireless connection requirements, while noting interoperable data connectivity could also be used to support other smart factory solutions, including other forms of robotics, and programmable logic controllers (PLCs) running over industrial IoT systems. An industrial IoT solution can enable individual PLCs to be better integrated with systems outside the factory, including servers in the cloud that process customer orders and requests in real time.

[1] TARA works with a range of government and private sector partners to support entrepreneurs with research and development as well as provide commercial cooperation. It promotes the industrial sector to adopt automation and robotic systems to boost capabilities and increase the productivity of manufacturing factories with new technologies.

## COMBINING OPERATIONAL AND INFORMATION TECHNOLOGY

AIS is also working with operational technology (OT) specialists and systems integrators in the manufacturing sector to develop solutions that draw on its 5G platform. It plans to use 5G to provide seamless data connectivity between different components of smart factory solutions, such as robotics, PLCs and industrial IoT systems.

"5G is an enabler of a wide range of smart manufacturing solutions and allows for seamless data connectivity among OT, IT and the cloud, transforming the industrial sector to industry 4.0." says Tanapong Ittisakulchai. "5G is the key technology driver of digital transformation. It creates more competitive advantage by overcoming technical limitations, such as bandwidth, latency, privacy and mobility."

In Thailand, the government is providing financial backing to manufacturers that embrace advanced technologies. AIS says the Thailand Board of Investment has introduced a three-year 100% corporate income tax exemption for companies that upgrade their machinery with automation and robotic technology systems (such as the AIS 5G network platform) to help increase productivity, reduce costs and increase workers' safety in the factory.

Research firm IDC has forecast that 5G technology could generate annual economic value of 2.6 billion Thai baht (US$82 million) in Thailand enterprise segment in 2025. AIS believes 5G will have a particularly big impact in the manufacturing, transportation and logistics, building and property, healthcare and agriculture sectors. The operator notes that Thailand's emerging 5G ecosystem encompasses both the technology supply side, including a strong developer base, and the industry demand side.

> " 5G is an enabler of a wide range of smart manufacturing solutions and allows for seamless data connectivity among OT, IT and the cloud, transforming the industrial sector to industry 4.0. 5G is the key technology driver of digital transformation. It creates more competitive advantage by overcoming technical limitations, such as bandwidth, latency, privacy and mobility. "

**Tanapong Ittisakulchai -** Chief Enterprise Business Officer at AIS 5G Business

## COLLABORATION ACROSS THE PUBLIC AND PRIVATE SECTORS

AIS says the development of "real commercial solutions" that enable the adoption of automation and robotics on both the supply and demand sides will require collaboration among a variety of partners in both the public and private sectors.

"To have effective solutions in order to deliver end-users with the best experience, business needs to understand issues or pain-points," notes Tanapong Ittisakulchai. "Cooperation with a variety of partners from both the business and technology sides is required to ensure the best framework for designing solutions that fulfil business requirements."

The public sector plays a vital role by setting policies and undertaking activities to engage businesses, AIS says. It notes that incentives for research and development and investment, together with the easing of regulation, can help drive technology adoption in the business environment.

AIS is hopeful that automation and robotic systems will increase the productivity of Thailand's manufacturing sector, giving it a competitive edge and helping it to withstand foreign competition in the future. "We have seen growth opportunities in the industrial sector to deploy technology as a driver of digital transformation through being a provider of 5G industrial solutions," says Tanapong Ittisakulchai. "We believe that the collaboration will foster the ecosystem of Thai industry to have the potential to cope with opportunities and competition which will arise in the future."

## ABOUT AIS BUSINESS

As a leader in telecommunication and ICT service providers in Thailand for more than 31 years, AIS Business has been trusted by private companies, from SMEs up to large enterprises, including state enterprises, in adopting our choices of solutions i.e., Enterprise Mobility, Business Network, Business Cloud, IoT/ M2M, ICT, Cybersecurity, including digital services like Digital Marketing, Digital Payment. Together with AIS 5G infrastructure and solutions i.e, network slicing, MEC, FWA and private network, our customers will successfully enable their businesses in the digital economy.

For more information, please visit https://business.ais.co.th/ or contact AIS Business team taking care of your company or AIS CORPORATE CALL CENTER 1149.

GSMA 5G Case Studies

# 5G: ENABLING DIGITAL HEALTHCARE

HKT collaborates with CUHK Medical Centre to create a 5G smart hospital for remote consultation, remote training and tele-medicine

HKT®   CUHK Medical Centre   APAC 5G INDUSTRY COMMUNITY

# HKT COLLABORATES WITH CUHK MEDICAL CENTRE TO CREATE A 5G SMART HOSPITAL FOR REMOTE CONSULTATION, REMOTE TRAINING AND TELE-MEDICINE

**Operator partner: HKT & CUHKMC** ● **Technologies: 5G** ● **Country: Hong Kong**

Reliable high-speed 5G connectivity could transform healthcare by enabling smart hospitals to improve the patient journey and overall operational efficiency. For example, 5G can transfer 4K ultra high definition medical videos and images, such as those obtained from operating theatres and endoscopy centres, for real-time review by remote specialist clinicians.

According to mobile operator HKT, its 5G network is able to support speeds of over 1Gbps with latency of less than 10ms. Such connections are fast and responsive enough to support very high quality 4K video, 3D imaging, virtual reality (VR), augmented reality (AR) and multi-camera views, thereby providing a fully immersive experience for remote clinicians and students.

In Hong Kong, CUHK Medical Centre (CUHKMC) is using HKT's high throughput and low latency 5G to support innovative medical applications, such as remote consultation, remote training, tele-medicine, and treatments guided by AR services. HKT has built full 5G coverage across the entire CUHKMC hospital. Wholly owned by The Chinese University of Hong Kong, CUHKMC has 28 operating rooms, 49 consultation rooms and 516 beds for in-patients.

CUHKMC is using 5G technology to speed up consultation, diagnosis and treatment. In cases where patients need specialist advice and help, front-line medics have historically referred them to an expert in the relevant field of medicine. Such referrals can take time to arrange, delaying treatment. Now, CUHKMC is using 5G-enabled real-time

remote consultation with specialists, eliminating the need for a separate appointment. An on-site doctor can promptly seek a second opinion from a remote specialist, thereby speeding up critical decision-making.

"Through the innovative use of 5G technology to support a wide array of smart hospital applications such as remote consultation (doctor-to-doctor), remote training (doctor-to-student) and telemedicine (doctor-to-patient), resources in the hospital can be optimised and patients can receive the best possible care," explains Tom Chan, Managing Director of Commercial Group of HKT. "5G also supports other innovative applications such as the Internet of Medical Things (IoMT) and robotics to better serve the Hong Kong public."

> " Through the innovative use of 5G technology to support a wide array of smart hospital applications such as remote consultation (doctor-to-doctor), remote training (doctor-to-student) and telemedicine (doctor-to-patient), resources in the hospital can be optimised and patients can receive the best possible care "
>
> **Tom Chan -** Managing Director of Commercial Group of HKT

## SUPPORTING SURGERY AND FOLLOW-UP CONSULTATIONS

CUHKMC operating theatres are fully covered with 5G, which is used to transmit multiple 4K video streams of the surgery as well as images captured by medical equipment, such as an endoscope. Where appropriate, multiple video streams are combined into a single view to give the remote clinician an immersive experience of the surgery. Viewed on a mobile device or PC, these visuals can help the remote specialist provide expert opinion on the surgery.

Leverage 5G connectivity, CUHKMC can provide virtual follow-up consultation for patients, reducing the need for them to revisit the hospital. The quality of diagnosis can be further improved by harnessing the IoMT. For example, a connected blood pressure monitor could track the progress of recovering patients, both in the hospital and after discharge.

## KEEPING STAFF AND STUDENTS CONNECTED

At the same time, the 5G network ensures reliable connectivity for CUHKMC staff and devices, such as cameras, iPads and medical equipment in operating theatres, endoscopy rooms, patient wards, and the multi-function auditorium, which is used as a training venue for broadcasting live streams of medical procedures. The 5G connectivity is also used to enable remote clinical training for medical students and to support international medical conferences hosted by CUHKMC, with participants physically located in the Greater Bay Area and overseas.

In the face of COVID-19, 5G's capacity for transmitting videos and images to auditoria and students' mobile devices helps ensure the continuance of large-scale clinical training and seminars even during a pandemic outbreak. It can even broadcast high-definition footage of surgical processes to global medical conferences, further strengthening the international standing of Hong Kong's healthcare industry.

## HARNESSING AR IN HEALTHCARE

5G infrastructure is also used to support very bandwidth-intensive applications, such as AR and VR services. Today, clinicians use two-dimensional multi-slice images, such as those from a CT scan, to make a diagnosis; in future, 5G could offer them a three-dimensional model of scan results.

Through a 5G-connected headset, such as a HoloLens, medics will be able to view a detailed 3D model of the scan from multiple angles. Even bi-directional communication between two HoloLens is possible, allowing clinicians to simultaneously view and annotate on the same 3D model. In clinical training, a 3D model can be a very useful tool for professors giving lectures to medical students.

"The focus of our smart hospital is to improve the patient journey by delivering optimal treatment and enhancing medical safety," said Dr Fung Hong, Chief Executive Officer of CUHKMC. "Through our partnership with HKT on 5G technology and applications, the digital transformation of CUHKMC is accelerated, thus improving the overall effectiveness and efficiency of the hospital."



Mr Tom Chan, Managing Director of Commercial Group of HKT, joins Dr Fung Hong, Chief Executive Officer of CUHKMC, at the 5G smart hospital for a look at the state-of-the-art facilities.

5G enables live remote consultation with participants at different locations.

## ABOUT HKT  **HKT**®

HKT (SEHK: 6823) is Hong Kong's premier telecommunications service provider and a leading innovator. Its fixed-line, broadband, mobile communication and media entertainment services offer a unique quadruple-play experience. HKT meets the needs of the Hong Kong public and local and international businesses with a wide range of services, including local telephony, local data and broadband, international telecommunications, mobile, media entertainment, enterprise solutions and other telecommunications businesses, such as customer premises equipment sales, outsourcing, consulting and contact centers.

HKT is the first local mobile operator to launch a true 5G network with differentiated value-added services. Backed by its substantial holding of 5G spectrum across all bands and a robust and extensive fiber backhaul infrastructure, HKT is committed to providing comprehensive 5G network coverage across the city.

HKT delivers end-to-end integrated solutions employing emerging technologies such as 5G, cloud computing, Internet of Things (IoT) and artificial intelligence (AI) to accelerate the digital transformation of enterprises and contribute to Hong Kong's development into a smart city.

Riding on its massive loyal customer base, HKT has also built a digital ecosystem integrating its loyalty program, e-commerce, travel, insurance, FinTech and HealthTech services. The ecosystem deepens HKT's relationship with its customers, thereby enhancing customer retention and engagement.

For more information, please visit **www.hkt.com.**

## ABOUT CUHK MEDICAL CENTRE

CUHK Medical Centre (CUHKMC) is a non-profit, private teaching hospital wholly owned by The Chinese University of Hong Kong (CUHK). With a social mission to bridge the service gaps between private and public healthcare in Hong Kong, CUHKMC is dedicated to offering quality healthcare service at affordable and transparent package prices. In line with the not-for-profit principle, all surpluses from all healthcare services will be ploughed back to the hospital for hospital development and the CUHK Faculty of Medicine for research and teaching.

GSMA 5G Case Studies

# 5G DRONES COULD KEEP PORTS OPERATING SMOOTHLY

M1 and partners successfully trial 5G SA connected drones with the Maritime and Port Authority of Singapore

# M1 AND PARTNERS SUCCESSFULLY TRIAL 5G SA CONNECTED DRONES WITH THE MARITIME AND PORT AUTHORITY OF SINGAPORE

**Operator partner:** M1, Infocomm Media Development Authority (IMDA), Maritime and Port Authority of Singapore (MPA) and Airbus ● **Technologies:** 5G ● **Country:** Singapore

Connected drones could play a key role in enabling port authorities to manage their operations and respond to any incidents. In Singapore, mobile operator M1 is working with the Infocomm Media Development Authority (IMDA), the Maritime and Port Authority of Singapore (MPA) and Airbus to trial 5G-connected drones.

As well as supporting air traffic management, the 5G connectivity can be used to relay video images in near real-time from the drone to a nearby server where video analytics software can be used to monitor the port operations and detect any issues or problems.

In 2020, the four parties began conducting trials on the Singapore Maritime Drone Estate, with a view to developing an open, inclusive and innovative 5G ecosystem around urban air mobility in Singapore. The group are using a 5G standalone (SA) network to enable drones to operate safely and efficiently during all phases of their flights. The 5G SA network is designed to provide secure wide-area connectivity, especially in low-altitude and urban environments where the existing aeronautical communication systems are less effective.

"With 5G, operators have the ability to overlay more value added functionalities, such as providing near real-time features that will work in tandem with video analytics," says Willis Sim, Chief Corporate Sales & Solutions Officer of M1. "It also provides faster response in surveillance by drones, and videos will be less jittery and much more seamless. With Wi-Fi, there is limited coverage and it is not best suited for outdoor usage. 4G, on the other hand, offers indoor and outdoor coverage support, but with lower bandwidth thus which might lead

to jitter and buffering issues when managing large scale drone operations."

For the trial deployment, M1 collaborated with TeamOne Technologies Pte Ltd, a local enterprise, to design and develop the world's first aeronautical certified 5G SA communication modem for urban air mobility operations. "Prior to this use-case, there was no aeronautical and maritime certified stand-alone 5G modem available anywhere in the world," says Willis Sim. "Without certification, there is no guarantee of the reliability of a modem."

M1 will also assess the use of 4G and 5G technologies to provide the drones with enhanced geo-location positioning information, which is more precise than that generated by global navigation satellite systems (GNSS).

M1 says the trial has helped it better understand the standards, feasibility and specific requirements of 5G for urban air mobility applications. The development of a certified 5G SA modem also paves the way for the safe adoption of 5G to support unmanned aircraft designs and operations.

The trial employed "an innovation model that allows for development, testing and benchmarking of 5G-enabled solutions that can eventually be applied across various industries, and will do a great deal to imbue M1's team with the necessary experience and expertise for 5G deployment," adds Willis Sim. "It will also inform existing and future use cases that will further M1's position in the forefront of 5G development for enterprises." Following the encouraging results from the trial, M1 is working closely with its partners towards commercial deployments.

## STANDALONE 5G OFFERS AN IMPROVEMENT IN PERFORMANCE

M1's 5G SA network was launched for consumer usage in July 2021. It says the network supports 10x faster speeds and 50% more responsiveness than a 4G network, allowing many more devices to be connected without any reduction in speed or quality. "This means that a higher influx of traffic is no longer a problem, and consumers can enjoy an extremely smooth mobile connectivity experience anywhere, anytime," says Willis Sim. "Together, these benefits also enable a range of innovative and diversified digital experiences — from 5G cloud gaming, to real-time streaming and entertainment; and from immersive augmented reality (AR) to virtual reality (VR) applications."

As well as launching 5G SA, M1 has integrated all of its back-end systems onto a cloud-native digital platform. It says this new architecture has significantly enhanced the scalability, evolution and performance of its systems. "Importantly, it allows us to unleash the full potential of 5G by using 5G SA's cloud native architecture to create and provide superior services to customers and businesses," adds Willis Sim.

M1 believes 5G SA could "be a game-changer" for a wide range of industries. It is now exploring potential applications through use-cases with key partners. "We are already making good progress with the 5G SA rollout," says Willis Sim. "We are already working on a range of both B2B and B2B2C cases — ranging from manufacturing to robotics and even 5G-based ATMs — which will not only drive monetisation for us, but will create significant value for businesses, as well as end-consumers."

M1 provides a suite of managed applications and solutions – tapping the Internet of Things, big data analytics and video analytics - to support enterprises. With the faster network and increased responsiveness, 5G is the enabler for cloud based IoT applications. Having begun 5G trials as early as

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>
> **Willis Sim -** Chief Corporate Sales & Solutions Officer of M1

2018, M1 has developed more than 15 5G use cases and trials across consumer, enterprise and government sectors. The operator is involved in an Industry 4.0 5G trial partnership, with IBM, IMDA and Samsung to develop, test and rollout smart manufacturing processes. The joint project is trialling a combination of 5G and AI for image recognition and video analytics; improved equipment monitoring and predictive maintenance using AI-enabled acoustic insights; and assembly and debugging using AR to improve productivity and quality.

In 2021, M1 also began working with Continental Automotive Singapore and JTC Corporation to trial the use of 5G SA to enable autonomous mobile robots to handle last mile deliveries of goods and food.

"One of the major factors that has promoted the growth and development of 5G in the Asia Pacific region is the support from strong and forward-looking regulatory bodies," says Willis Sim. "Singapore's government and local regulators have been proactively encouraging the adoption of new technologies, which fosters the growth of an innovative 5G ecosystem."

Currently, M1 and Keppel Digi are collaborating with Keppel Offshore & Marine (KOM) on the 5G Industrial use cases including wearables to enhance workforce safety and health monitoring, smart video analytics and real-time asset monitoring. There are more pilots in the pipeline which aim to transform the current yard processes into digital-based processes to drive towards greater efficiency, safety and productivity aligning with KOM's digitalisation journey.

## ABOUT M1

M1, a subsidiary of Keppel Corporation, is Singapore's first digital network operator, providing a suite of communications services, including mobile, fixed line and fibre offerings, to over two million customers.

Since the launch of its commercial services in 1997, M1 has achieved many firsts – becoming one of the first operators to be awarded one of Singapore's two nationwide 5G standalone network license, first operator to offer nationwide 4G service, as well as ultra high-speed fixed broadband, fixed voice and other services on the Next Generation Nationwide Broadband Network (NGNBN).

M1's mission is to drive transformation and evolution in Singapore's telecommunications landscape through cutting-edge technology and made-to-measure offerings. For more information, visit www.m1.com.sg

GSMA 5G Case Studies

# 5G CAN SAVE WAREHOUSES TIME AND MONEY

Singtel and Accenture use 5G to dramatically speed up stock picking and stock taking for Zuellig Pharma

# 5G CAN SAVE WAREHOUSES TIME AND MONEY

**Operator partner:** Singtel + Accenture, Ericsson, Teamviewer, Aerolion | **Technologies:** 5G | **Country:** Singapore

Wholesale and retail sales processes are rapidly moving online. Although some online retailers' warehouses and distribution centres may have state-of-the-art sales systems, the product picking, shipping and stocktaking tend to be labour-intensive and costly manual activities.

Singtel has joined forces with Accenture and ecosystem partners to develop a solution that harnesses 5G, edge compute, augmented reality and drone technologies to help streamline these processes. The first implementation of the solution in Singapore was in warehouses operated by Zuellig Pharma, a large and expanding healthcare services business. Singtel and Accenture say their deep understanding of 5G, end-to-end capabilities and broad ecosystems made them the ideal solution providers for Zuellig Pharma.

As it expands, Zuellig Pharma is seeing more variety, size, and fluctuations in the stock its workers need to pick. To help its warehouse operations better cope with the increase in picks, across different periods of the month, the business is employing a 5G-enabled AR-Vision picking solution. Workers wear a 5G connected headset that superimposes digital information on to their view of the real world, helping them to quickly locate the right stock.

Singtel says a proof of concept solution boosted picking productivity by up to 30%. "This could be further enhanced once more features are built into the solution, enabling more accuracy and speed in picking," the operator adds. The solution is also having a positive impact on the warehouse operator experience and safety: with the AR headset, the pickers' hands are free and they don't need to juggle multiple devices.

At the same time, Zuellig Pharma is deploying 5G-enabled drones to speed up the stocktaking process. In the past, warehouse inventory was counted manually. Now, using a pre-loaded map to navigate, the autonomous drone's on-board camera scans barcodes as it flies past them. The resulting videos are transmitted to an edge compute facility to be analysed in near real-time - image recognition software decodes and translates the barcode.

A drone can scan through the warehouse at nine times the speed of a manual worker, freeing up time for the inventory team to work on more valuable tasks. Singtel hopes to further enhance warehouse throughput and capacity, as it enables more edge solutions and applications, such as warehouse utilisation analysis.

"There's no question that 5G is the key to truly transforming manufacturing and warehouse operations for the future," says Dennis Wong, VP, Enterprise 5G & Platforms, Singtel. "This is just the beginning."

Zuellig Pharma chose to use 5G because the wide area coverage will make it easier to scale the automated picking and stocktaking solutions. The choice of 5G was also guided by its responsiveness, the relatively low cost and high maturity of the technology.

> " There's no question that 5G is the key to truly transforming manufacturing and warehouse operations for the future. This is just the beginning. "
>
> **Dennis Wong -** VP, Enterprise 5G & Platforms, Singtel

"5G has enabled our warehouse operations to be more efficient, productive, transparent and flexible," says Maikel Kuijpers, Executive Vice President Distribution at Zuellig Pharma. "Its adaptability can help to support Zuellig Pharma's evolving needs as we continue to make healthcare more accessible to the communities we serve."

A broad ecosystem came together to co-create the solutions:

- Singtel provided the portable 5G platform GENIE, developed by Ericsson, and infra structure knowledge.
- Accenture designed and brought the different solutions together to orchestrate the 5G-enabled warehouse and enable value tracking and realisation for Zuellig Pharma.
- TeamViewer, Realwear and Zebra provided their AR-vision picking glasses and ring scanner solution.
- Aerolion provided the 5G autonomous drone.

"The results of this 5G-powered 'warehouse of the future' proof of concept speak for themselves, but at the end of the day, there's nothing more rewarding than when innovation is the result of true collaboration with our clients and partners," adds Pankaj Chopra, Managing Director, Global Accenture Partner for Singtel Group.

www.accenture.com/sg-en/case-studies/communications-media/singtel

> " GENIE's ability to upend industries can't be overstated. Its portability means that any company can experiment...and experience the true power of connected operations for themselves. "

**Martin Wiktorin -** President & Country Manager for Ericsson Singapore, Brunei, Philippines & Pacific Islands
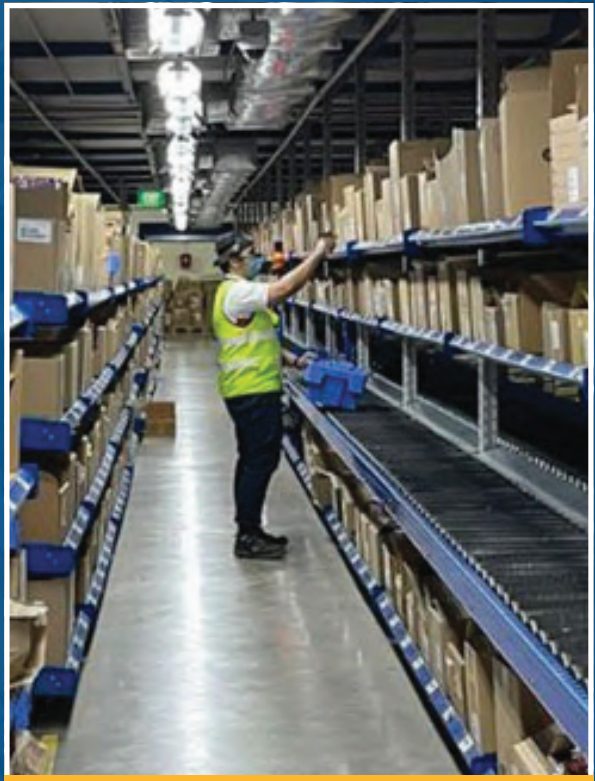


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**Pankaj Chopra -** Managing Director, Global Accenture Partner for Singtel Group

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**Maikel Kuijpers -** Executive Vice President Distribution at Zuellig Pharma

## MANUFACTURING AND LOGISTICS LEAD 5G ADOPTION IN APAC

The successful deployment of the 5G solutions at Zuellig Pharma highlights the value of developing ecosystems of partners that can make 5G easy to adopt across industries, Singtel says. The operator is working with Accenture and other partners to support a wide range of customer use cases, involving robotics, drones, mixed reality, video analytics, and other AI-centric use cases.

Industrial use cases, including manufacturing and logistics, look set to be the first major drivers of 5G adoption in Asia. "A lot of manufacturing happens in the APAC region, with one of the largest production network (logistics) in the world to support these activities," Singtel notes. "The need to track an integrated supply chain where a single product is built and assembled in multiple location are expected to drive 5G adoption in the enterprise market."

Describing 5G as a foundational technology, the operator says it is working to expose various capabilities of the underlying infrastructure, including both connectivity and edge computing. "This means bringing compute nearer to where the data is being generated, providing infrastructure capabilities and telemetry to our technology partners to build new end-to-end applications," Singtel explains.

## THE FIRST STANDALONE 5G NETWORK OF ITS KIND IN ASIA

Singtel says it is now in the advanced stages of 5G deployment and is rolling out the network "aggressively" to provide coverage to customers. Its 5G standalone network can use both the 3.5GHz and mmWave spectrum bands, supported by edge computing capacity. Designed to encourage adoption of 5G applications and services by Singapore government agencies, Singtel's standalone environment is the first of its kind in Asia, the operator says.

Singtel is providing Singapore's government agencies with 5G devices and SIMs, as well as network infrastructure and a variety of edge computing propositions. It is also engaging with ecosystem partners to deliver on their ideas, proofs of concept and use cases. Singtel flags the importance of developing clear business models that show the potential return on investment in 5G-enabled solutions.

Whereas the rollout of 5G in Singapore has been focused on implementing standalone networks underpinned by strong government support, the dynamics are different in other APAC countries. As APAC is a very heterogeneous region, the usage and impact of 5G differs significantly from country to country. Although APAC operators are innovating on specific areas and use cases for problems faced within the region, they also take a keen interest in how operators in other regions are employing 5G, Singtel says.

"Based on the current characteristics of 5G, the earliest use cases for 5G are predominantly high bandwidth, low latency use cases which are in the areas of immersive technologies (AR/VR), streaming and video analytics, and industrial use cases," the operator adds. "These use cases leveraging on 5G and standalone networks, with edge compute infrastructure, are expected to drive early 5G adoption."

Singtel expects 5G to complement other connectivity technologies, such as Wi-Fi 6. "Each technology plays a role due to either it wide adoption, economics or specific technology gap it fills," the operator says. "Singtel will continue to play to the strengths of 5G, while supporting and integrating various other access technologies into our use cases."

## ABOUT SINGTEL Singtel

Singtel is Asia's leading communications technology group, providing a portfolio of services from next-generation communication, 5G and technology services to infotainment to both consumers and businesses. The Group has presence in Asia, Australia and Africa and reaches over 750 million mobile customers in 21 countries. Its infrastructure and technology services for businesses span 21 countries, with more than 428 direct points of presence in 362 cities.

For consumers, Singtel delivers a complete and integrated suite of services, including mobile, broadband and TV. For businesses, Singtel offers a complementary array of workforce mobility solutions, data hosting, cloud, network infrastructure, analytics and cyber security capabilities.

Singtel is dedicated to continuous innovation, harnessing next-generation technologies to create new and exciting customer experiences as we shape a more sustainable, digital future.

For more information, visit **www.singtel.com**. Follow us on Twitter at **www.twitter.com/SingtelNews**.

## ABOUT ZUELLIG PHARMA ZUELLIG PHARMA
*making healthcare more accessible*

Zuellig Pharma is one of the largest healthcare services groups in Asia and our purpose is to make healthcare more accessible. We provide world-class distribution, digital and commercial services to support the growing healthcare needs in this region. The company was started a hundred years ago and has grown to become a US$13 billion business covering 13 markets with over 12,000 employees. Our people serve over 350,000 medical facilities and work with over 500 clients, including the top 20 pharmaceutical companies in the world.

More recently, we launched our Zuellig Health Solutions Innovation Centre to develop new services and address some pressing healthcare needs in Asia. Since then, our teams have been focused on creating data, digital and disease management solutions, supporting patients with chronic conditions and helping payors manage healthcare costs.

## ABOUT ACCENTURE accenture

Accenture is a global professional services company with leading capabilities in digital, cloud and security. Combining unmatched experience and specialized skills across more than 40 industries, we offer Strategy and Consulting, Technology and Operations services and Accenture Song— all powered by the world's largest network of Advanced Technology and Intelligent Operations centers. Our 699,000 people deliver on the promise of technology and human ingenuity every day, serving clients in more than 120 countries. We embrace the power of change to create value and shared success for our clients, people, shareholders, partners, and communities.

Visit us at **accenture.com**.

## ABOUT ERICSSON ERICSSON

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans the business areas Networks, Digital Services, Managed Services and Emerging Business. It is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's innovation investments have delivered the benefits of mobility and mobile broadband to billions of people globally.

Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York. **www.ericsson.com**

GSMA 5G Case Studies

# 5G BRINGS SMART MANUFACTURING TO INDONESIA

Telkomsel's IoT Smart Manufacturing solution aims to boost productivity across supply chains

JUNE 2022

# TELKOMSEL'S IOT SMART MANUFACTURING SOLUTION AIMS TO BOOST PRODUCTIVITY ACROSS SUPPLY CHAINS

**Operator partner: Telkomsel** ● **Technologies: 5G** ● **Country: Indonesia**

Highly reliable, low latency wireless connectivity can help manufacturers move faster, paving the way for major productivity improvements. In Indonesia, mobile operator Telkomsel has developed a 5G-based solution that is designed to support automated guided vehicles, remote assistance, augmented reality (AR) and virtual reality (VR).

In June 2021, Telkomsel deployed its IoT Smart Manufacturing solution with a leading multinational manufacturing company in Batam City. The manufacturer has used the solution to equip staff with VR headsets that can help them fix faulty machinery, and to enable real-time reporting on plant operations. As a result, managers no longer need to prepare weekly reports, while worker productivity has improved by about 17%, according to Telkomsel.

"This collaboration is the first use of industrial 5G technology services in Indonesia," says Alfian Manullang, Vice President Telkomsel Internet of Things (IoT). It underlines "our commitment to present Telkomsel 5G service ecosystem by building partnerships with stakeholders, especially industry players."

Telkomsel's IoT Smart Manufacturing solution is designed to enable the customer's end-to-end supply chain to become more integrated, while enhancing production control and monitoring, execution and traceability, warehouse management and energy management. It can be used to connect processes, peoples and machines to improve efficiency, increase automation and optimization.

For example, the 5G-based solution can enable factory layouts to quickly be reconfigured for new products, while providing visibility across all operations to allow real-time decision-making, detect faults, and support safety monitoring. Telkomsel says that, on average, manufacturers anticipate the solution can deliver costs savings of about 38%.

Embedded with Telkomsel's 5G Enterprise network, the IoT Smart Manufacturing solution enables manufacturers to enhance existing or new businesses by adding data from multiple sources (such as sensors and tools), access data that can minimise errors and improve the quality of decision-making, and protect sensitive data with reliable telco-grade connectivity. It also supports remote control of machines operating in hazardous environments.

"Telkomsel IoT smart manufacturing will support a sustainable manufacturing industry by improving efficiency, productivity, and security at each operational level through accurate data analysis," explains Alfian Manullang. "By transforming to IoT smart manufacturing, production output will increase 20%, machine utilisation will increase 20%, overall equipment effectiveness also will increase 15%, as well as reducing unplanned downtime to 30%."

> " By transforming to IoT smart manufacturing, production output will increase 20%, machine utilisation will increase 20%, overall equipment effectiveness also will increase 15%, as well as reducing unplanned downtime to 30% "
>
> **Alfian Manullang -** Vice President Telkomsel Internet of Things (IoT)

## HELPING INDONESIA HARNESS THE POTENTIAL OF 5G

Telkomsel describes 5G as a "game-changer for manufacturers", noting that the consulting firm STL Partners has estimated the benefits of 5G to the global manufacturing industry could be worth US$740 billion by 2030.

As well as providing highly reliable, low latency connectivity, 5G can also deliver the high throughput and density that manufacturers need, according to Telkomsel. "For the past four years, Telkomsel has invested significantly in building out our 5G know-how, talent development, and setting up a comprehensive set plan to bring 5G to Indonesia," says Alfian Manullang. "With 5G, we can transfer a big amount of data in real-time. 5G will facilitate advanced technology, artificial intelligence, automation and industrial IoT. 5G is expected to be one of the mainstream technologies of the future, with alternate technologies playing complementary and selective roles."

The deployment in Batam City is the first stage in the development of Telkomsel's 5G portfolio for manufacturers. It is working closely with the government, partners and associations to further build out Indonesia's digital infrastructure and support the implementation of Industry 4.0 concepts, such as greater automation, customisation and responsiveness.

Telkomsel advises mobile operators to forge partnerships with app developers and vendors to identify 5G use cases that fit specific industry opportunities "because each vertical is different with unique connectivity, latency and reliability requirements – not to mention legislative sensitivities."



In December 2021, Telkomsel and the Ministry of Industry (Kemenperin) of the Republic of Indonesia signed a memorandum of understanding and launched Indonesian Digital Industry Center 4.0 (PIDI 4.0). Telkomsel has also established a 5G Experience Centre to support the government's Making Indonesia 4.0 roadmap.

In addition to its IoT Smart Manufacturing solution, Telkomsel offers end-to-end fleet management solutions to provide real-time visibility over supply chain and logistics, as well as a smart connectivity solution. "We support Indonesia to be at the forefront of technology, facing the Industry 4.0 competition," says Alfian Manullang. "To be the first mover, we give a strong and clear signal to our ecosystem of partners."
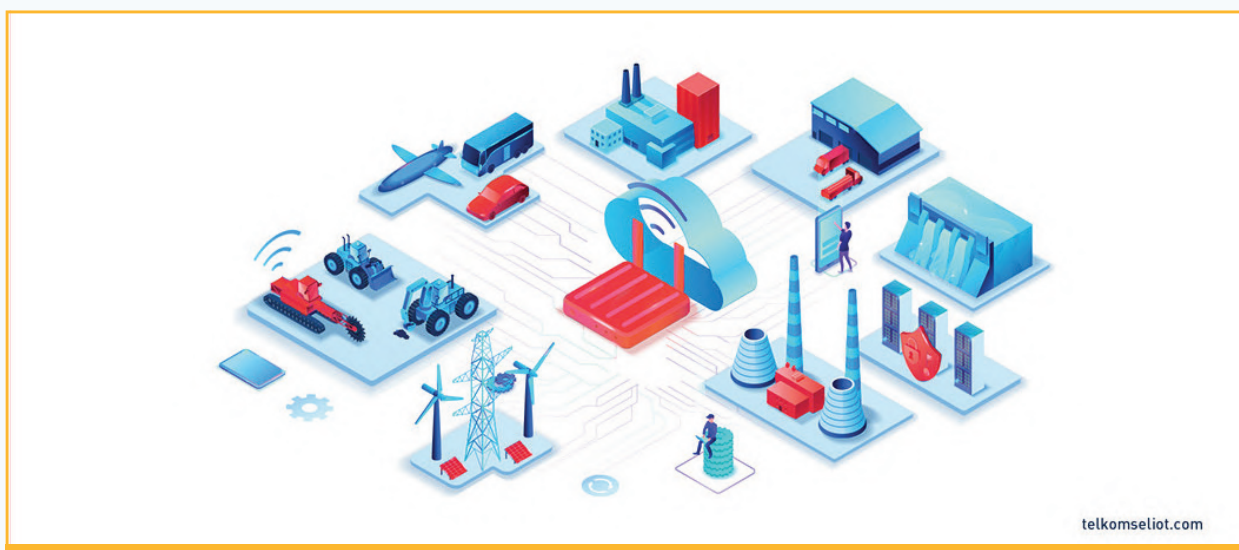
## ABOUT TELKOMSEL  Telkomsel
by Telkom Indonesia

Telkomsel is a leading digital telecommunication company that continues to open up more opportunities and possibilities by enabling digital connectivity, digital platform, and digital services developed by prioritizing the benefits of technology for all levels of society across the country.

Telkomsel has been consistently deploying 4G mobile broadband networks and developing 5G networks, as well as enriching innovative digital solutions including Mobile Gaming, Digital Entertainment, Digital Lifestyle, Mobile Financial Services, Enterprise Solutions, and Internet of Things. During its 26 years of existence, today Telkomsel has served more than 175 million customers across Indonesia supported by more than 247,000 BTS.

Further information about Telkomsel can be accessed through **telkomsel.com**.

**GSMA 5G Case Studies**

# SECURE AND RESPONSIVE CONNECTIVITY FOR MANUFACTURING AND HEALTHCARE

True and its partners have developed commercial 5G solutions for factories and hospitals

# TRUE AND ITS PARTNERS HAVE DEVELOPED COMMERCIAL 5G SOLUTIONS FOR FACTORIES AND HOSPITALS

**Operator partner: True** ● **Technologies: 5G** ● **Country: Thailand**

Fast and secure 5G connectivity can help all kinds of organisations to become more efficient and effective. In Thailand, mobile operator True is exploring opportunities to use 5G to improve both manufacturing and healthcare.

For example, True and Huawei have deployed a standalone 5G network and mobile edge computing (MEC) to enable Siriraj Hospital in Bangkok to become a smart hospital. In this project, one of the key use cases is employing unmanned vehicles for logistics. A 5G self-driving car can deliver medicines and medical equipment from the pharmaceutical department to other hospital buildings. True says the combination of 5G and edge compute enables the vehicles to operate automatically or be controlled and monitored via secure, low latency connectivity.

Integrated into a hybrid public-private 5G network, the edge facility enables hospital staff to also use

5G to access the on-site data centre directly without exposing potentially sensitive data traffic to a public network. True is now working with other hospitals to deploy similar solutions in their buildings.

The Faculty of Medicine Siriraj Hospital, Mahidol University and Huawei have established a Joint Innovation Lab to incubate innovative 5G applications. In addition to unmanned vehicles, Siriraj Hospital is piloting 5G portable medical boxes, 5G medical carts and 5G smart hospital beds. It expects to incubate 30 5G medical applications in 2022. The lab is also exploring how to use 5G and artificial intelligence to improve emergency medical services, pathological diagnosis systems, treatments of non-communicable diseases, inventory management and personal health records.

## ENABLING GREATER AUTOMATION

In the manufacturing sector, True has partnered with Mitsubishi and Lertvilai to demonstrate how a 5G network can support production lines. For the ongoing demonstration at Automation Park, near Bangkok, Mitsubishi set up robots and machines to manufacture products.

True is using 5G to connect the autonomous factory system (provided by Mitsubishi) to the autonomous mobile robots (AMR) provided by Lertvilai and an automated storage and retrieval system provided by Daifuku. The AMR, which are used to transport products from the demo production line to the warehouse, are successfully communicating with the factory via 5G without changes to the existing configuration. The 5G connectivity is also used to connect the Mitsubishi SCADA (supervisory control and data acquisition) system to a production line performance dashboard. For the demo, True has provided a virtual private network solution (using a private DNN - data network name – a 5G version of an APN).

The demonstration went live at the beginning of 2022. True says the connectivity is running smoothly, and the solution is now commercially available. It expects the increased automation will improve efficiency, by reducing the need for human resources.

As well as offering 5G private networks, True also provides Internet of Things, augmented reality and virtual reality (AR and VR) solutions which benefit from 5G. True says it is aiming to prove that the combination of "5G and ICT solutions can power up industry."

Having been granted a mmWave license (26GHz) in February 2020, True is now testing millimetre wave spectrum for commercial service, which can provide greater capacity, faster throughput and greater responsiveness than lower frequency bands

## CULTIVATING A 5G ECOSYSTEM

True has organised three programmes to help build a 5G ecosystem and community in Thailand:

» 5G Worldtech X: an immersive tech show in Thailand showcasing over 40 use cases from over 30 local and global partners.

» 5G Tech Talk: a forum where a local and global guru from each vertical sector shares 5G trends in that industry.

» 5G Tech Sandbox: a start up pitching programme to encourage small tech companies to prepare their solution to harness 5G capabilities.

Piroon Paireepairit, Head of the 5G Working Group at True, said: "True's key agenda is to drive a new 5G ecosystem in Thailand, which will enhance the national digital transformation, as well as create new potential in the digital economy era. One of the key drivers would be the support of government agencies who could provide funding and support to pilots and develop new 5G business cases and ecosystem in various vertical industries."

## ABOUT TRUE    true5G

True Corporation Plc. is Thailand's only
fully-integrated, nationwide telecommunications
provider and leader in convergence.

Its four core business segments are: True Mobile
business under TrueMove H brand offers mobile
services with the largest network coverage and
encompasses the broadest frequencies, TrueOnline,
the largest broadband and WiFi operator,
TrueVisions, the largest nationwide pay TV
operator, and True Digital Group offers a portfolio
of digital services as the ultimate digital enabler in
Southeast Asia.

True's major shareholders include the Charoen
Pokphand Group, one of Asia's largest
conglomerates, and China Mobile, the world's
largest mobile telecommunications company by
market capitalization.

For more information, please visit
www.truecorp.co.th

# CONCLUSIONS

As the case studies in this booklet show, 5G is already having a significant impact on productivity and efficiency in multiple industries across the Asia Pacific region. By streamlining processes and enabling the capture of more and better real-world data, 5G is helping organisations to become more responsive and dynamic. These gains are particularly apparent in manufacturing, logistics, and healthcare. The construction sector, which has been notoriously difficult to automate, is also beginning to benefit from the flexible connectivity provided by 5G.

As well as supporting the wider deployment of robotics, drones and artificial intelligence to enable greater automation, 5G is helping individual workers become more efficient and effective. Connected headsets can provide staff with augmented reality and virtual reality services that can help them learn new processes and techniques, and install, maintain and repair machinery.

At the same time, 5G-connected sensors and cameras can capture detailed data in real-time, enabling the development of digital twins and dashboards that staff can use to track how their operations are performing minute by minute. Equally, 5G-connected drones can quickly survey large sites both to monitor progress and for security and safety checks. The 5G connectivity can be used to relay real-time video streams to image recognition software that can detect any issues or intruders.

In many cases, 5G networks are working hand-in-hand with edge compute capabilities provided by mobile operators. This approach lowers the network latency to a point where the connected equipment has immediate access to the intelligence running on the edge facility, whether than be image recognition software or some other form of analytics. At the same time, 5G is proving to be reliable enough to enable critical processes, such as the remote control of machinery or vehicles in factories or for remote consultations in the healthcare sector.

## More to come

The advent of standalone 5G networks (with a dedicated 5G core) will enable this versatile cellular technology to have an even greater impact. With standalone 5G, mobile operators will, for example, be able to offer enterprises a dedicated slice of connectivity, along with quality of service guarantees.

Meanwhile, the cost of 5G modules and other equipment is falling as the ecosystem gains economies of scale. The rollout of 5G in major markets, such as Indonesia and Malaysia, with India to follow, is helping to lower the cost of 5G devices and base stations. By the end of 2025, the GSMA expects 5G to account for 14% of total mobile connections in the Asia-Pacific region[3], overtaking 2G and 3G in the intervening period.

As the case studies in this booklet show, many mobile operators are working with governments and public agencies to explore the potential of 5G, particularly with respect to drones and other applications that may require regulatory oversight. As the role of 5G continues to grow, Asia-Pacific's policy makers are increasingly looking to create a favourable business environment that will encourage further investment and allow operators to extend next-generation digital services to all of the region's citizens and accelerate the recovery from the pandemic.

*[3]Source: The Mobile Economy Asia Pacific 2022*

For more information, please visit the
GSMA website at **www.gsma.com**