Experience
Singapore

mapping a
cyber future

How Singapore and
ASEAN are harnessing
the possibilities, while
adressing the challenges,
of digitalisation
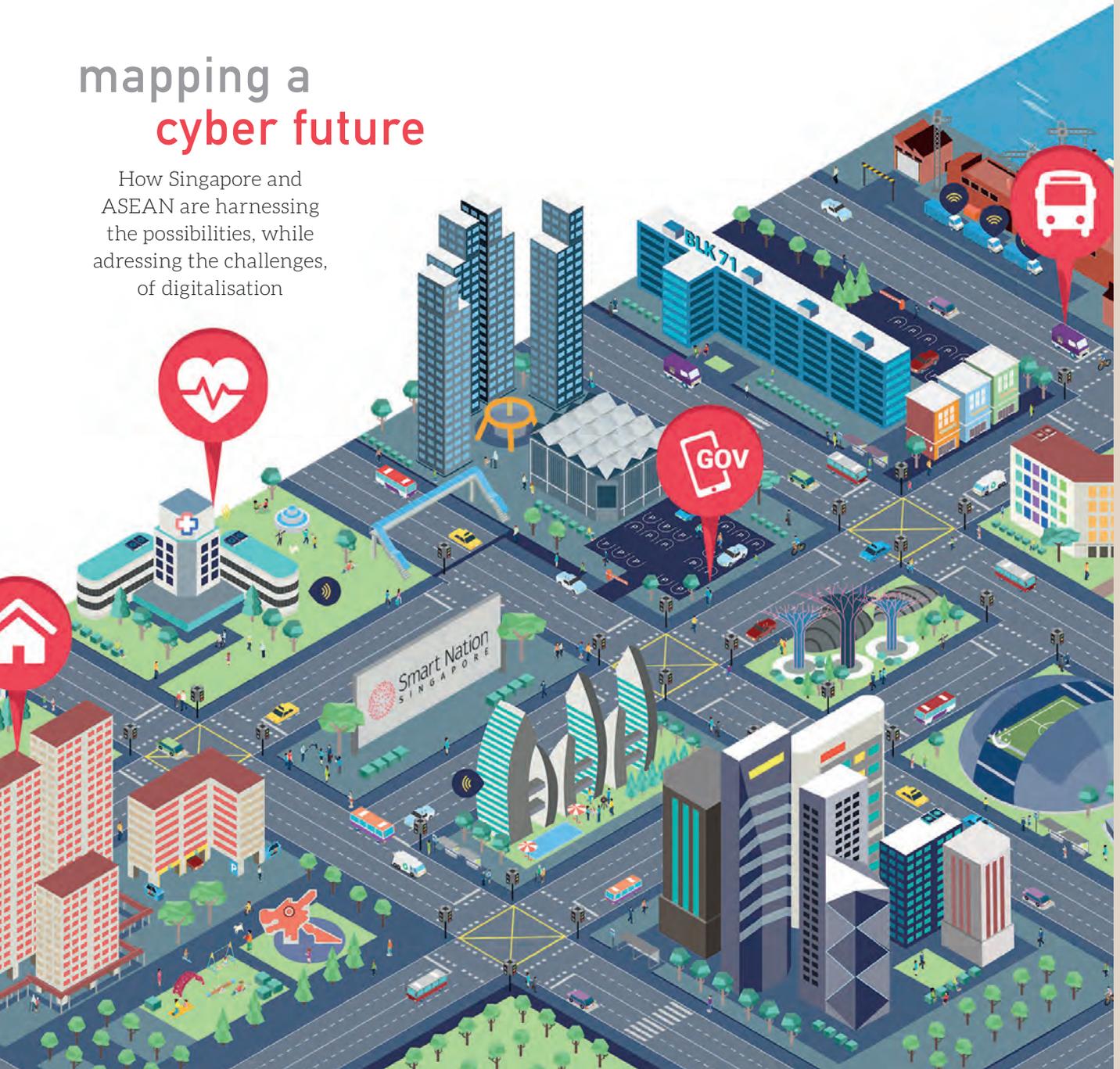
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ED'S NOTE

Dear readers,

It's undeniable that advances in robotics, Artificial Intelligence and Big Data have the power to transform societies and usher in a new level of prosperity and efficiency, in areas ranging from traffic management to digital payments. But the march towards 'Smart Nation'-hood comes with its own set of challenges, and dangers.

Historically, the threats to our security, while no less dangerous, were at least 'tangible' — the robber breaking into your home; a bank heist. You knew who the enemy was. But with digitalisation comes a new breed of cyber-criminals — hackers, conmen, terrorists — who have unleashed a wave of threats. From identity theft, embezzlement and data breaches to internet love scams, a compendium of crimes have now been made possible by technology. Often, the actions of these 'unseen' forces are not known to the victim until it's too late. The severity of the problem is compounded by the borderless nature of the internet, which means that such criminals can operate beyond the jurisdiction of national law enforcement agencies. It is thus imperative that governments come together to develop strategies and share expertise so as to effectively police this new frontier. The question then remains: how do we embrace progress while ensuring that principles of safety, security and sovereignty remain unviolated?

In Mapping a Cyber Future (pages 3-5) we look at how Singapore is addressing challenges in its own push towards digitalisation. Two Singaporean public service officers talk about their contributions to digital security in Plugged In (pages 8-9). Cooperative Connections (pages 10-11) and Smart Cities — The ASEAN Way (pages 6-7) take the issue to the regional stage, by exploring measures that have been undertaken to safeguard cybersecurity and urban development. Of course, in a region as diverse as the ASEAN, there is no single model for every city. But with effective leadership, cooperation and a spirit of adaptability, there is hope that we can collectively enjoy the benefits of a 'wired' future. Enjoy the issue.

Teo Lay Cheng

Director
Strategic Communications Directorate
Ministry of Foreign Affairs Singapore

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SINGAPORE

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mapping a cyber future

Despite the challenges of going digital, Singapore is going full steam ahead in its efforts to become a Smart Nation.

It's a Sunday morning in Singapore when Madam Usha Venkatramaiah realises she needs to check on her pension balance. Twenty years ago, she would have had to wait for a working day to visit a pension office and perform the transaction in person. But today, the 55 year-old simply whips out her smartphone and checks her balance with her Singapore Personal Access (SingPass) account.

The introduction of SingPass in 2003 was one of the first steps made by the Singapore Government to digitise its services. SingPass allows citizens to perform transactions with over 60 state agencies securely and conveniently. And in the 15 years since its launch, it has stayed ahead with changing technology. Over the years, SingPass was enhanced to include an improved user interface, and 2-Step Verification (also known as 2FA) was introduced for digital transactions involving sensitive data. Most recently, the SingPass Mobile application was introduced. Users can now log in using biometrics (thumbprint or fingerprint), for faster and more secure transactions.

The evolution of digital governance is a continued priority for the Republic, with Prime Minister Mr Lee Hsien Loong spelling out his vision for a Smart Nation in 2014. That year, he explained that embracing technology would allow Singaporeans to make most of global opportunities. And leading the way is the Smart Nation and Digital Government Group (SNDGG), which has been set up under the Prime Minister's Office The outfit is made up of the Smart Nation and Digital Government Office (SNDGO) and Government Technology Agency (GovTech).

SNDGO is in charge of driving the digital transformation of government and building long-term capabilities for the public sector. GovTech works on building the key platforms needed for a Smart Nation. The goal for Smart Nation is to improve convenience and citizen's quality of life, drive efficiencies and transform the economy. And Smart Nation has 6 focus projects: digital identity, e-payments, a national sensor platform, urban mobility, integrated government services, and CODEX (a project to re-engineer the government's digital infrastructure).

This holistic approach allows GovTech to ensure its applications and recommendations are not limited to one sector alone. It also encourages the transfer of knowledge and best practices to the private and people sectors. The Government's eagerness to adopt new technologies has also spurred these sectors to do the same.

In this vein, the Republic's finance and banking sectors introduced PayNow in July 2017. The service allows users of different banks to transfer funds instantaneously using just their

A SAFER WEB EXPERIENCE

The approximate number of SingPass users:

3.3 MILLION

With a SingPass, users can access hundreds of e-services provided by more than 60 government agencies.

Source: The Business Times

recipient's mobile or identity card numbers. To de-clutter QR code stickers on store fronts and to enable quicker payment processesing for merchants, the government also worked with industry players to launch the Singapore Quick Response Code (SGQR) standard in September 2018. It is a first-of-its kind in the world. SGQR combines multiple payment QR codes into a single SGQR label, making QR code-based mobile payments simple for both consumers and merchants. With SGQR, merchants only need one QR code to accept mobile payments from consumers. It can accept payments from 27 different schemes. Since its introduction, PayNow has expanded its customer base to include corporates, businesses, Government agencies, associations and societies.

KEEPING ATTACKS AT BAY

But the march to a Smart Nation isn't without its dangers. The Government established the Cyber Security Agency of Singapore (CSA) in 2015 to oversee national cybersecurity efforts in both the public and private sectors. Signalling that cybersecurity is everybody's responsibility, a cybersecurity start-up incubation hub was also opened in April this year. Dubbed the Innovation Cybersecurity Ecosystem @ Block 71 (ICE71), it also provides funding for future cybersecurity entrepreneurs and leaders. The project is a collaboration between CSA, the Infocomm Media Development Authority (IMDA), telco Singtel and the National University of Singapore.

And it's not just private-public partnerships that will keep cyber-attacks at bay. Cross-border collaborations are just as crucial in the fight against data hacks and leaks. Speaking at the 3rd ASEAN Ministerial Conference on Cybersecurity, Minister-in-charge of Cybersecurity S. Iswaran noted that cyber-incidents

"It is absolutely essential for us to attract top talent with deep digital skills for us to fulfil our Smart Nation ambitions. We will invest in our long-term engineering capabilities, to ensure that we have a core group of passionate innovators to lead and drive technology change, both within the civil service and across the private sector."

Dr VIVIAN BALAKRISHNAN
MINISTER FOR FOREIGN AFFAIRS AND MINISTER-IN-CHARGE OF THE SMART NATION INITIATIVE, SINGAPORE

have had a debilitating impact on economic activity and regional connectivity. "Hence, our pursuit of ASEAN's digital ambition must be undergirded by our commitment to strengthen cybersecurity in the region," he said. Mr Iswaran, who is also Minister for Communications and Information, stressed that "the one cannot function without the other." *(Find out more about regional cybersecurity initiatives on pages 10-11.)*

The real threat of cyber-attacks was brought to the fore this year, when Singapore experienced its largest cyber-attack yet. Hackers broke into a healthcare group's database to steal the personal particulars of 1.5 million patients. In response, Mr Iswaran convened a Committee of Inquiry (COI) to investigate the cyber-attack. The Committee will also recommend measures to strengthen public-sector IT systems against similar attacks. Chaired by a retired judge, the COI will release its findings later this year.

ALL GEARED UP

On average, each Singaporean owns an average of

3.3
DEVICES

including a smartphone, tablet and computer.

Source: Consumer Barometer (Google)

CONNECTING A COUNTRY

Another challenge on the road to becoming a Smart Nation is inclusivity. Despite its ability to connect people, cyberspace can also alienate those who can't keep up with fast-evolving technology, lingo and etiquette. But it appears that Singapore has largely avoided this problem — in 2014, a Google study found that 78 per cent of those aged above 55 in the Republic accessed the Internet every day, either through a traditional web browser or apps on their smartphones.

But unique dangers lurk every time a senior goes online. The most common are cyber-scams by criminals who take advantage of the elderly's vulnerability. As Ms Joelle Fong, a researcher at the Insurance Risk & Finance Research Centre from the Nanyang Technological University found, "'Sweetheart scams' targeting the elderly not only prey on their victims' sense of loneliness, but also exploit the huge void that may be left through events such as children leaving home, divorce or death of a spouse." Singaporeans lost about S$7.5 million to Internet love scams in the first quarter of 2016. Similar figures in Malaysia show that the problem is not unique to Singapore.

Tackling these unique issues are initiatives like IMDA's IM Silver Portal, which teaches seniors how to go digital in a safe manner. Boasting an elderly-friendly interface, the website equips users with skills and knowledge related to cyber-activities as well as cybercrime. "It is now even easier for seniors to learn how to use technology to stay connected with friends and family, enhance the quality of their lives through online resources and at the same time, stay safe from cybercrimes," explained IMDA's chief executive Mr Tan Kiat How.

Seniors can also tap on a national lifelong learning credits scheme known as SkillsFuture to enrol in courses on email etiquette, e-commerce and even social media. Or if they prefer, they could even try their hand at learning on national TV. Earlier this year, Channel NewsAsia aired a well-received documentary, *#DontForgetMe*. Aimed at teaching two seniors the ways of social media, the documentary featured Instagram photographers Yafiq and Yais Yusman, 25, twins with more than 100,000 followers between them. Viewers watched the seniors learn to take selfies, frame photos and upload their work on Instagram. Episodes of the show are available on Channel NewsAsia's website.

Asked why he was interested in participating in the show, Yais said, "It's a way of bringing everybody along on the tech ride. It's no fun when people are left out so I'd like to see everybody try, regardless of how old or IT 'un-savvy' they think they are." Judging by Singapore's private and public initiatives, it seems to be a sentiment shared by the entire country.

STRENGTHENING READINESS AND CAPABILITIES

▶ Singapore is home to **31** Silver Infocomm Junctions, senior-friendly infocomm learning hubs

▶ Introduced in **2007**, these hubs have benefited some **80,000** participants

▶ On the other end of the age spectrum, the inaugural Smart Nation Scholarship was awarded to **nine** recipients this year

▶ Recipients will be groomed for various information & communications technology **leadership roles** in the public sector, with opportunities to work on a diverse range of cybersecurity work, and shape Singapore's infocomm and media ecosystem

The pioneer batch of Smart Nation Scholars with Minister-in-Charge of the Smart Nation Initiative, Dr Vivian Balakrishnan.

Southeast Asian cities are growing fast and two fundamental mega-trends are going to affect the way these cities develop. The first is urbanisation – 90 million more people within ASEAN are expected to urbanise by 2030, and cities will drive most of our region's growth. The second trend is digital disruption, which is not only transforming patterns of production and consumption, but also revolutionising the way we live, work and play.

With challenges come opportunities. The information age makes available a whole suite of powerful tools for cities. 'Artificial intelligence (AI)', 'data science', 'e-payment' and 'cloud computing' are among the buzzwords in cities today. But being a 'smart city' takes more than having technologies – it calls for a systematically innovative way to address urban challenges that is based on good governance and planning, enabled by technologies.

Singapore's experience offers a glimpse of how it can work.

the ASEAN way

Addressing the challenges and opportunities that urbanisation and digitalisation present in the region.

1

1 A group photo of the participants from the ASCN workshop in May.

2 Participants from the ASCN workshop in May discussing Smart Cities Initiatives.

"The ASCN is a ground-breaking initiative. I've enjoyed the diverse exchanges, and look forward to more discussions and collaborations."

Mr Tan Chee Hau
Director (Planning and Prioritisation), Smart Nation and Digital Government Office, Prime Minister's Office

"The ASCN allows ASEAN cities to share a common vision, but more importantly, to ensure that NO ONE IS LEFT BEHIND"

Mr Nigel Paul Villarete
City Administrator, Cebu City

Since the 1960s, the city state launched successive national IT plans to be future-ready by anticipating long-term needs for connectivity. The government also readily invested in physical and digital infrastructure, such as fibre broadband. These early works laid a solid foundation for individuals, businesses, and the public sector to develop capabilities and fully exploit the benefits offered by new technologies.

Besides adopting infocomm technology, Singapore also consistently innovates itself to prepare for new challenges: from transforming our physical environment and enhancing our industrial productivity to improving public sector service standards and planning for communities with stronger ties. The comprehensive Smart Nation vision unveiled in 2014 signifies a move to harness the efforts of the whole society to leverage digital technology. The goal is to become a leading economy powered by digital innovation, and a world-class city with a government that gives our citizens the best homes possible and responds to their different changing needs. At the heart of this vision are the people: people who should be empowered with the additional capabilities to take control of daily experiences, who will enjoy faster commutes and convenience in their daily activities, and who will gain opportunities to improve their standards of living.

Singapore's experience demonstrates the foresight of the successive generations of leaders, and the value of integrated planning. Technology never stands on its own: it has to be integrated with our economic and physical development and carefully managed to safeguard people's interests.

CUSTOMISED TO CONTEXT

A region that is as culturally and socioeconomically diverse as the ASEAN means that no single smart city model will work for every ASEAN city, nor would one solution for traffic management or digital payment work for all. City leaders, with their intimate knowledge of places and people, ought to take the lessons, customise them to fit their own context, and create their own smart city models. This process calls for flexibility in creating a common regional understanding of what a 'smart city' is – not to be prescriptive but to be collaborative – and providing ample opportunities to explore available industry solutions as well as for a platform for the exchange of ideas and experiences. The ASEAN Smart Cities Network (ASCN) was thus established as a collaborative platform for catalysing smart city development in the region.

There is more to the network than having individual cities working on their own. In the journey to address these challenges, cities struggle to find the solutions that match their problems and secure sustainable funding for projects. During the ASEAN Smart Cities Governance Workshop, chief smart city officers from all 26 pilot cities in the network interacted with industry leaders through matchmaking sessions. They also shared their opinions on pressing urban issues through panel discussions. These programmes were to facilitate mutual understanding: city leaders become aware of the available solutions the industry can provide, the private sector gets acquainted with the challenges facing each city, and ASEAN external partners can come in with the necessary levers – funding, capability, or other services – to truly realise the smart city action plans.

At the ASEAN Smart Cities Inaugural Meeting during the World Cities Summit (WCS) 2018, five memoranda of understanding and letters of intent were signed between cities and businesses or external partners.

Still, the journey will not be easy. At the end of the day, a smart city is a means to an end: technology alone cannot live up to the grand vision of sustainable development and improving people's lives. However, with good planning and governance, close partnership and viable funding, it offers more opportunities than ever to deliver solutions to the people, businesses and the public sector. We have confidence that the ASCN can catalyse actions on the ground, and bring real value to the cities and their people.

"Interoperability and Integrated Services are the two defining characteristics of the ASCN."

Rowena Henedine Dominguez – Narajos
Information Technology Officer II, City Information Technology Center, Davao City

plugged in

Whether it's building digital products or fighting cyber-attacks, these two public officers know that — as in real life — connections matter in cyberspace.

TEN IS BETTER THAN ONE

"I've learnt that each of the ASEAN Member States (AMS) has a part to play. The effort to create a safe and secure cyberspace cannot be done alone," says Ms Intan Safinas Binti Mohd Tawfik. The 33 year-old was responding to *Experience Singapore*'s question about her biggest takeaway from her two years at the Cyber Security Agency of Singapore (CSA), where she serves in its International Cyber Policy Office.

As an ASEAN Desk Officer within the agency, she has seen firsthand how important collaborations are when it comes to promoting cybersecurity. "It's a transboundary issue," she says. "There are no boundaries per se in cyberspace, so we really need everyone's cooperation on the issue." Promoting such cooperation are initiatives such as the ASEAN Cyber Capacity Programme (ACCP) (see page 10 for more). Since the launch of the ACCP, Singapore has been reviewing further plans to contribute to and complement existing regional capacity-building efforts.

A HOLISTIC RESPONSE

The ASCCE will comprise:

▸ **Cyber Think-Tank and Training Centre** conducts research and provides training in areas spanning international law, cyber-strategy, cyber-conflict, legislation, cyber norms and other cybersecurity policy issues.

▸ **Computer Emergency Response Team (CERT) Centre** provides CERT-related training as well as facilitates the exchange of cyber-threat and attack-related information and best practices.

▸ **Cyber Range Training Centre** delivers virtual cyber-defence training and exercises for all AMS.

In this vein, CSA will launch a multi-disciplinary physical facility, the ASEAN-Singapore Cybersecurity Centre of Excellence (ASCCE — pronounced 'ace'). Announced at the third edition of the Singapore International Cyber Week, the ASCCE addresses feedback garnered during previous installations of the ACCP. "AMS participants shared that ACCP could benefit from a more structured programme delivered from a facility dedicated to such purposes," shares Ms Intan. CSA will house the ASCCE, while the Singapore Government will fund its S$30 million cost over the next five years, until 2023.

Ms Intan believes that the ASCCE is a logical next step for intra-ASEAN collaboration on cybersecurity. It comes on the heels of the enhanced capacity-building

PHOTO / AIK CHEN

> **"It might be a one-time pain for businesses but after signing up for CorpPass, they can enjoy enhanced security, better control and increased convenience."**

Mr Poon Shou Xin
Senior Manager,
National Digital Identity, Govtech

Singapore Corporate Access
CorpPass

GOOD BUSINESS

Just over two years ago, the Government Technology Agency of Singapore (GovTech) launched the Singapore Corporate Access, also known as CorpPass. Similar to SingPass (see page 3), CorpPass is a digital identity system that allows corporate entities to transact with over 140 Government digital services. "As we developed CorpPass, we were mindful of three aims," shares Mr Poon Shou Xin, a senior manager at GovTech's National Digital Identity team, which was also the brains behind SingPass. "These aims were to create a product that enhances security and convenience of use, as well as giving business entities better control."

Together with other Government agencies, GovTech launched CorpPass as as the required digital identity for businesses to transact with government digital services, among them corporate and consumption tax filing. Before CorpPass, employees of businesses used

their individual SingPass accounts to perform such transactions. But this mixing of personal and corporate identities wasn't ideal. And so CorpPass was developed to effectively separate one's SingPass from one's work. In doing so, the system promotes "cyber-hygiene" in corporate cyberspace.

Mr Poon, 38, says that by the time CorpPass was implemented, users were already accustomed to the fact that they needed a digital identity to transact with the Government. "So there wasn't a need to get them to adopt new technology, but rather just evolve their habits." Still, the Government gave businesses a two-year grace period to make the switch to CorpPass. Since then, CorpPass has become the single login method for businesses transacting with Government agencies.

Today, some 90 per cent of local businesses use the system — something that makes Mr Poon and his team swell with pride. "At the end of the day, we hope to make it more efficient and effective for businesses, by facilitating their interface with government agencies," he explains. He adds that the number of commercial entities using CorpPass is set to grow further in the coming weeks, since the service was rolled out to foreign entities in October. "There are many foreign entities that transact with the Government, so they will need to get onboard with CorpPass as well," he says, pointing to transactions related to taxation as well as intellectual property. Signing up for CorpPass is free for foreign and local entities, and foreign entities' applications will be processed in about five to 10 working days.

For more information on CorpPass, visit corppass.gov.sg or e-mail support@corppass.gov.sg.

brought on by the ACCP as well as regular exchanges on potential cyber-attacks. "I work closely with other cyber-agencies from all AMS and this close collaboration helps us put on a united front against cyber-warfare," she says. This close partnership, she adds, promotes knowledge- and information-sharing in times of crisis following cyber-attacks.

Working closely with her counterparts in the region has also proved enriching for Ms Intan's personal life. She has forged strong friendships with them, which has allowed her to better appreciate the different cultures of Southeast Asia. "We might be working in different countries but at the end of the day, it's a common cause to protect our shared cyberspace we're working towards. And that's what keeps me going every day."

cooperative connections

Cyberspace knows no boundaries — *Experience Singapore* explores the impact of this on cybersecurity and urban development.

In today's digital world, no one bats an eyelid at buying goods and services online. But unbeknownst to many, these cross-border transactions depend on a safe cyberspace environment, one that is free of malicious threats and crime. And given the boundary-free nature of the Internet, no sole state can police it alone. Cyberspace doesn't have distinct jurisdictions where one country's rule applies over another's.

That's why global cooperation is dubbed the bedrock of cybersecurity. In this vein, the Cyber Security Agency of Singapore (CSA) is actively seeking international partners with whom it can cooperate on global cybersecurity matters. In the past year alone, the agency has signed memoranda of understanding — and expanded existing agreements — with countries as diverse as India, the United Kingdom and Japan. These agreements allow signatory states to cooperate in areas like cybersecurity capacity-building as well as the exchange of best practices.

Beyond bilateral programmes, there are also regional efforts that combine the expertise and efforts of groups like the Association of Southeast Asian Nations (ASEAN). One such initiative is the ASEAN Cyber

MORE THAN

140

director-level
ASEAN
participants have
benefited from
the ASEAN
Cyber Capacity
Programme

*Source: Cyber
Security Agency
of Singapore*

Capacity Programme (ACCP). Launched in 2016, the S$10 million initiative takes a modular, multi-disciplinary, multi-stakeholder approach to building cyber-capabilities in ASEAN Member States across both technical and policy areas. "Singapore launched the ACCP to boost cybersecurity know-how across the region and keep pace with technological developments," noted Mr S Iswaran, Singapore's Minister for Communications and Information. "Thus far, we have trained more than 140 director-level officials from ASEAN Member States (AMS) on topics ranging from cyber-strategy development and legislation, to incident response. Under the ACCP's Industrial Attachment Programme, every AMS has been invited to send two officers to Singapore for training in Security Operations Centre (SOC) set-up and management."

True to ASEAN's inclusive nature, the ACCP also taps on the strengths of non-ASEAN Member States, among them the United States. Such participation makes the initiative more robust as participants benefit from a global perspective of cybersecurity issues.

1 Dr Vivian Balakrishnan (right) and a delegate learning more about the plans underway in the pilot phase of the ASEAN Smart Cities Network.

2 Dr Balakrishnan delivering his welcome address at the inaugural ASEAN Smart Cities Network Meeting.

3 Mr David Koh (right), Chief Executive, Cyber Security Agency of Singapore (CSA), and Dr Ikuo Misumi, Deputy Director-General of the National Center of Incident Readiness and Strategy for Cybersecurity (NISC), Japan. Singapore signed a memorandum of cooperation on cybersecurity with Japan in 2017.

PHOTOS / MFA

CITIES OF THE FUTURE

90 MILLION people are expected to make the rural-to-urban switch in ASEAN by 2030

Mid-tier cities housing between 200,000 and 2 million residents are set to drive **40 PER CENT** of the region's growth

Source: ASEAN
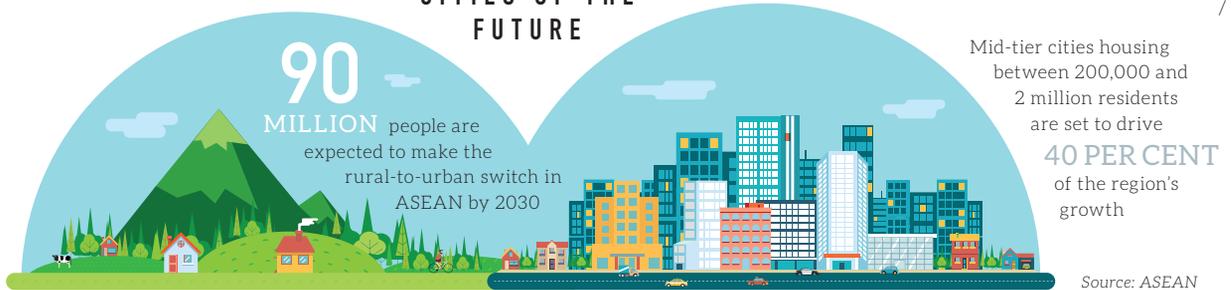
BENEFITS BEYOND SECURITY

There are endless benefits to a robust and safe global cyber-domain. These benefits spread across different sectors, promoting cooperation in healthcare, transport and even urban development.

The benefits related to urban development are best seen in the ASEAN Smart Cities Network. Launched earlier this year, the Network brings together ASEAN Member States with the common goal of using technology to promote smart and sustainable urban development. Technology will also be used to tackle complex development issues related to city congestion, water/air quality, poverty, rising inequality, urban-rural divide, citizen security and safety. "These are common challenges that all of us throughout ASEAN will face," pointed out Dr Vivian Balakrishnan, Singapore's Minister for Foreign Affairs. Given the regional nature of the pressing urbanisation problem, the ASEAN Smart Cities Network will be launched in 26 cities across the ten states, including Singapore, Johor Bahru, Phuket, Yangon, Phnom Penh and Vientiane.

The Network, which will be ratified at the 33rd ASEAN Summit in November, has three broad aims:

- **Facilitate** cooperation on smart cities development. Participants will come together to explore potential complementarities, share best practices, develop individualised action plans for smart cities development and craft a development framework that is unique to ASEAN.

- **Catalyse** bankable projects with the private sector. Member cities will be linked up with private sector solution providers to kick-start practical and commercially-viable projects with tangible outcomes.

- **Secure** funding and support from ASEAN's external partners. Member cities will pair up with external partners on a voluntary basis, and form mutually beneficial partnerships to drive smart cities development. Multilateral financial institutions such as the World Bank and Asian Infrastructure Investment Bank will be approached as well.

Technology will drive most of the ASEAN Smart Cities Network's work, which will tap on Artificial Intelligence, Big Data and robotics to succeed efficiently. Just like in the area of cybersecurity, ASEAN continues to collaborate with global partners to realise its vision of a Smart Cities Network. In this vein, the regional bloc partnered Australia to launch the ASEAN-Australia Smart Cities initiative in March. Dr Balakrishnan noted that Australia's involvement — valued at S$30 million — was encouraging and rapid.

PHOTO 3 / CSA

INNOVATION AND THE NATION

Singapore's Smart Nation initiative seeks to digitalise various aspects of daily life, from e-payments, autonomous vehicles and tech solutions within homes to the use of robotics in the manufacturing and service industries.