KPMG

Smart City Transformation in a post-COVID world

Reimagining the digital transformation of our cities on the road to recovery from COVID-19

October 2020

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As hubs of human activity, interaction and connection, cities around the world have been hit hard by the impacts of COVID-19. Amidst this uncertainty the burning platform for Smart City transformation has become clearer than ever before.

Smart City transformation can no longer be seen as a 'nice to have' – COVID-19 has resulted in us all experiencing different levels of isolation and a lack of connectedness. As we emerge from the immediate crisis, there is a unique opportunity to improve connection by embedding digital infrastructure and Smart City initiatives as part of the business-as-usual design, development, operation and maintenance of our cities.

Smart Cities are resilient cities and, through the integration of physical and digital environments, we can address the gaps in resilience which COVID-19 has exposed. By harnessing data and digital technologies, we can re-engineer flourishing, inclusive cities which are able to adapt in the face of change.

Importantly, successful re-imagination of our cities requires adopting a human-centred design approach. As was evident from the Smart Cities Roadshow we hosted across the country in late 2019*, this approach focuses on tapping into the collective intelligence of communities in order to understand the human experience from the diverse perspectives of the people who live, work, learn and play in cities each day. This approach holds even greater value at a time when we are seeing an increased focus on the role of local neighbourhoods in strengthening community resilience.

* https://assets.kpmg/content/dam/kpmg/au/pdf/2019/smart-cities-snapshot-of-australia-in-2019.pdf

The Smart City Stack

KPMG has developed the Smart City Stack framework to help cities build the digital infrastructure required for Smart City transformation. The stack has been developed in alignment with ISO 37106:2018, the internationally recognised standard for creating a Smart City framework and operating model. While the stack comprises six individual layers, developing a Smart City requires a system-of-systems approach in which there is seamless integration across all of the layers.

This framework provides a useful prism through which to consider the opportunities to accelerate Smart City transformation on the road to recovery from COVID-19.

Smart Physical Infrastructure

The physical landscape of the urban realm serves as the backbone for the digital instrumentation underpinning a Smart City. This layer includes all of a city's physical structures and assets, such as street poles, bus shelters, parks, rubbish bins and footpaths.

Accelerating Smart City transformation

The shape and accessibility of public spaces has been under the spotlight as millions of people around the world had their movements confined. Open green spaces such as parks and playgrounds, as well as shared infrastructure such as cycle lanes and footpaths are valuable assets for community well-being and resilience.

Local Action

Reimagining public space

New South Wales Government

The NSW Government has demonstrated leadership with the recent announcement of the $15 million Streets as Shared Spaces grants program[1] which will fund council initiatives to create more accessible and safe public spaces, such as new cycle lanes, pedestrian-only streets, wider footpaths and smart street furniture. This initiative will help to accelerate achievement of the Premier's Priority to increase the proportion of homes in urban areas within 10 minutes' walk of quality green, open and public space by 10 per cent by 2023[2].

The NSW Government is also seeking to revitalise the state's economy by fast-tracking shovel-ready projects through the Planning System Acceleration Program[3]. The latest project to gain approval through the program is a $1.49 billion revamp of the Mt Druitt CBD, which will create 15,000 jobs and build a vibrant new hub in Western Sydney.

Global Action

Championing active transport

Milan

As one of Europe's most polluted cities, and hit hard by COVID-19, Milan is planning to transform 35km of street scapes to mitigate a resurgence in car use and encourage active transport. The plan includes low-cost temporary cycle lanes, new and widened pavements, 30km per hour speed limits, and pedestrian and cyclist priority streets.

Under lockdown, there was a reduction in car traffic of up to 75 per cent throughout the city.

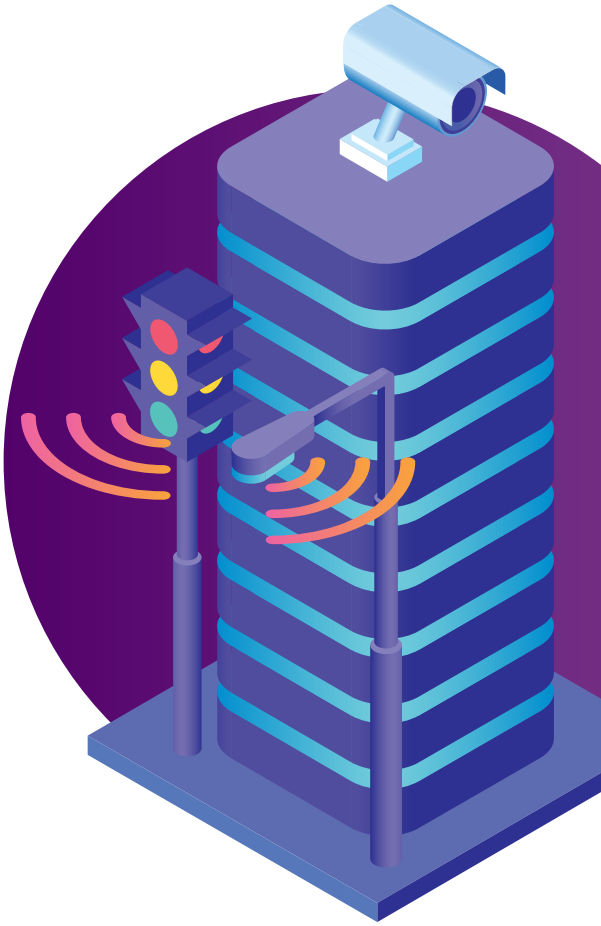
> We worked for years to reduce car use. If everybody drives a car, there is no space for people, there is no space to move, there is no space for commercial activities outside the shops… We think we have to reimagine Milan in the new situation. We have to get ready.[4]"

Marco Granelli, Milan's Deputy Mayor.

1 https://www.dpie.nsw.gov.au/premiers-priorities/great-public-spaces/streets
2 https://www.nsw.gov.au/premiers-priorities/greener-public-spaces
3 https://www.planning.nsw.gov.au/Policy-and-Legislation/COVID19-response/Planning-System-Acceleration-Program
4 https://www.theguardian.com/world/2020/apr/21/milan-seeks-to-prevent-post-crisis-return-of-traffic-pollution

Sensors and Devices

Serving as the integration point between the physical and digital worlds, this layer consists of measurement and instrumentation technology that has been embedded across the physical urban realm. These sensors and devices collect real-time information, such as air quality, carbon emissions, pedestrian counts, traffic flows and noise levels. Internet of Things (IoT) sensors, CCTV cameras and other devices provide visibility of a local area's condition and evolution with a high degree of granularity.



Accelerating Smart City transformation

You can't manage what you can't measure and planning for resilience requires robust evidence based on real-time, local data. COVID-19 has catalysed significant investment in IoT projects as governments and organisations across the world seek to manage, monitor and automate operations remotely.

Local Action

COVIDSafe App

Australia

Like many governments globally, the Australian Government launched the COVIDSafe app to improve virus contact tracing. Whilst it experience some initial technical speed bumps, at the time of writing, nearly seven million Australians have downloaded the app. Once downloaded, the app provides a mechanism to speed up contacting people that have been in close contact with someone who has tested positive for COVID-19. Importantly, downloading the app is voluntary and has prompted healthy discussions to develop sufficient trust from the public that their data is private and secure. The government has strongly communicated its data-driven, decision-making approach with the public and has sought to equip people with data on daily case numbers and emergency information through the government's coronavirus app and dedicated WhatsApp channel.

If the app proves successful in helping trace people who have come in the proximity of citizens infected with the virus, it could catalyse greater collaboration between government agencies and communities on the use of data to inform better decision-making and deliver positive outcomes.

Global Action

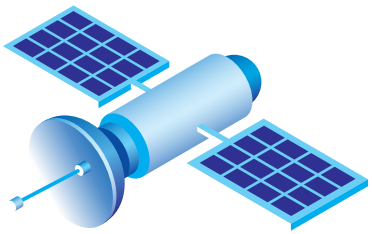
Real-time situation reports

Tel Aviv-Yafo Municipality

The Tel Aviv-Yafo Municipality has developed a sophisticated system for creating real-time situation reports. These reports are based on a combination of residents reporting to the 106 Plus municipal hotline (via phone and mobile app), reports from municipal workers and data captured from a diverse range of IoT sensors across the city.

In order to improve the accuracy of situation reports during the pandemic, the city deployed IoT sensors and other systems to capture data on events critical to preventing virus spread. These sensors and devices are helping the city identify gatherings of people and business operations that contravene COVID-19 regulations, enabling the city to rapidly respond.

Communications and Connectivity Networks



The connectivity layer represents a city's digital nervous system, rapidly transmitting the volumes of data collected by the sensors and devices. There is a range of different network technologies that can make up this layer, such as 4G/5G, broadband, wifi and low-power wide-area networks (LPWANs).

Accelerating Smart City transformation

COVID-19 has underscored the need for ubiquitous connectivity as the backbone for a productive, sustainable and resilient city. Connectivity networks support the diverse spectrum of activities that have been forced to rapidly shift to online, across working, learning and playing. These networks are critical to enable the continued operations of essential services, such as telehealth, and support people to remain connected and maintain wellbeing.

The NBN, which is now available to 95 per cent of Australian households, saw connectivity demand increase by more than 70 to 80 per cent during daytime hours in March, compared with figures calculated at the end of February[5].

5 https://www.abc.net.au/news/2020-04-01/coronavirus-internet-speeds-covid19-affects-data-downloads/12107334

Local Action

Prioritising connectivity for the most vulnerable

Australia

In April 2020, the Australian Government, together with Australia's major telecommunications companies, agreed to a set of principles that will help Australians remain connected in the face of COVID-19[6]. This agreement includes prioritising the connection and restoration of services for vulnerable Australians and provides measures for those unable to pay their bills due to sudden redundancies. For example, many of the telecommunications companies are providing discounted services for Australians who are accessing the JobSeeker benefit scheme.

Global Action

Accelerating 5G roll-out

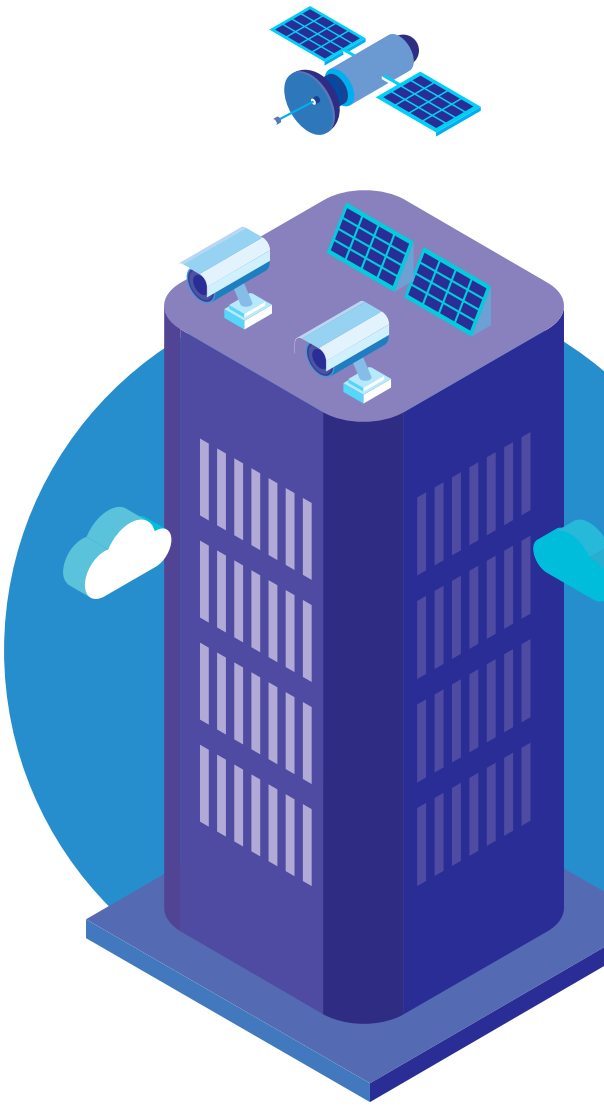
New Zealand

In May, the New Zealand Government decided to cancel plans to auction 5G spectrum, instead allocating it at a low cost to telecommunications providers. This decision has been welcomed by the industry to help to maintain momentum in rolling out 5G despite the disruptions caused by COVID-19. The 5G spectrum is a critical component of the digital infrastructure required to enable a post-COVID-19 world of mainstream remote working, telehealth, digital supply chains and commerce, and virtual social connections.

6 https://www.communications.gov.au/sites/default/files/joint_statement_-_final.pdf

Security and Privacy

The Security and Privacy layer ensures that all smart city components that provide tangible improvements in human experience cannot be compromised and attacked, to adversely affect the health and safety of individuals, or the reputation of the city.



Accelerating Smart City transformation

In an unprecedented time where physical movement is restricted, COVID-19 has shown how important access to stable communications infrastructure is to keep people connected. If not properly secured, these communication links could be cut, denying people the ability to connect. Further, if not adequately secured, the IoT devices and the data that are available from smart cities could be targeted to affect the confidentiality of citizens' information. COVID-19 has shown that despite potential health, safety and quality of life benefits of new technologies, individuals are still as concerned as ever about protecting their privacy. In order to ensure that smart city technologies are protected from cyber attack, it is imperative that security is considered in all designs, and controls are built into every layer of the smart city.

Local Action

Prioritising connectivity for the most vulnerable

Australia

The IoT Alliance Australia (IoTAA) is the peak industry body representing IoT in Australia, with a vision to empower industry to grow Australia's competitive advantage through IoT. The IoTAA has 12 workstreams designed to address key enablers and inhibitors for the Australian IoT industry.

One of those workstreams is 'Cyber Security and Network Resillience' with a purpose " To develop security guidelines for IoT service elements, including data protection". Terms of reference include:

- Provide an IoT interpretation of current and future regulatory security proposals to ensure the right balance between building trust and enabling innovation.
- Developing and maintaining security guidelines for IoT.
- Maintaining the IoT sectors reference guide to global markets regulatory requirements.
- Develop and maintain IoT network and service resilience attributes and guidelines for service classes.

The IoTAA has published the ***Internet of Things Security Guideline***[1] designed to provide comprehensive, top level guidance to:

— promote a 'security by design' approach to IoT;

— assist industry to understand the practical application of security and privacy for IoT device use;

— be utilised by the IoT industry and digital service providers which use or provide support services for IoT deployments; and

— assist industry to understand some of the relevant legislation around privacy and security.

The IoTAA has also produced the ***IoT Reference Framework***[2] which provides a good practice blueprint for physical and digital security, including:

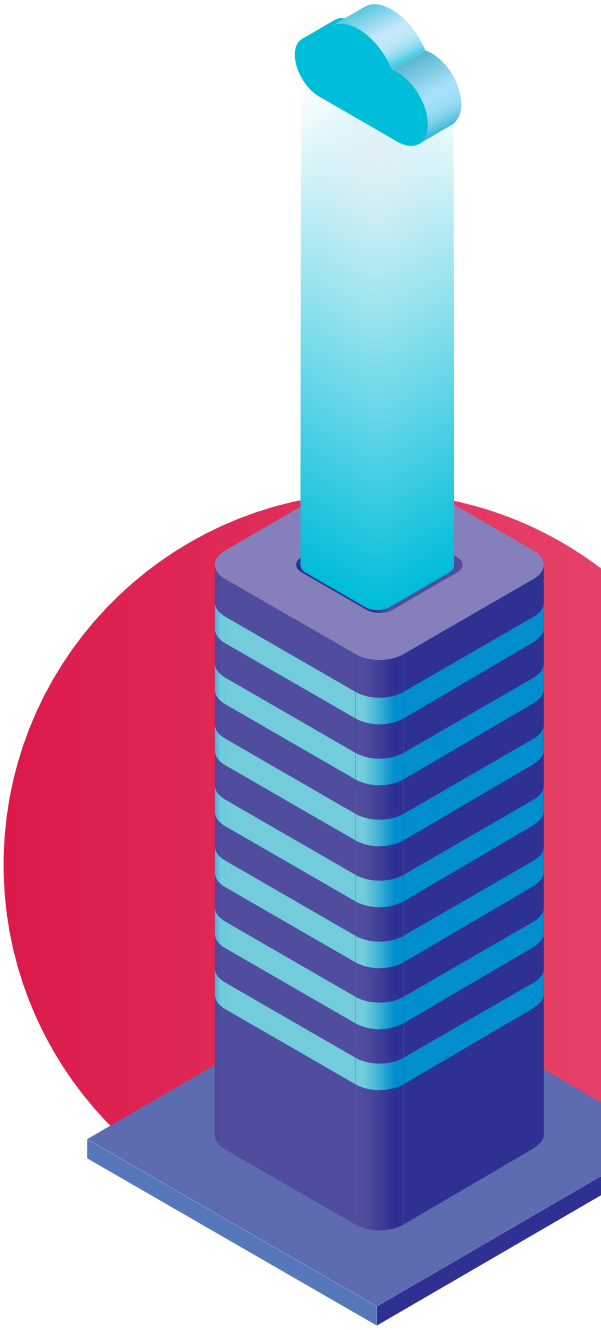
- safety, privacy and reliability, ensures security of smart infrastructure and control networks;
- References other Security Frameworks, ie. NIST Security Framework, IoT Compliance Framework (IoTSF), Trustworthiness Framework (IIC).

1 https://www.iot.org.au/wp/wp-content/uploads/2016/12/IoTAA-Security-Guideline-V1.2.pdf

2 https://www.iot.org.au/wp/wp-content/uploads/2016/12/IoT-Reference-Framework-v1.0.pdf

For more information visit **www.iot.org.au**

Data Ingestion and Orchestration



The true power of a city's diverse data streams can only be unlocked when the data is integrated, analysed and transformed. This layer is where both structured and unstructured data points from different sources are brought together and analysed to create useful knowledge, informing better decision-making.

Accelerating Smart City transformation

Big data is driving the decisions governments around the world are making to respond to COVID-19 and plan the road to recovery. This data will become even more valuable as restrictions are gradually wound back. Real-time data will enable governments to rapidly respond to local hotspots experiencing outbreaks before case numbers get out of hand, and predictive analytics will play a significant role in the pre-emption and prevention of future pandemics.

Local Action

Data-driven virus mapping

Victorian Government

Victoria's Department of Health and Human Services has released an interactive daily report of confirmed cases of COVID-19 in Victoria[7]. The dashboard integrates a range of data streams to provide a breakdown of cases by age, gender, mode of acquisition and residential location. The dashboard also displays the number of tests, recoveries and fatalities.

Global Action

A data-driven response

Taiwan

Taiwan has been lauded for its rapid and effective response to COVID-19, having learned from the experience of SARS. Taiwan adopted a whole-of-government approach with big data at the centre. The government integrated its national health insurance database with its immigration and customs information to use data analytics to optimise tracing of potential cases.

The government also developed a system whereby QR code scanning and online reporting of travel history and symptoms were used to classify the risk of incoming travellers. Those who had not travelled to high-risk areas were issued a health declaration border pass via text message, while those who had come from riskier places were quarantined at home and mobile phone tracking was used to ensure compliance.

7 https://app.powerbi.com/view?r=eyJrIjoiODBmMmE3NWQtZWNlNC00OWRkLTk1NjYtMjM2YTY1MjI2NzdjIiwidCI6ImMwZTA2MDFmLTBmYWMtNDQ5Yy05Yzg4LWExMDRjNGViOWYyOCJ9view?r=eyJrIjoiODBmMmE3NWQtZWNlNC00OWRkLTk1NjYtMjM2YTY1MjI2NzdjIiwidCI6ImMwZTA2MDFmLTBmYWMtNDQ5Yy05Yzg4LWExMDRjNGViOWYyOCJ9

Applications, Analytics and Interfaces

This layer transforms data into actionable insights for public use and provides mechanisms for community engagement. This can be achieved by developing interfaces such as applications, data analytics and visualisation dashboards, and personalised push notifications. Communicating data in accessible formats enables communities to make better decisions and empowers them to engage in the co-creation of cities.

Accelerating Smart City transformation

COVID-19 has fundamentally disrupted the social infrastructure we had previously taken for granted, bringing the importance of local neighbourhoods and communities into sharp relief. Effective recovery requires building strong communities, empowered by data and digital infrastructure to collaboratively contribute to the creation of a resilient future.

Local Action

Wyndham Together

Wyndham City Council

Wyndham City Council launched Wyndham Together, a portal of free online events, classes and virtual meetups, to support the community's wellbeing and foster connections during isolation.

Minecraft

City of Adelaide

To engage the community and relieve boredom in isolation during school holidays, the City of Adelaide released two Minecraft challenges. The city asked citizens to become chief town planners and engineers and build a new city based on the original 1836 town plan, or reimagine the existing city to create a post-COVID-19 2021 city of the future.

The City of Adelaide has recorded over 900 downloads of the Minecraft challenges, not only by children but also by many adults. Through gamification, the city is demonstrating their commitment to understanding the human experience of the communities who live, work, learn and play in the local government area. The City of Adelaide is exploring options to build on what has been achieved to meaningfully engage with communities and co-create the future city.

City of Adelaide's spatial planning expert Josh Roberts said the initiative was generating new thinking and creative approaches to town planning and education.

"The Minecraft challenge has captured the imagination of the young, and the young at heart, and created a way for them to engage with us around smart cities".

The Adelaide Minecraft worlds were generated in part using Geographic Information Systems (GIS) data from the city's 3D model to render eight billion blocks to create the built form.

"We look forward to expanding the project and engaging with more of Minecraft's 112 million month active users to reimagine the City of Adelaide," said Roberts.

Global Action

‘Citizens as Mayors’

Seoul

Seoul has applied its ‘citizens as mayors’ approach to managing the COVID-19 crisis, empowering citizens with the data and information required to protect themselves and their communities from spreading the virus. The city regularly updates its data dashboard which displays the numbers, locations and demographics of confirmed cases.

Covidconnect

Belfast City Council

Belfast City Council established covidconnectni.com in collaboration with businesses and universities to support a coordinated contribution to solving local, pandemic-related challenges. The platform matches digital expertise, capacity and resources with local problems. For example, data analysts and software developers have been sourced to create digital solutions to solve challenges such as the distribution of food to vulnerable communities.

Hack the Crisis

Estonia

On the day that Estonia announced national emergency in response to COVID-19, the Estonian Ministry of Economic Affairs and Communications launched an online hackathon called Hack the Crisis. Over 48 hours, more than 1,000 entrepreneurs across 14 time zones developed solutions. Many of the solutions have since been implemented, such as the chatbot called Suve which answers pandemic-related questions from the community.

Better, together

No country, city or community is an island in the age of COVID-19 – around the globe, cities are collaborating to share data, solutions and learnings, with the collective goal of accelerating recovery.

It's undeniable that an immense volume of learnings will arise from our experience of the pandemic. In the context of our cities, some of these learnings include:

- This pandemic is a once in a generation crisis – don't waste it. Use this as an opportunity to direct Smart City efforts and steer your transformation focus.
- There is an imperative to improve the digital connectivity between an array of city infrastructure, processes and functions, and city residents, workers, visitors and officials.
- Pre-COVID-19 Smart City learnings and innovation were a warm up – these need to be given additional weight as we enter this recovery and rebuilding phase.

At this critical moment, let's choose to respond to disruption with innovation, placing the human experience at the centre and investing in the digital infrastructure and smart solutions that will enable us to create a more resilient future for all.

KPMG's Smart City Advisory Services

A Smart City is a city that harnesses emerging technologies such as the Internet of Things (IoT), Artificial Intelligence, Machine Learning and Big Data in order to make it more liveable, workable and sustainable.

Advanced technologies are comprehensively transforming the urban fabric of cities via the instrumentation, measurement and collection of data from potentially every physical 'thing' within a city.

This will help make better, faster decisions, automate processes and enable prediction of future events. It will lead to improved city services such as better waste management, efficient transportation, as well as more closely monitored and improved food and water supplies, and better air quality.

A city becomes 'smart' when it manages to cohesively leverage and invest in its physical, social (human & business) and its technology (value) infrastructure to fuel sustainable economic growth and a high quality of life for its citizens.

KPMG advises many of the leading cities around the world to help develop and realise their smart city strategies.

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Contacts

To explore how KPMG can help your Smart City transformation, please contact:

Piers Hogarth-Scott
Partner, KPMG Digital Delta
E: piershs@kpmg.com.au
T: +61 405 151 971

Mason Davies
Partner, KPMG Digital Delta
E: masondavies@kpmg.com.au
T: +61 410 444 747

Toni Jones
Partner in Charge, Industries, Enterprise and Local Government Sector Leader
E: tonijones@kpmg.com.au
T: +61 409 200 721

Elizabeth Watts
Partner, Local Government Advisory
E: ewatts@kpmg.com.au
T: +61 416 081 608

Katherine Robins
Partner, Cyber Security Services
E: krobins@kpmg.com.au
T: +61 407 114 380

Ken Holder
Associate Director, KPMG Digital Delta
E: kholder2@kpmg.com.au
T: +61 405 699 349

October 2020. 543877756MC