HKT®

PolyU Innovation Challenge 2021

Carlson Chu, HKT Limited

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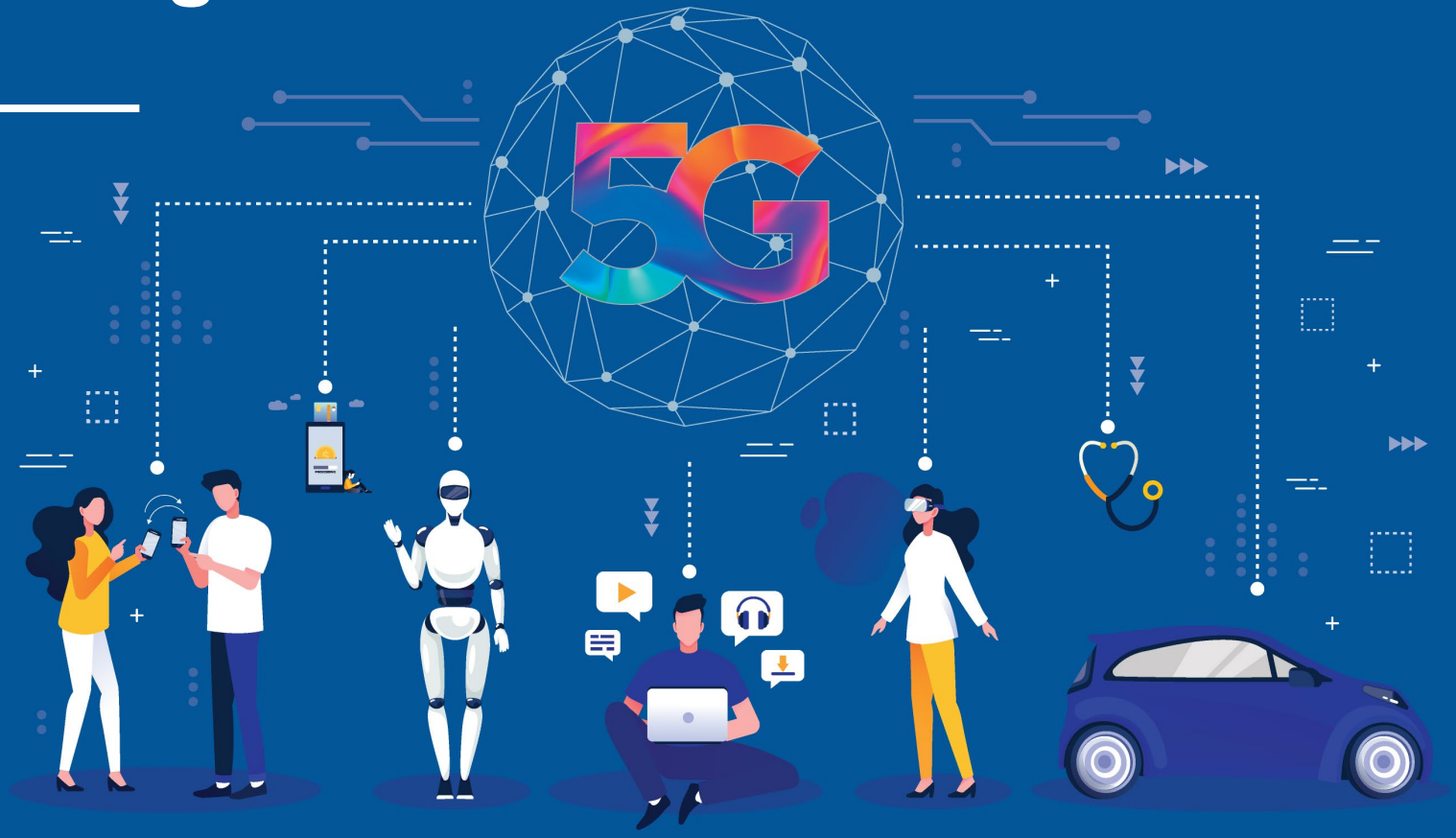
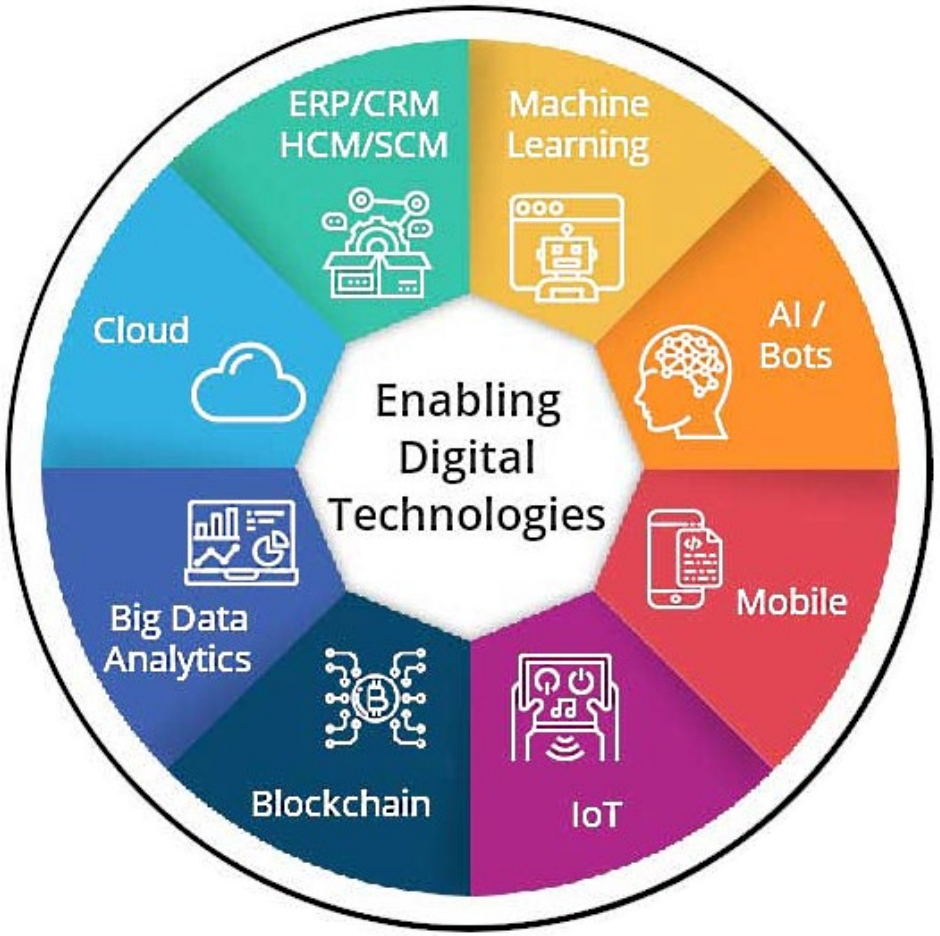


Harnessing Smart Technologies



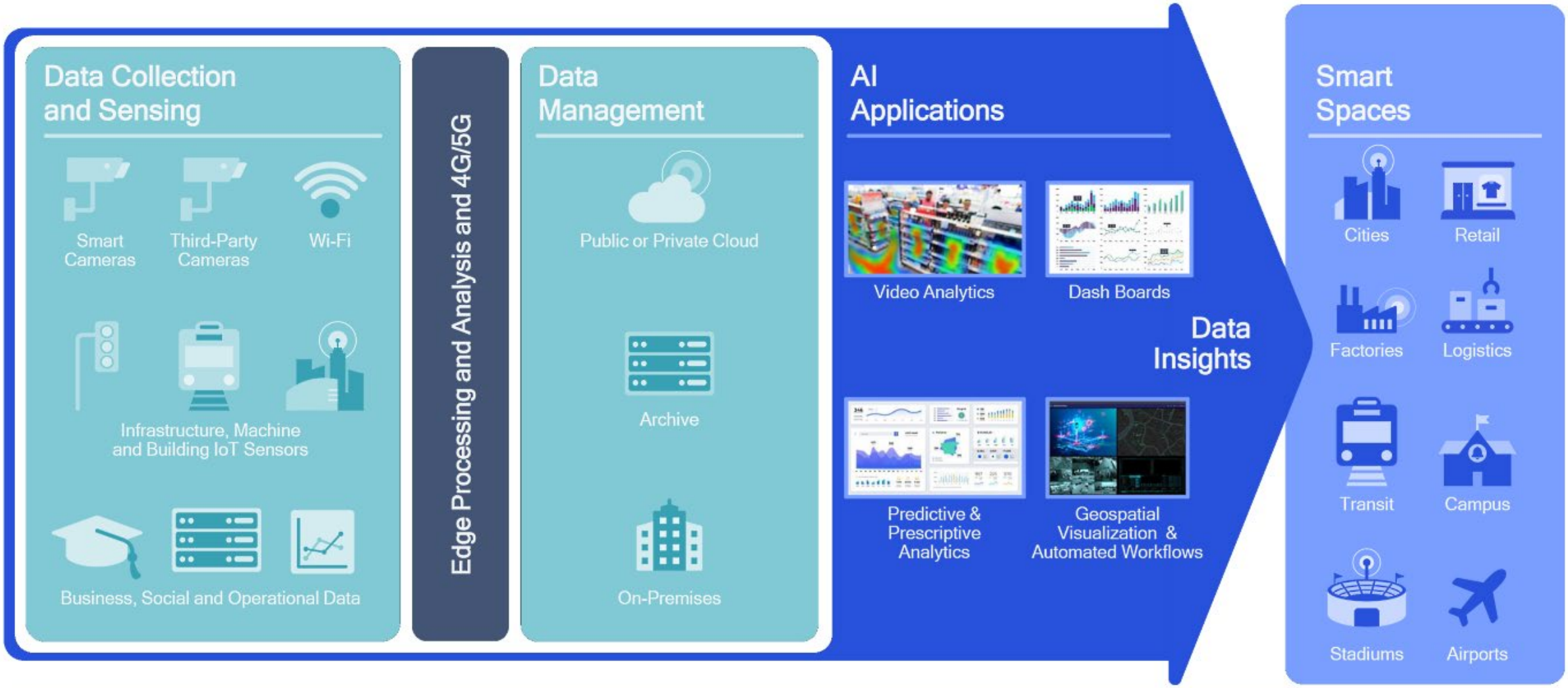
Vision

Embrace innovation and technology to build a world-famed Smart Hong Kong characterised by a strong economy and high quality of living

Mission

- To make people happier, healthier, smarter and more prosperous, and the city greener, cleaner, more livable, sustainable, resilient and competitive
- To enable the business to capitalise on Hong Kong's renowned business-friendly environment to foster innovation, transform the city into a living lab and test bed for development
- To provide better care for the elderly and youth and foster a stronger sense of community. To make the business, people and Government more digitally enabled and technology savvy
- To consume fewer resources and make Hong Kong more environmental friendly, while maintaining its vibrancy, efficiency and livability

Cross-Technology Collaboration is the Key for Smart City



Intelligent data operations: Orchestration, Governance, Security, Privacy Protection and Compliance

Source: Qualcomm

Problem Statements

Harnessing the power of 5G and Internet of Things (IoT) to advance the goal of sustainability and decarbonization

5G and IoT can help businesses become smarter and more efficient by collecting and analyzing data in real-time to optimize processes and decision making, thus reducing the consumption of energy and resources.

Taking virtual healthcare consultation into mainstream

The development of 5G communication technology has provided the possibility of remote diagnosis and treatment. Pioneer telemedicine app platforms such as DrGo prove to be appealing to early adopters and what measures can be taken to move it into mainstream?

Applying 5G to smart mobility

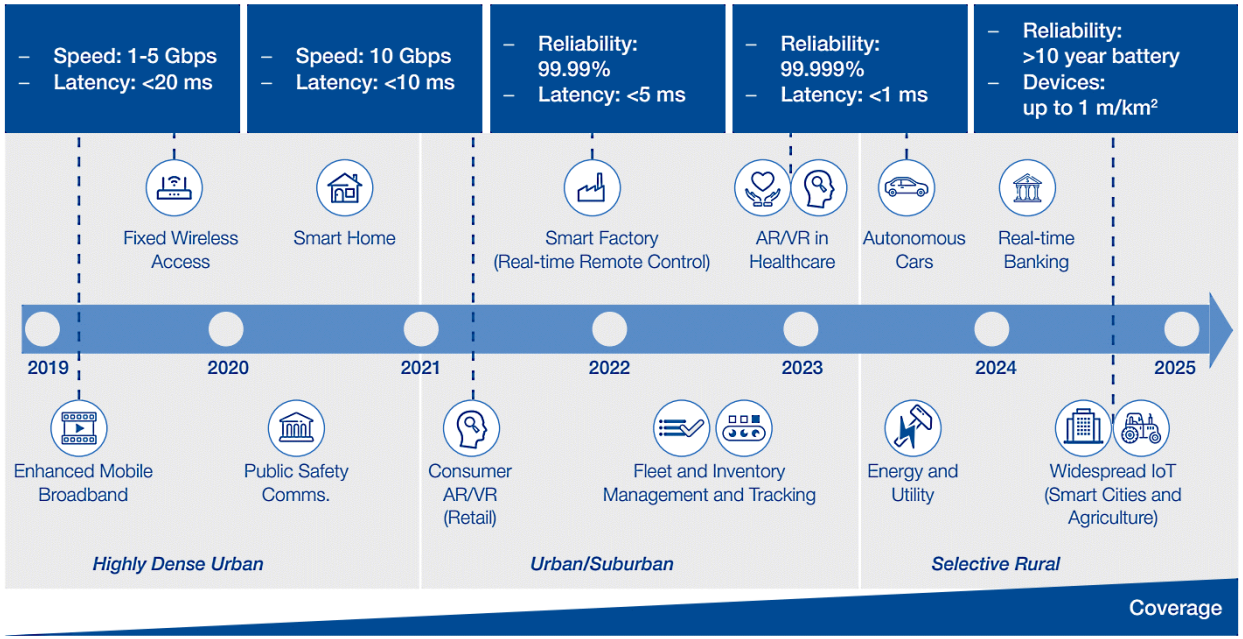
Cellular Vehicle to Everything (C-V2X) technology is expected to revolutionize road safety and efficiency in future. In near term, innovations in smart mobility can also be boosted by 5G technology.

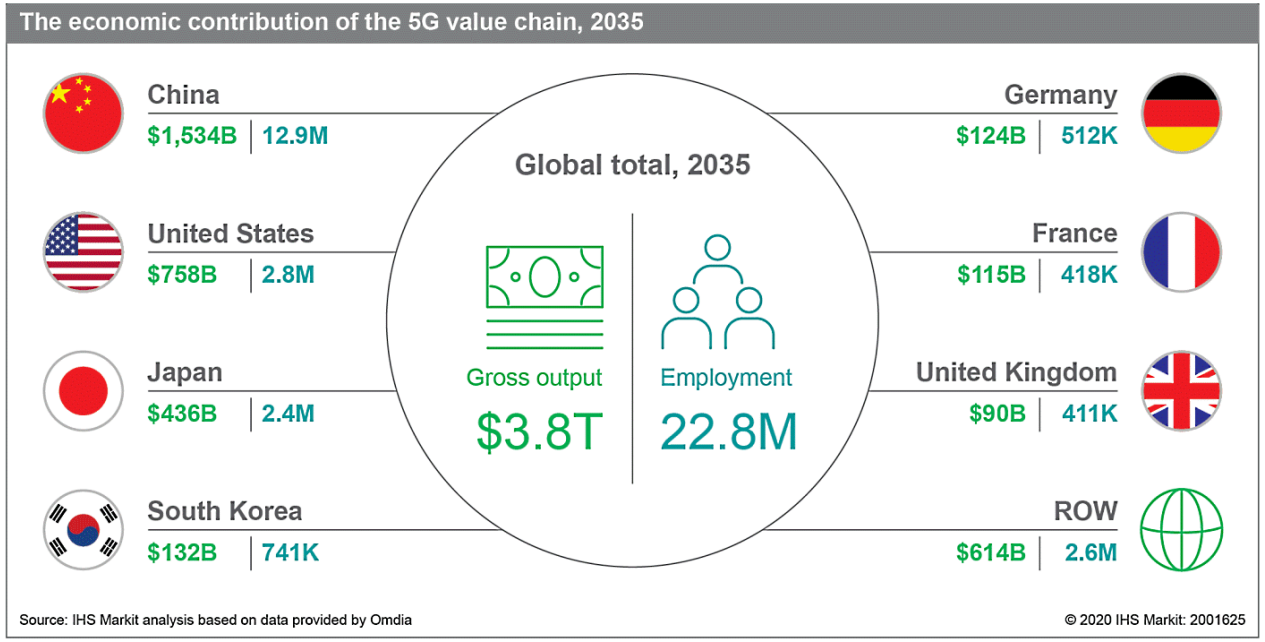
Overview of 5G

Faster Speeds
Data rates through 5G networks can reach up to 20 Gbps, a significant increase over 4G speeds of around 100 Mbps.

Lower Latency
Latency as low as 1 ms can eliminate any delay or lag that users would experience while accessing online applications.

More Capacity
The greater bandwidth of 5G networks will allow more users to connect with a strong, reliable signal.

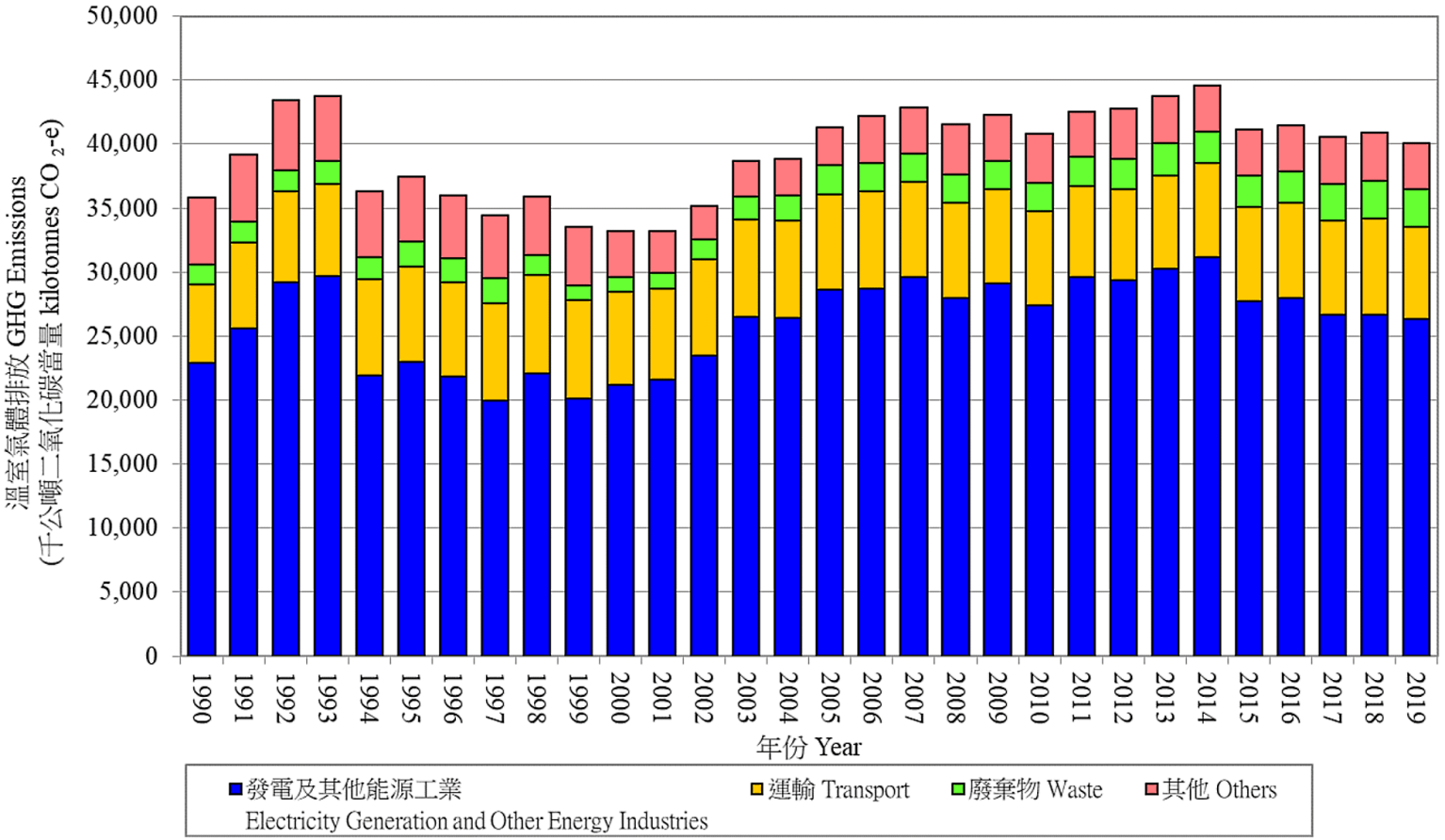




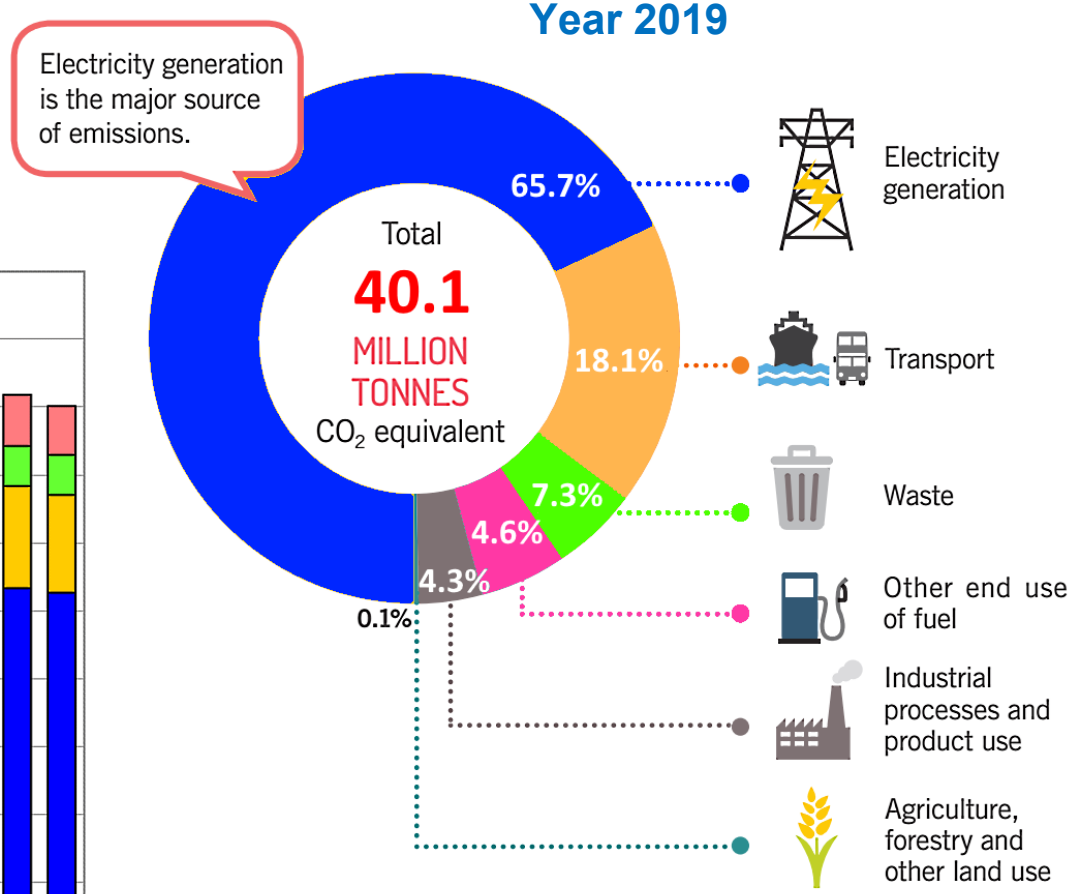
Source: PwC Strategy& and World Economic Forum, "5G for the Fourth Industrial Revolution", 2019.

Greenhouse Gas Emissions in Hong Kong

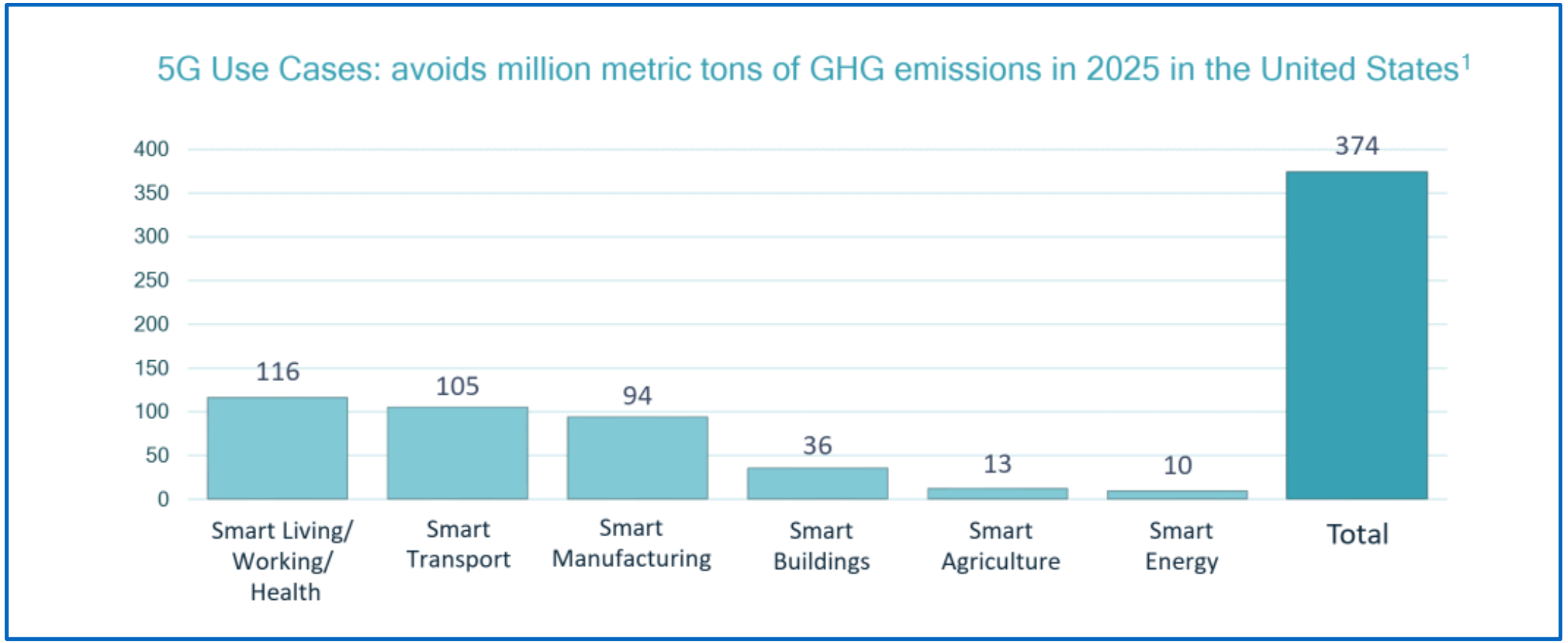
Greenhouse Gas Emission Trends of Hong Kong from 1990–2019



Year 2019



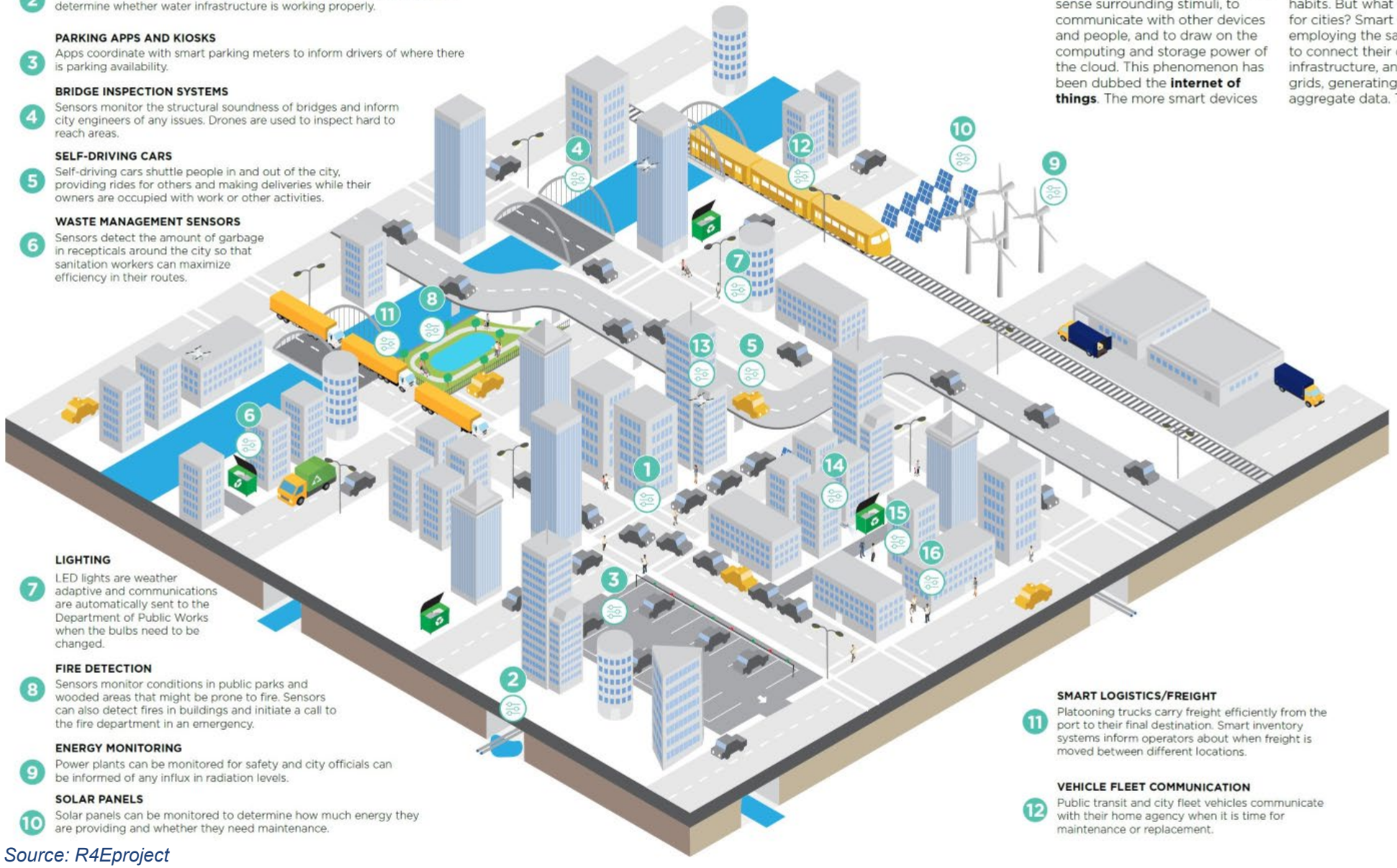
The Impact of Mobile Communications Technologies on Carbon Emission Reductions



**1 Independent analysis based on data published by GSMA, "The Enablement Effect The Impact of Mobile Communications Technologies on Carbon Emission Reductions" (2019).*
Source: Qualcomm

INTERNET OF THINGS IN CONNECTED CITIES

Every consumer product and piece of infrastructure increasingly has the ability to sense surrounding stimuli, to communicate with other devices and people, and to draw on the computing and storage power of the cloud. This phenomenon has been dubbed the **internet of things**. The more smart devices and sharing platforms there are, the more data is generated about consumer's preferences and habits. But what does this mean for cities? Smart cities are employing the same technology to connect their disparate utility, infrastructure, and public service grids, generating real-time aggregate data. This, in turn, can help cities manage their programs and services more effectively and gauge their impact immediately. The city of the future is an interconnected one, where devices communicate with one another in a constant stream of data that provides real-time information to the public and to the municipality.



1. **TRANSPORTATION CONGESTION SENSORS**
Smart transportation systems use sensors to detect congestion and bottlenecks in traffic patterns. They also rely on cameras to enforce speed and traffic infractions. In doing so, these tools gather real time information that can be used by city DOTs to make mobility networks safer and more efficient.

2. **WATER AND WASTEWATER MONITORING**
Monitoring devices can detect leaks as well as changes in water pressure to determine whether water infrastructure is working properly.

3. **PARKING APPS AND KIOSKS**
Apps coordinate with smart parking meters to inform drivers of where there is parking availability.

4. **BRIDGE INSPECTION SYSTEMS**
Sensors monitor the structural soundness of bridges and inform city engineers of any issues. Drones are used to inspect hard to reach areas.

5. **SELF-DRIVING CARS**
Self-driving cars shuttle people in and out of the city, providing rides for others and making deliveries while their owners are occupied with work or other activities.

6. **WASTE MANAGEMENT SENSORS**
Sensors detect the amount of garbage in recepticals around the city so that sanitation workers can maximize efficiency in their routes.

7. **LIGHTING**
LED lights are weather adaptive and communications are automatically sent to the Department of Public Works when the bulbs need to be changed.

8. **FIRE DETECTION**
Sensors monitor conditions in public parks and wooded areas that might be prone to fire. Sensors can also detect fires in buildings and initiate a call to the fire department in an emergency.

9. **ENERGY MONITORING**
Power plants can be monitored for safety and city officials can be informed of any influx in radiation levels.

10. **SOLAR PANELS**
Solar panels can be monitored to determine how much energy they are providing and whether they need maintenance.

11. **SMART LOGISTICS/FREIGHT**
Platooning trucks carry freight efficiently from the port to their final destination. Smart inventory systems inform operators about when freight is moved between different locations.

12. **VEHICLE FLEET COMMUNICATION**
Public transit and city fleet vehicles communicate with their home agency when it is time for maintenance or replacement.

13. **DRONES**
Drones can be used for law enforcement and firefighting, as rural ambulances, for infrastructure inspections, and for environmental monitoring. Commercial uses include precision farming, aerial photography, and in the near future, package delivery.

14. **SURVEILLANCE CAMERAS**
Cameras ensure security by monitoring activity in areas that are not frequented by public safety officers. Areas that are not open to public access can be monitored to keep unauthorized personnel out.

15. **BODY CAMERAS**
Public safety officers can wear body cameras that capture footage of interactions between themselves and city residents to ensure safety for both parties.

16. **WEARABLE DETECTION**
Cities can build in smartphone and wearable detection sensors so that people can be an active part of the internet ecosystem, communicating with the city, and with each other.

17. **BROADBAND INFRASTRUCTURE**
A reliable internet ecosystem is the glue that holds the internet of things together.

Source: R4Eproject

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Applying 5G to smart mobility

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Development of Telehealth Services

The potential for using teleconsultation services in Hong Kong can be reflected by a survey conducted in May 2020 on the perception of senior citizens towards the COVID-19 outbreak and telemedicine services.

Among the 638 respondents aged 55 years or above surveyed, 61.3% were willing or very willing to try teleconsultations when the relevant technology was fully developed. A higher percentage was observed for those respondents with tertiary or above education level (70.6%), as compared with those with secondary or below education level (55.2%).

The fairly high receptiveness of teleconsultation services among the senior citizens suggests that the new service model might be a viable option for treating older patients amidst the COVID-19 pandemic in order to lower their risk of infection.

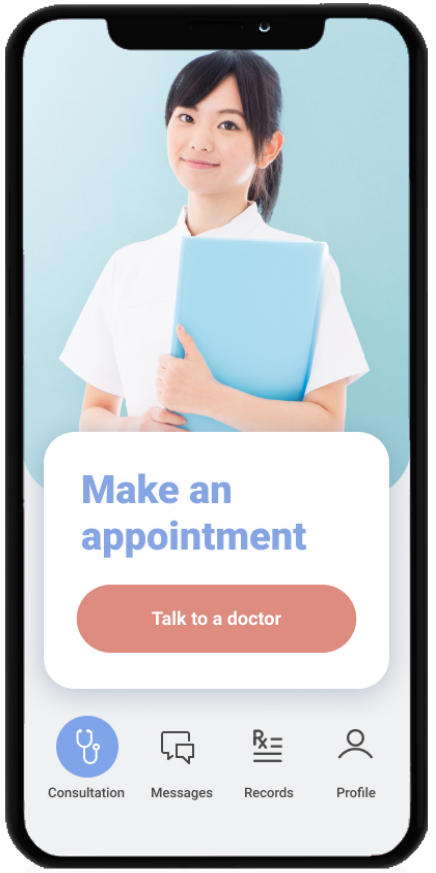
Source: Legco research article ISE14/20-21

Leading Telehealth Apps in Europe

Source: Drake Star Telemedicine Sector Report

What's drgo

DrGo is a personal healthcare assistant that helps Hong Kongers access quality health advice, reducing unnecessary in-person physical visits to the doctor's clinic



Customer Value Proposition

- Quality health advice through effortless video consultations with doctor from the comfort of your own place
- Massive time savings with convenient medication deliveries directly to your front door
- Peace of mind in connecting with your trusted local specialists and GPs

A private hospital and two clinical groups have already experienced with HKT's 18K employees 500+ successful video consultations with positive patient feedbacks. Our service has publicly launched on 3 August 2020.

drgo

e体健 Smart Health

HKT 摯誠為你

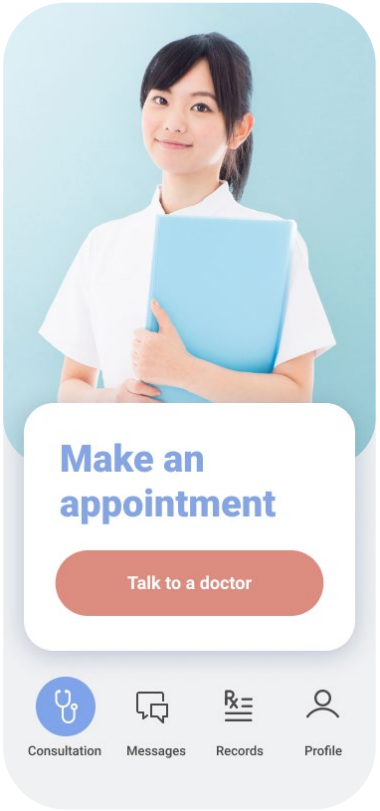
PCCW 電訊盈科

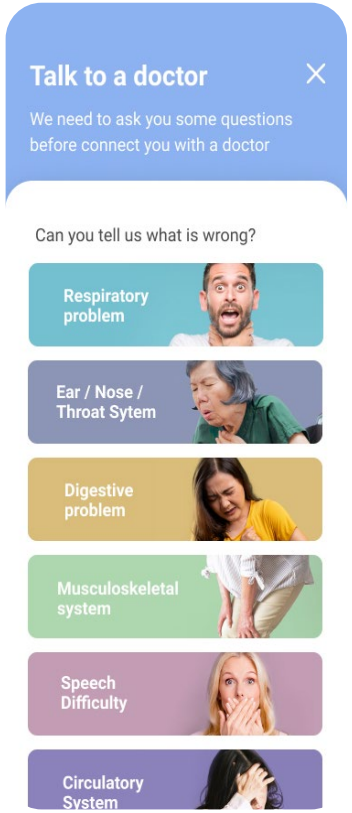
Gleneagles HONG KONG 港怡醫院

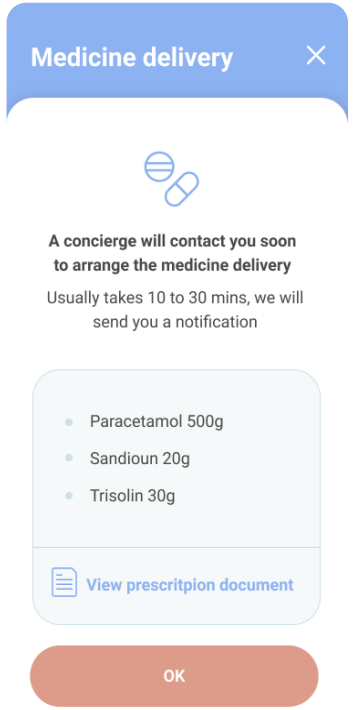
How does it work?

drgo

Patient App



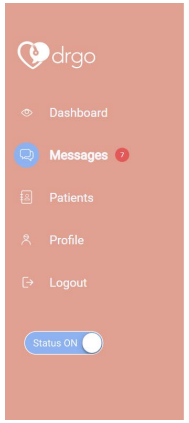


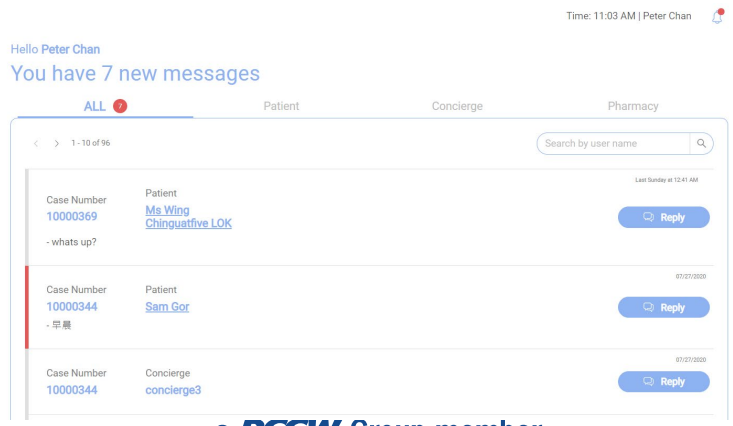


including voice records by nurse

Delivery

Doctor Portal





HKT Here To Serve

a PCCW Group member

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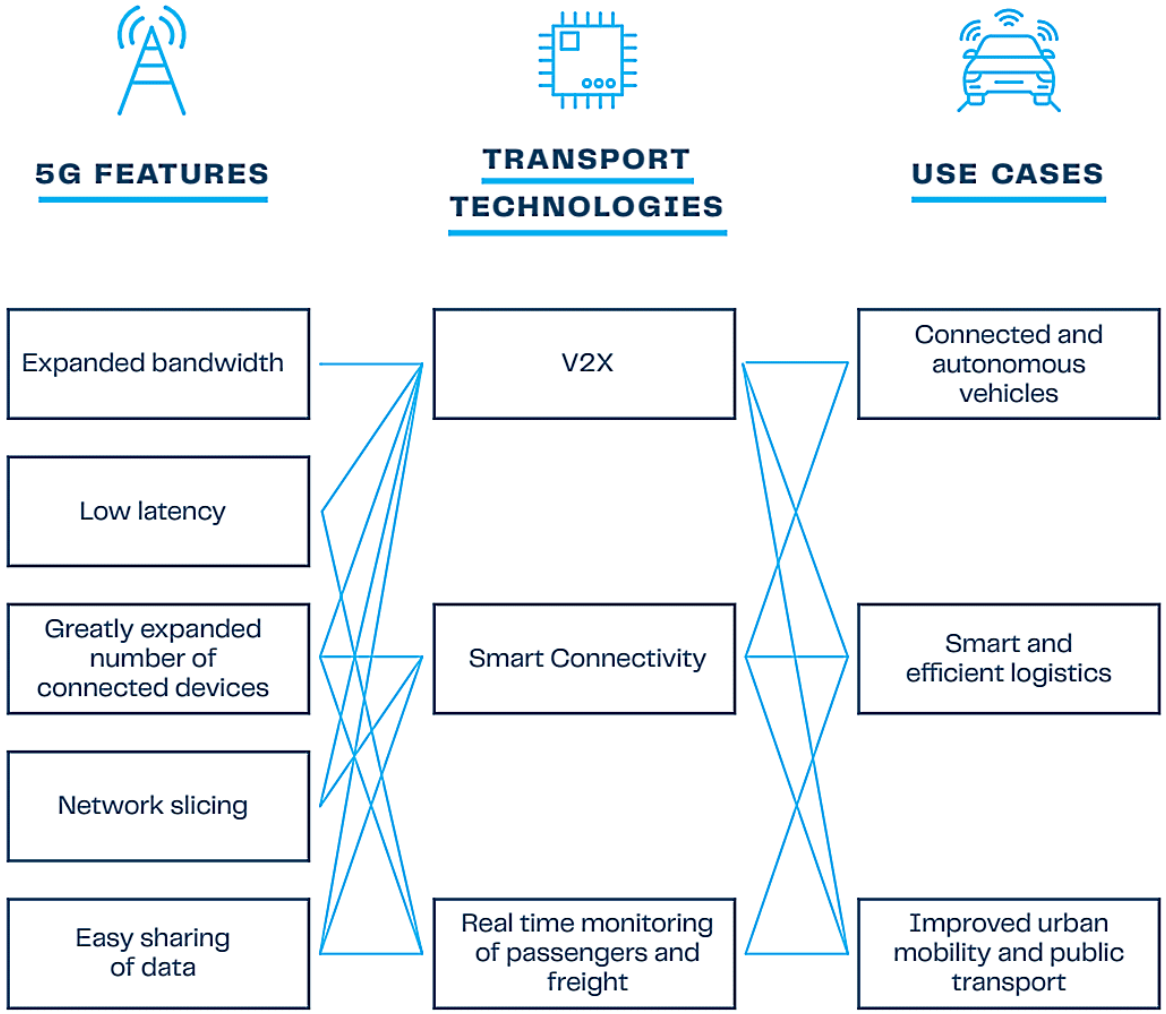
Benefits of 5G C-2VX



Source: International Bank for Reconstruction and Development / The World Bank

Benefits

Safer roads

Truck platooning, driver monitoring, minimizing manual operations to substantially human error

Clean environment

Reduced emission and shorter travel time

Enhanced personal mobility

Mobility services, assistive technologies, route planning

New business opportunities

Parking services, mapping services, fleet management, etc.

Source: Qualcomm

Example of Smart Mobility Services

Cities are actively looking at solutions addressing ***critical urban mobility issues*** around ….

And respond by deploying ***digital point solutions*** to solve…

- Mobility as a Service
- Integrated Fare Management / Smart Cards
- BI + AI Analytic Platform
- Multi-Modal Transport Solutions
- Smart Parking
- Shared Mobility (PT, IPT, PBS)
- Autonomous Vehicles
- Electric Mobility
- Real time Traffic Management
- Mobility Command Centre

Thank you