SMART CITY BLUEPRINT 2.0
Advisory Report

The Way Forward

STRATEGIC PARTNERS:

Credit

This report has been produced by Smart City Consortium (SCC) in collaboration with the support of the Hong Kong General Chamber of Commerce (HKGCC) and the Hong Kong Polytechnic University's Jockey Club Design Institute of Social Innovation (JCDISI).

The editorial team is grateful of all the contributions and support received from many stakeholders including SCC's members, HKGCC's Smart City Working Group and HKGCC's members. Through a series of engagement, the editorial team has also received many suggestions from various industry stakeholders and from SCC's MoU partners.

Table of Content

1. Executive Summary

The year 2019 proved to be a challenging year for the HKSAR Government to execute plans and strategies to achieve smart city development objectives. With the civil unrest and protests that we have observed, this is inevitably plaguing the development of any smart city initiatives in Hong Kong. In early 2020, the HKSAR Government is also facing the fight with the Covid-19 virus of epidemic nature, which also affects the original plan in deploying smart city initiatives. Having said that, we can see these crises as a catalyst for accelerating the development of smart city in HKSAR Government, as the Shanghai Government suggested in its *Several Suggestions on Further Speeding Up the Construction of Smart City[1]* released on 10 February, during the peak of the Covid-19 epidemic. For example, improved communications between the Government and the public through an easy-to-understand interactive map dashboard can be pacifying, the use of mobile big data to investigate the origin of local infections can build solid foundation for smart healthcare. These are some of the key initiatives for us to prepare for the next outbreak.

As of Dec 2019, Hong Kong is ranked as world's no. 11 by the IESE Cities in Motion[2] and eight years ago, Hong Kong was ranked as world's no. 9 by the same organization tracking development of smart cities for over 174 cities. This shows that Hong Kong has dropped a couple of spots in this IESE report. Despite all these setbacks, we have also seen how Hong Kong's disciplinary officers and public health professionals had been working so hard and diligently to keep our city safe and resilient. In addition, we also commended Hong Kong's utility companies and public transport providers for their pledge for sustainability and performance in delivering reliable services for our citizens.

We are experiencing a "double-ageing" phenomenon in Hong Kong with our ageing buildings and the ageing population - both entering new record levels in the next 15 years, which presents a golden opportunity to deploy innovative urban solutions. We presented a "Double-Smart" approach to retrofit smart living technologies into our building stock and to prepare our future aged to live comfortably with preventive digital healthcare measures. We have also made recommendations to match the talent pool of post-secondary students through paid internships to support the local businesses. To further support this drive for talent development, we have also made recommendations in providing fiscal support for developing various programmes in STEM competitions, authentic tasks learning, problem-solving curriculums and intellectual property development. A suggestion to revitalise our economy through smart tourism by reorganising our theme park operations with a crossover with local E-Sports and AR/VR industry was also presented. To further support tourism and livability, we also recommend investing in latest sensor technologies to make our public toilets smarter and create smart signboards.

---

[1] *http://www.shanghai.gov.cn/nw2/nw2314/nw2319/nw12344/u26aw63566.html*
[2] *https://media.iese.edu/research/pdfs/ST-0509-E.pdf*

We commended the excellent progress made with successful launch of different dashboards from data.gov.hk portal and will continue to encourage different bureaus and departments to unlock the trapped data (e.g. 1823). We are also supportive of the citizen engagement exercises and improvement works carried out by other bureaus and departments and recommended that a central reporting mechanism is needed to aggregate the various achievements and these need to be communicated to all stakeholders through organizing conferences, forums and town-hall engagements.

And finally, we presented our notions of the Smart-City-As-A-Service. The *Budget 2020-21* has allocated $22 billion from the Future Fund to set up a Hong Kong Growth Portfolio to invest in companies and projects related to Hong Kong. It should focus on the research and development achievements of smart city and local start-ups to nurture a stronger ecosystem.

Hong Kong has always been ranked high in the global smart cities, ahead of all cities in the mainland. The critical success factors include the effective use of information technology in urban planning, financial innovation, education and healthcare, coupled with the government investment experience in the new economy. We should also work together to help lead in industry standards (e.g. IDex), policy frameworks (e.g. Fast-Pass), start-up ecosystems (e.g. Innovation Lab), education (e.g. Professional Diploma in Smart City).

All of these are certainly what the Association of Southeast Asian Nations (ASEAN) countries want to learn from. Therefore, the Hong Kong Trade Development Council which has been allocated an additional funding of $150 million recently should include the Smart-City-As-A-Service as a major part of its overseas activities when organizing various initiatives to promote Hong Kong. By doing so, Hong Kong will not miss out on an estimated $96 billion (over HK$700 billion) in business opportunities from ASEAN countries and neighboring cities, and the initiative will help inject new impetus into the Hong Kong economy.

2. Smart City Blueprint – A Critical Review

At the end of 2017, the HKSAR Government announced a list of development plans for the special administrative region when the *Smart City Blueprint for Hong Kong*[3] was published. This first *Smart City Blueprint* proposed more than 70 initiatives, including smart lampposts, electronic identity (e-ID) or digital persona and now called iAM Smart[4], the Faster Payment System[5] (FPS) and the virtual bank licenses[6] - to promote smart city development in Hong Kong. Some of the initiatives like the virtual bank licenses is trailing ahead of other regional economies according to a recent news report.[7] Furthermore, we have also observed great progress in the enablement of local start-up ecosystem in procuring innovative technology solutions through the OGCIO's Smart Government Innovation Lab[8] and the EMSD E&M InnoPortal[9] (see Figure 1).

Figure 1. Smart Government Innovation Lab and E&M InnoPortal

Source: http://SmartLab.gov.hk, http://inno.emsd.gov.hk

The original HKSAR *Smart City Blueprint* was undeniably a first working plan from the HKSAR Government to layout a "To-do" list, to engage the industry and the public - to set the agenda forward. As smart city development in Hong Kong is an ongoing process, it is necessary for the HKSAR Government, the industry and the public to jointly review and rationalise the smart city development goals and objectives. A blueprint as such serves to facilitate the establishment of short, medium and long-term goals and objectives. It is based on this premise that this report will present as a part of a collaboration amongst the HKGCC, the PolyU's JCDISI, the SCC, related industry professionals, academics and our members - to review the status quo in Hong Kong's smart city development.

---

[3] *https://www.smartcity.gov.hk/doc/HongKongSmartCityBlueprint(EN).pdf*
[4] *http://twdc.ogcio.gov.hk/en/our_work/business/tech_promotion/iam_smart/*
[5] *https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/financial-market-infrastructure/faster-payment-system-fps/*
[6] *https://www.hkma.gov.hk/eng/key-functions/banking/banking-regulatory-and-supervisory-regime/virtual-banks/*
[7] *Ming Pao news report on virtual bank licenses http://bit.ly/2FMeXAV*
[8] *OGCIO Media http://twdc.ogcio.gov.hk/en/news/speeches/2020/01/doc/sp_20200116.pdf*
[9] *EMSD InnoPortal https://inno.emsd.gov.hk/en/home/index.html*

In this review, we would like to highlight that the general public still does have mixed reactions – pointing out some shortcomings and one that the HKSAR Government and the office of the Steering Committee in Innovation and Technology for smart city development needs to address.

As an example, in an op-ed contributed article[10] to the *South China Morning Post (SCMP)*, a reader commented that,

> *"The Smart City Blueprint fails to achieve this goal, presenting piecemeal solutions instead" and "Hong Kong urgently needs a comprehensive, coherent and conscious policy towards smart mobility which puts movement of people first, far ahead of private cars."*

In another op-ed contributed article[11] submitted to the SCMP, another reader said that,

> *"The process for procurement should also be revamped to stimulate innovation in the digital ecosystem. The current process is designed for purchasing infrastructure – bridges and roads – but not the digital goods of the 21st century – software and apps. Software development requires iterative testing to discover user behaviour. An agile and end-user-focused procurement process would allow the government to develop better digital services and use its fiscal strength to stimulate a smarter digital ecosystem".*

Better communication and collaboration are needed.

These two articles, albeit not representative of all voices from the public, had nonetheless succinctly articulated the shortcomings of the current effort in communicating the smart city developmental work in progress and its strategic policy framework. There are clearly targeted improvement works in both smart mobility and smart government related to the two contributors' specific concerns; however, these improvement works may not have been adequately communicated to the public. As an example, the Enhancing Walkability programmes from the Transport Department address directly on putting pedestrians first, and the new initiative to procure innovative technology solutions through the Smart Government Innovation Lab and the E&M InnoPortal directly addresses the procurement of latest technology and software solutions. The need to communicate effectively through the future iterations of the *Smart City Blueprint* and related public communications activities will be instrumental to the success of any public management. Failure of which will in turn undermine the collaborative effort led by the government, industry, academia, professional community, SMEs and the citizens at large who helped create a smarter Hong Kong.

Summarising different achievements in necessary

The phenomena we highlighted above is not new. Communication has always been high on the agenda in public management and this could have been resulted from the wrong approach that various departments and bureaus have adopted – concentrating on internal functions and efficiency first, often adopting a project-based approach and therefore failed to share information, data and

---

[10] https://www.scmp.com/comment/letters/article/2131217/why-hong-kongs-smart-city-blueprint-wrong-track
[11] https://www.scmp.com/comment/insight-opinion/hong-kong/article/2166773/hong-kongs-smart-city-ambitions-must-be-powered

the progress with other departments or to the public[12]. This could also be resulted from insufficient time, lack of adequate knowledge-sharing, empowerment and man-power allocation specifically assigned for collaborations amongst different bureaus and departments. The more communications across departments and bureaus by design could reduce frictions in achieving our smart city development goals.

In education, critique has also made it to the news desk from another contributor - discussing how reform in the Hong Kong curriculum[13] has still left our students and teachers with stress by having *"too much time spending on the dreary rote learning for tests and exams"*.[14] While in the economic trade front, as an example, there is very few news coverage by the mass media on the subject of the Trade Single Window (TSW) project headed by the Customs & Excise Department (C&ED) other than an alliance forming in Guangzhou advocating the need for faster digital transformation in this international trade[15]. This has been suggested in the SCC/HKGCC joint first interim-advisory paper in 2016 and later in SCC's response to the *Smart City Blueprint* in 2017. This has neither been addressed in the appointed *Smart City Blueprint*'s consultant report nor mentioned in the final *Smart City Blueprint 1.0* published in 2017. The TSW is very important to our economy as a regional trading hub and should be tracked and reported in the future *Smart City Blueprint*.

What's on the right track

In addition to the progress made in the iAM Smart, FPS, virtual bank licenses, Smart Government Innovation Lab and E&M InnoPortal, there is a plethora of improvements in many areas and perhaps too many to list here other than to name a few. We observed that there are now great visualisations of the various open data available at the data.gov.hk portal website with dashboards. These dashboards can now be accessible by both mobile devices and computers (See Figure 2).

Figure 2. City Dashboard at data.gov.hk

---

[12] https://epaper.chinadaily.com.cn/a/201912/30/WS5e093e64a310fb3de82eb265.html
[13] https://www.scmp.com/comment/letters/article/2187738/throwing-more-money-it-wont-make-hong-kong-education-reform-problems
[14] https://www.scmp.com/comment/insight-opinion/article/2131727/hong-kong-education-reform-continues-beijings-role-presents
[15] http://paper.wenweipo.com/2019/11/29/CH1911290009.htm

Source: https://data.gov.hk

In addition, we also observed that there are many improvements works achieved in other bureaus and departments that could be also chartered as part of the HKSAR Government's effort in building our city's resilience and towards making our city smarter. We observed a sustainability development campaign by the Drainage Services Department in turning waste treatment to electricity[16]. We also observed the new Hong Kong-Macao-Zhuhai bridge and related highway works to support our growing cross-border traffic[17]. We also observed an award-winning roadmap of a digital twin[18] of the Hong Kong International Airport.

Track centrally smart city related achievements and reporting rather than reporting by bureaus and departments only.

There are many completed smart city projects (in different disciplines) that could also be categorised as part of our HKSAR Government's smart city achievements. There is one caveat, and this is also one of the agenda we want to highlight in this critical review. During our research effort, our editorial team must browse through different departments and bureaus' websites for gathering their specific progress and read through their sustainability report, press releases or annual reports, or even reports from the Audit Commission. All these discrete improvement works or targeted goals and objectives for smart city development may have been tracked already by the Steering Committee of Innovation and Technology for smart city development. However, these are more than often not effectively communicated to the citizen and industry stakeholders.

Currently, all these achievements have been reported separately by bureaus and departments. It is our recommendation for the Innovation and Technology Bureau (ITB) to consider incorporating such achievements by other bureaus and departments in all reporting of smart city development in future conferences and townhall engagements. By periodically summarising such achievements and presenting to the public, this effort serves as documenting the progress and will help to communicate to all stakeholders and citizens who

---

[16] https://www.dsd.gov.hk/uploads/page/DSDSustainabilityReports/0503338_DSD_SR_2018_19_v14.pdf
[17] http://www.xinhuanet.com/english/2019-10/23/c_138496401.htm
[18] https://www.opengovasia.com/hkia-develops-digital-twin/

may not be able to fully comprehend the breadth and depth of work in smart city developments.

And finally, the SCC, HKGCC and the PolyU JCDISI had been in consultation with many industry leaders and our members through a consultative approach and collectively, we have summarised some of the suggestions and opinions in the following chapters. The following chapters had been categorised into the six pillars following of the Smart City Wheel by Dr. Boyd Cohen, one which the HKSAR Government has also benchmarked her *Smart City Blueprint*.

3. Smart Economy

Hong Kong is more than just an international financial centre, it is one of the most influential regional hubs for logistics and goods and is home to many SMEs, start-up companies and headquarters to many multinational corporations. According to the Trade and Industry Department, there are around 340,000 small and medium enterprises (SMEs) in Hong Kong[19] which accounted for over 98% of the total business units, providing jobs to nearly 1.3 million people. Over 50% of these SMEs are actively involved in import and export trading or wholesale. To facilitate and improve our efficiency in the trade and ancillary services, we need to have a systematic approach to ensure our SMEs can have different levels of support. We commended the HKSAR Government for reacting fast to the challenging business environment ahead and swiftly leveled up their funding support in the SME Export Marketing Fund[20] and SME Loan Guarantee[21].

Members of the HKGCC have also emphasized the importance to transform the customer journey and reduce cost and time through digitisation and application of robotic process automation (RPA) in international trade. Many airlines and shipping lines still require physical documentation for each shipment process (e.g. licenses, battery certification, safety documents, etc), which involves more manual work in the entire process. As such, physical operations are still highly dependent upon hardcopy paperwork e.g. booking forms during receiving, loading sheets, etc, and the need for many smaller businesses to digitise their operations will enhance the efficiency suggesting programme like the technology voucher programmes should also be levelled up.

Trade Single Window is a pillar of Smart Economy and Smart City Blueprint

In our original advisory report, we have made recommendations on the Trade Single Window (TSW). It is worth reiterating that the TSW, which is considered as one important Smart Economy and Smart Government initiatives led by Custom and Excise Department. The current status of the TSW can now be tracked at www.tradesinglewindow.hk website and Phase 1 covers 13 types of trade documents. Hong Kong has a vibrant trade economy and the need to modernize our trade related systems in B2G, G2G - allowing the use of open application programming interface (API) for related parties to exchange trade related data should be discussed and reviewed and ITB should be playing a pivotal role to ensure that it complies with our open data policy and future uses. SCC has previously suggested in the Interim Advisory Paper in 2016; and will reiterate here that our Hong Kong *Smart City Blueprint* will need to put more effort into this as well as defining the requirements for electronic identities for enterprises. Furthermore, blockchain-based distributed-ledger technology (DLT) could also be applied here so that green financing and ESG initiatives could be enabled, measured and secured.

---

[19] https://www.tid.gov.hk/english/smes_industry/smes/smes_content.html
[20] https://www.smefund.tid.gov.hk/english/emf/files/EMF_Guide_Eng.pdf
[21] https://www.smefund.tid.gov.hk/english/sgs/sgs_objective.html

For example, in our earlier interim advisory report, we have provided a suggestion to have a common data application programming interface (API) that allows SMEs' to have the resources and capability to connect their system to the TSW. For SMEs, it is also essential that they could receive financial support to upgrade and digitise their system to integrate with such future trade single window related documentation and compliance systems – thereby reducing costs, maximising the investment in implementing TSW and improving efficiency. Google's *Smarter Digital City 3.0* report has also echoed the need to offer support to SMEs[22].

Smart Tourism with E-Sports, AR and VR integrated with theme parks

Integrating our theme parks investment with E-Sports and support local AR/VR industry to deliver immersive experience

Tourism is one of the major pillars of Hong Kong as a regional economy and one that brings in a lot of incremental businesses and consumptions to related industries including hotels, restaurant, and local shops. In this regard, we recommend that the theme parks for which the HKSAR Government has a major stake should take the lead to encourage the theme parks to have a strategic plan to procure and to adopt local E-Sports gaming content and to support augmented reality and virtual reality (AR/VR) technology companies incubated in the Hong Kong Cyberport (Cyberport) and the Hong Kong Science & Technology Park (HKSTP). E-Sports is a trending sport that has now become a recognised sport in the Asian Games and one that has been earmarked as one of the growing categories supported by Cyberport with fiscal policy support. At the opening of the E-Sports stadium in Hong Kong[23] in Jan 2019, our Chief Executive has also provided her support in this growing international sport for the young people and an emerging industry providing economic growth. While E-Sports is growing amongst the younger generation, the theme park facilities in Hong Kong have been experiencing slowdown as an attraction. Given the fact that the theme park operators had been supported by the government, it only makes sense for our HKSAR Government to consider a strategic plan for encouraging the theme parks to also think of supporting the local industry in E-Sports and immersive entertainment content and license property. The benefits are many folds – firstly the growing E-Sports industry will need convenient access to space, buildings and experience to obtain necessary permits from the EMSD. The journey of upgrading and transforming their facilities to meet today's customers' need for new thrilling and adventurous mechanical rides can now be digitised into a much longer lasting digital and immersive entertainment experience. Our theme parks do require fresh idea from the more technological advance and agile start-up community to help build this public-private-partnership (PPP). With this partnership, the promotion of immersive digital AR/VR content and E-Sports and themed parks as a collective can bring down the cost of marketing and customer acquisitions. Furthermore, the theme park operators can therefore partner with an ecosystem of subject-matter experts in this field. Theme parks today should be operated as the apps store of Apple Inc and Alphabet Inc with an ecosystem of innovative apps partners that can contribute to a better customer satisfaction. As an analogy, the bestselling apps

---

[22] https://services.google.com/fh/files/misc/google_smarter_digital_city_3_whitepaper.pdf
[23] https://www.chinadailyhk.com/articles/135/114/168/1548671421173.html

of apps stores are generally not provided by store owners. The notion of disrupting the business model of theme parks management will support new growth in an industry and is a compelling proposition for challenges that are experienced by today's theme parks and E-Sports industry alike. With digital transformation, one can imagine that all these facilities could be booked, upgraded, maintained and measured for their usage much easier than mechanical rides, and the fireworks could be replaced by E-Sports tournaments that brings in new customers.

Intellectual Property – better IP Banking and portfolio management

Invest in mentoring companies and youth in applying for Patents

Hong Kong Productivity Council (HKPC) is currently the administrative manager under the ITC's funding scheme for patent application grant[24] (PAG) and yet HKPC is also the holder of some 123 patents and quite possibly numerous other patents pending applications. In this regard, HKPC plays both the roles of administrative body and the application. In the quest for transforming to becoming a knowledge-based economy, the industry itself had been trying hard to acquire different intellectual properties; HKPC needs to address this dual-roles issue.

In the intellectual property marketplace today, there are successful open innovations and matchmaking of IP portfolios such as the IPHatchDay[25] competition. This open innovation competition had successfully paired local start-ups and SMEs with patent assignments from companies like Nokia, Panasonic, City University of Hong Kong and ASTRI. We recommend HKPC to consider reaching out to the organizers by licensing out their patent portfolio.

The HKSAR Government's Information and Technology Commission has a very good funding scheme to support any HK company and any HK citizen to apply for Patent-Application Grant (PAG). Unfortunately, this scheme benefits only companies and elite individuals who has deep knowledge of this game of patent prosecution and the commercialization of intellectual property. The PAG scheme needs to benefit a wider audience where science discovery, problem-solving, engineering and creativity should be promoted. In Hong Kong, some universities have specific Knowledge Transfer Office (KTO) to help commercialise research and development output into intellectual property. However, there are very little help to offer to the start-up and SMEs. This however is a close garden approach.

Smart City as a Service for the Greater Bay Area and ASEAN countries

Smart-City-As-A-Service injects impetus into local economy

In recent years, the economy of ASEAN countries has been booming. With an average annual GDP growth of 5% in the past four years, Vietnam, the Philippines, Indonesia, and Malaysia are the locomotive of growth, turning ASEAN into the world's 6th largest economy[26]. However, economic development and urbanization also brought many problems to these countries.

---

[24] https://www.itc.gov.hk/en/fund_app/patent_app_grant.html
[25] https://unwire.hk/2019/11/22/bipasia-2019/hottopic/walk/
[26] https://cdn.aseanstats.org/public/data/statics/ASEAN_Selected_basic_indicators.xls

Firstly, except for Singapore, urbanization in the other nine ASEAN countries is in the early stage. According to the estimation of McKinsey Global Institute (MGI)[27], six ASEAN countries are less urbanized than the global average of 54% and China's 60%. The lowest is Cambodia (21%), with the middle being Thailand (50%) and Indonesia (54%), and the higher one Malaysia (75%). However, the rapid economic development attracted many migrants to the cities, causing problems such as insufficient housing, poor water and air quality, huge income gap between urban and rural areas, poverty and public security issue.

In addition, many low-lying cities, such as Bangkok of Thailand, Ho Chi Minh City of Vietnam, Jakarta of Indonesia, Manila of the Philippines, and Yangon of Myanmar often have to endure natural disasters like typhoons and flooding. It is estimated that 115 million people are vulnerable to coastal flooding. Therefore, the local governments hope to use advanced technology and smart city solutions to address these problems, so as to improve the quality of living and at the same time, increase employment opportunities especially for many of their young people as 60% of their population is under the age of 35.

As a result, there are huge business opportunities in smart cities. For example, MGI estimates that private companies involving in mobile mobility applications and built environment industry in ASEAN countries have US$96 billion (over HK$749 billion) of business opportunities in developing smart cities. While Southeast Asia needs some US$7 trillion (HK$55 trillion) in infrastructure, housing, and real estate investment to support sustainable growth. Many countries are ready to enter this huge market. Singapore and South Korea have formed the ASEAN Smart Cities Network (ASCN)[28] and the Korea Smart City Open Network (K-SCON) in recent years to assist smart city development of the ASEAN countries. The United States, Japan and Australia also participate actively[29].

In last November, China and ASEAN issued the *ASEAN-China Leaders' Statement on Smart City Cooperation Initiative*, and announced that eight mainland cities, including Shenzhen, have formed alliance with ASEAN cities to facilitate their development. At the same time, Shenzhen and Singapore also signed a Memorandum of Understanding (MoU) on the *Singapore-China (Shenzhen) Smart City Initiative* to jointly build a new platform for cooperation[30].

This is also a huge opportunity for Hong Kong as it has always been ranked high in the global smart cities. For example, in the *IMD Smart City Index 2019*[31] published by the International Institute for Management Development in Switzerland, Hong Kong ranked 37th, ahead of all mainland cities. One of the reasons behind is a better use of geographic information.

Geographic information system (GIS) has been introduced in Hong Kong for 22 years with wide adoption among government departments and corporations for

---

[27] https://mck.co/2VfVnWP
[28] https://bit.ly/37Riwlc
[29] https://bit.ly/2VfVxgT
[30]https://www.fmprc.gov.cn/web/gjhdq_676201/gjhdqzz_681964/lhg_682518/zywj_682530/t1712943.shtml?from=timeline&isappinstalled=0
[31] https://www.imd.org/research-knowledge/reports/imd-smart-city-index-2019/

planning urban development, tracking disease outbreaks, guiding business expansions, and supporting disaster relief. The most recent example is the introduction of an Interactive Map Dashboard for COVID-19 by the joint efforts of the government's various bureaus and departments to integrate their open data in helping to contain the epidemic.

Therefore, Hong Kong should strive to partner with ASEAN cities, exchange and assist in the development of smart city standards and promote the export of related solutions and services to find a new market for Hong Kong's service industry and talents.

4. Smart People

We have observed in the past that our highly literate workforce has been one of the driving forces behind the success of Hong Kong as a regional economy. With the advances in ICT and associated industry applications, we have observed significant improvements in adopting all kinds of technologies in our workplace and at the schools. As our workforce becomes more digitally literate through on-the-job or specialized training on how to apply the use of all the technologies and tools, it is also important to ensure that these digital-literate talent can find jobs that allow them to apply their digital skills in different work environments and contexts.

According to the latest Google's *Smarter Digital City 3.0* study[32], 64% of the bigger corporations being interviewed claim that it is difficult to recruit talent with digital skills and the same number is 51% for small businesses. One of the solutions is to develop a holistic plan for the younger generation to embrace technologies and develop competency in Science, Technology, Engineering and Mathematics (STEM). In addition to developing some understanding of coding, principles of design thinking, problem-solving, project-based authentic tasks and group-work should be encouraged. Respondents to the same study have overwhelmingly agreed that having the right digital talent available will be essential especially for the smaller businesses. Only 14% of Hong Kong citizens think the city is cultivating and developing enough digital talent. As a result, some concerns are raised whether the schools and universities are investing enough in promoting digital education and whether the curriculum is adequately filling the gaps in the short and medium term. Indeed, the Convenor of HKGCC Smart City Working Group, Mr. Patrick Lee also echoed the same issue whether our schools have been allocating the appropriate resources to ensure STEM education can be sustained and continued to be supported by fiscal policy through new educational reform and programme funding.

Develop AI and STEM programme for schools for the long term

In the past decade, Hong Kong government has been promoting STEM education within schools. Parents are delighted to see the flourished opportunities for children to get hands-on experiences in STEM. While STEM by itself is in fact core subjects with a twist, students are learning STEM through hands on experience. To facilitate the future generation to gear up jobs that are yet to exist in present time, we must equip with our young ones with skillsets that will be core to future workforce rather than pure knowledge transfer. Problem solving skill training using geographic information system (GIS), for example, has been integrated into STEM. GIS was seen as solely a geography subject in the past, but the software helps students figure out the most possible solutions using database, images, applied mathematics and mathematical models[33]. Therefore, a number of western countries such as Germany, Switzerland, the United Kingdom, Australia, the United States and Canada have included it into STEM education for some time.

---

[32] https://services.google.com/fh/files/misc/google_smarter_digital_city_3_whitepaper.pdf
[33] http://www.ejinsight.com/20190911-the-latest-education-trend-integrating-gis-with-stem/

In 2018, Singapore has adopted a new 21st Century Education framework[34] to steer the development of the necessary skills for future. The framework no longer emphasizes the importance of knowledge transfer, rather it pinpoints the acquisition of other skills in a carefully cultivated curriculum such as artificial intelligence (AI). AI is being promoted to students at age as young as 10 years old through AI Singapore[35]. Besides AI being introduced to primary school students, we recommend an education curriculum reform to investigate how technologies could be further immersed into our core curriculum as core subjects to prepare our kids for future jobs and careers.

In addition to developing AI curriculum in our talent development effort, we also recommend the Education Bureau and the HKEdcity to revisit the various programmes in promoting the adoption of education technologies. Technology-enhanced learning disrupts how education can be deliver to our future generations. For centuries, we believe the transfer of knowledge is the most important part of education. We are now at the point where one's learning path could be defined through adaptive learning platform powered by AI. As adaptive learning addresses the unique needs of each learner, the role of teachers is no longer purely for knowledge transfer. Instead teachers' role will be largely different in future years. Student's personal growth is no longer bounded by the rigid framework. If education can harness the power of AI and a territory-wide adoption in creating unique learning path for each student starting from young age, we will soon have a talented workforce trained up ready for the future.

Retraining our workforce in the use of latest smart city technologies

Provide more subsidy to more accredited smart city related programmes

As part of the effort to promote smart city development, we recommend the government to provide more fiscal support for our workforce to be retrained in the latest accredited programmes in industry 4.0, Internet of things (IoT), smart city technologies like blockchain-based distributed ledger, big data analytics, AI and cybersecurity. We are particularly glad to witness the Vocational Training Council (VTC) partnering with SCC through the Smart City Academy (SCA) to launch accredited Professional Diploma programme in Smart City[36]. Other executive and post-graduate programmes are also being developed with the University of Science and Technology (HKUST) and Lingnan University to promote to senior managers in the government and corporations.

Such programmes will become invaluable to our workforce, our government officers and their contractors who all need to upgrade their understanding of the impact of technology-led urban solutions and digital transformation that are crucial to smart city development. These programmes have been designed to attract non-technical working professionals to embrace new technological concepts such as introductory concepts in smart city, design thinking for adopting new technology, smart city applications, big data, IoT, artificial intelligence, reindustrialisation, cyber physical systems and smart automation knowledge. In addition to the two VTC's accredited programmes[37][38] which are

---

[34] https://www.moe.gov.sg/education/education-system/21st-century-competencies
[35] https://www.aisingapore.org/talentdevelopment/ai4k/
[36] https://hk.on.cc/hk/bkn/cnt/news/20190619/bkn-20190619123115704-0619_00822_001.html
[37] https://cpe.vtc.edu.hk/en/admission/programmes/Professional_Diploma_in_Smart_City/EG424412P

mostly catered for working adults, we would like to encourage primary schools, secondary schools, post-secondary institutions and training bodies to also incorporate such smart city topics as part of their lesson plans when promoting sustainability and environmental causes.

Figure 3: Official Launch of the Professional Diploma in Smart City programme

Source: VTC and Smart City Academy

Fiscal policy to give authentic learning experience to student interns

Besides upgrading our current workforce, we also recommend the government to provide guidance and financial support to SMEs to effectively run student internship programme. This will also help college and university students to acquire new skills and authentic learning opportunities through paid internship. Youth training and talent development are not purely about education and standardized tests. Youth training is about learning new life skills and talent development is about matching one's interests and the opportunities in the real world. Our education system has been flawed (for many years) because the system focuses on academic excellence and failed to nurture these students with programmes that help them to develop trust, build their self-esteem and help them acquire life-skills. Authentic learning programmes by design can help students become more inclusive and resilient.

Paid internship programme for SMEs for hiring post-secondary students

One of the current problems is that the HKSAR government does not offer any fiscal support in any city-wide internship programme. It is entirely up to the industry as a free-market economy to find its own way or have some NGOs running some specific programmes for students with better grades. In some local post-secondary institutions, the students may have a good chance to experience such authentic learning opportunities if their colleges and university departments could organise some form of apprenticeship, internship programme or industry attachment programme. In the meantime, some students count on working part-time at fast food restaurants while others find random work through random opportunities. In Hong Kong, there are an estimated 350,000 SMEs and it has always been challenging for many SMEs to

[38] https://cpe.vtc.edu.hk/en/admission/programmes/Professional_Diploma_in_Industry_4_0/EG424721P/1

find the right staff or part-time help especially those that have digital skills. It is equally challenging for the students to find the right employer who will give them a chance to learn and earn some income either for paying their student loans or for their leisure. In all the above scenarios, there is no market efficiency and it is a huge effort and cost to the society.

It is true that by design the SMEs should benefit from an internship programme and it is also true that not all SMEs could provide good supervision and mentorship for the student interns and the supervisors may simply treat the students as another form of low-cost labour. The perceived impact for both could therefore be compromised. To overcome this, we are recommending that training and professional guidance will be provided by statutory organizations such as the Employee Retraining Board and focus on how to best mentor the student interns. In this fashion, optimum results and good applied-learning experience could therefore be obtained for both the SMEs and the students.

The notion of putting these students into some form of paid internship sponsored by the HKSAR Government will be appreciated by both the SMEs and the students. There are two key pain points that this recommendation could therefore solve – hiring problem and shortage of good practical digital skills for SMEs for which SMEs can receive financial support. This also benefits the college and university students as they are rewarded with authentic task skillsets, mentorship, care and monetary compensation[39].

Financial subsidy to sponsor competition and mentorship programme for young scientists and engineers to apply for inventive patents

Today's Hobby Makes Future Engineers

There are quite many types of robotics competition being promoted as part of the movement in adopting STEM in education. There are Robocon, Robotic Olympiad, First Tech and many others. We are in the opinion that our society needs more than just robotics and coding and STEM programmes which should allow for diversity, curriculum reform and learning activities. An exemplary programme such as the *Innovate for Future* (IFF) competition which was initiated by the Hong Kong Electronics & Technologies Association together with the San Jose State University. IFF has just celebrated their first year as a joint school competition with a demo event at HKSTP (See Figure 4). IFF is financially supported by the trade association and is entirely run by volunteers and university interns. The programme is designed for students from different secondary schools in Hong Kong[40] and does not focus on only junior robotics and coding. Such programme creates diversity and a longer-lasting impact by inspiring these young minds to become future scientists and engineers - solving real world problems. These learning activities are specifically addressing the gaps in our current educational regime which is specifically designed for competency-based assessment and standardised testing.

---

[39] https://www.scmp.com/comment/letters/article/3026362/hong-kongs-youth-and-smes-would-both-benefit-government-sponsored
[40] http://www.hketa.org.hk/events/categoryDetail.shtml?category_id=256&type=1

Figure 4. Innovate for Future demo day event celebrated at HKSTP

Source: www.hketa.org.hk

As an example, a city-wide scientific programme on air quality monitoring could be implemented with the Environment Bureau and data.gov.hk to promote STEM at the secondary schools, colleges and universities to install air quality and weather monitoring sensors kits. The programme allows the schools to implement it as a science project for senior forms students with a set of certified equipment manufactured by various local vendors. With many schools dispersed at different districts, the various monitoring datasets could become very useful. The benefit is obvious as the programme can enable the school students to be more involved in authentic tasks in STEM applications. There are at least three to four local companies involved in air purification, monitoring and sensing technologies in Hong Kong. Such sensors can use mobile data technologies such as LoRA, NB-IoT, 4G and Thinxtra with the adoption of standardised application programming interface (API) with the data.gov.hk open data platform and make it available for public use. As our 5G network is being deployed, the cost of using low-bandwidth resources will also become less expensive as the cost of embedding a modem compatible with 3G/4G, Thinxtra and LoRA at each point of collection becomes lower.

Mentor our youths to acquire inventive patents

Recruit retired engineers and science practitioners as mentors

We are making a recommendation to encourage our future engineers and scientists to receive professional guidance through a structure programme. We propose that the ITC should extend the funding to encourage qualified individuals with the background of STEM with specific experience (for example, one that has been a named inventor in any USPTO or EPO issued patent) to become a supervisor or mentor for capable young students and engineers (e.g. below the age of 26 years old) qualified and recommended by their respective university and colleges or secondary schools. A trade body or training body

could help oversee the programme and receive fiscal support from the ITC programme as an extension to Patent-Application Grant (PAG). By helping our youths to develop their talent in acquiring intellectual property through generation of ideas and applying for inventive patents, this programme becomes a platform for extending the research and development to the school system. The programme should also develop a structure where our SMEs could help commercialise these inventions and provide licensing royalties to the young inventors.

5. Smart Government

In Hong Kong, we have an exceptionally capable and educated workforce totalling 3.956 Million with an unemployment rate at 3.2%.[41] The HKSAR Government herself is the largest employer with civil servants nearing 180,000.[42] According to the World Bank, Hong Kong however is only ranked 5th as the most effective government, trailing behind Switzerland, Finland, Andorra and Singapore. Singapore has the most effective government scoring 2.23 Government Effectiveness Score followed by HKSAR with 1.9 (World Bank, 2020). The World Bank defines the effectiveness of the government as a direct relationship with the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies (Quah, 2018). A few years ago, HKSAR was ranked 3rd behind Singapore and Denmark. This data shows that the HKSAR will need to put much more effort into ensuring we have an efficient government.

Release the trapped data in 1823 services for incidents reporting and for public use

As mentioned earlier in our critical review, there is a pressing need for various bureaus and departments within the HKSAR Government to collaborate with each other sharing more knowledge, defining the best practices and most importantly changing their mindset to share their data in a common format. The ITB can take the lead in doing this by first codifying all the 1823 data into reusable data format and allow these to be used by all departments and the general public through data.gov.hk. The 1823 services are provided by the Efficiency Office (effo.gov.hk) under ITB. The 1823 services accept public telephone call-in from anyone and the scope of services provide a variety of public information, and the services extend to receiving all sorts of compliments, suggestions and complaints via web and its own app as well. It currently only provides datasets related to 1823 service requests frequency and performance in the data.gov.hk open data portal.

Let's take a holistic view of the nature of the 1823 service; it is a well known public service (historically) due to the need to provide timely response in delivering public service in the era of telephone hotline - where agents can receive inbound request followed by ticketing, documenting reports and dispatching workforce to fix a gas leak, a fallen tree or to make further assessments for threat or epidemic. In today's digital economy, information is captured digitally and shared online via social media faster than the newswire and news crew. It is therefore understandable that there are many crowd-source incident reports and complaints that are trapped in the 1823 service operation governed by business processes in pre-social media era.

In an op-ed submission to SCMP[43], titled *"Hong Kong's people are a great source of smart information: let's make use of it"*, SCC has made a suggestion

---

[41] https://www.censtatd.gov.hk/hkstat/sub/so30.jsp
[42] HKSAR C&SD reported the no. of civil servants as at Sep 2019 to be 176,661
[43] https://www.scmp.com/comment/insight-opinion/hong-kong/article/2177058/hong-kongs-people-are-great-source-smart

to tap the actual data provided by our citizens using 1823, such that the city could be run more efficiently. An example would be how the social media app - Twitter was used for informing Jakarta motorists to avoid flash floods; and how an improved version of the city portal called Qlue was also used by the local authorities to engage with business enterprises, application developers to come up with useful ICT solutions to address urban issues ranging from combating fire and identifying and fixing pot holes in the roads. These are the most useful data yet to be made categorised and open for public use. However, this trapped data could become very useful for application developers if they are made public in the data.gov.hk; and in the mean time, whenever there is a crisis in Hong Kong, such as those mishaps with MTR or major road accidents and traffic congestion, it is usually faster for the average citizen to find out the latest information from a few specific pages in social media (e.g. Facebook or WeChat). It is from this case study of trapped data within 1823 services that we can further understand more about the need for unleashing the trapped data and store them in a common data protocol and publish them as open data. We recommend the HKSAR Government to design a smart data framework that which could support sematic analysis of big data. Data from different domain can now be aggregated to needed to make the city interconnected and smart and to ensure data collected follows a semantic data model to simplify the development of application that require integrated access to city data sources.

A great example of such effort was also recently achieved by a public-private partnership led by the Development Bureau, Lands Department, the Centre of Health Protection (CHP) and other government units with support from SCC's volunteer IT team - in aggregating city map geolocation data together with confirmed, suspected cases of the coronavirus for the public to know more about the latest status of this epidemic[44]. Through this type of public private partnership, the ITB can facilitate the application of existing technologies available from local companies and the data collected through the various government official data sources and build them through a standard data interfaces as part of the Common Spatial Data Infrastructure (CSDI) as proposed in the *Smart City Blueprint*.

Figure 5: City Dashboard with latest situation of novel coronavirus infection in Hong Kong

---

[44] https://chp-dashboard.geodata.gov.hk/nia/en.html
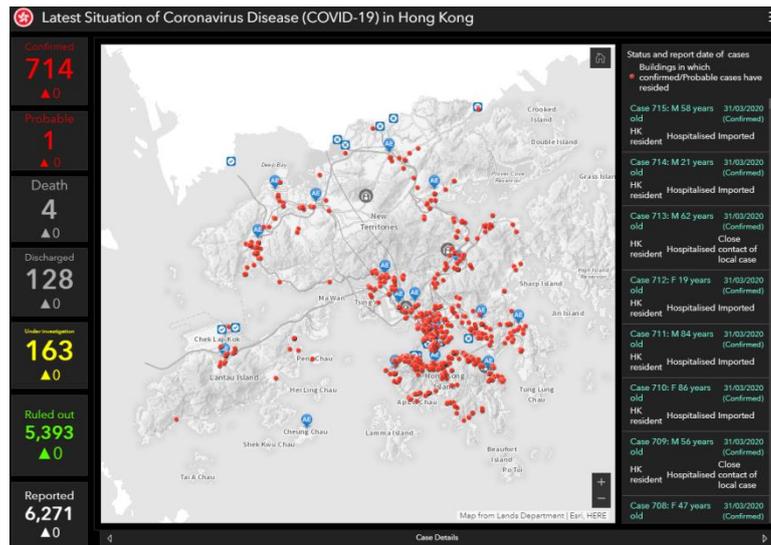
Build smart signage in partnership with private companies

The next level of the citizen dashboards should target at integrating more sources of data, the quality of the data should be verified if they are crowd-sourced from the citizen and identify additional presentations to address new requirements from the public. There are many companies that operates advertisement signboards, LED TV walls and all sorts of smart displays installed in elevators, and the best way to make certain information publicly available is to consider setting up a standard communication protocol and interface and allow these private companies to become part of the information dissemination channels. We are recommending some form of public-private partnership in disseminating public service announcements through smart signages. Smart signage could then be setup to work with specific data feed or API with the data.gov.hk thereby providing a flexible platform of local communication for the city. This will allow citizens and visitors to have access to real time information through real-time broadcasting. If strategically placed, the smart signages will guarantee excellent visibility of municipal information and is a more sustainable and efficient option to publicize about all the happenings in the city unlike the current flags used on lamp posts which is very environmentally unfriendly. This will keep our citizens informed about their city in an organized method of collection and then dissemination. This information is delivered as real time contextualised messages to the citizens at the right time and at the right locations. (e.g. traffic accidents nearby, typhoon signals). In addition, some of our street furniture today (e.g. in tourist areas) could also use an upgrade by turning into information kiosks with mobile data connection integrated and solar-powered. This can improve citizen's daily life by being well-informed and allow the government to collect and analyse respective data.

Start with a common set of data by being CSDI-ready

The notion on Common Operational Picture with CSDI readiness

In the original *Smart City Blueprint* published in 2017, the HKSAR Government had pledged their support to building a Common Spatial Data Infrastructure

(CSDI). This development is the core of a smart city and a one-stop information center. In the upcoming milestones, a well-defined roadmap for the CSDI is needed for all departments and bureaus and external contracting parties to be able to access the CSDI.

First of all, in our mission to achieve CSDI, the administration should mandate all datasets produced by the departments and bureaus will need to be "CSDI ready", a machine-readable format [45]. Secondly, interdepartmental collaboration for constructing a data- driven common operational picture (COP), a central platform that enables the exchange of information and facilitates better coordination amongst departments is also crucial. An example would be the road blockages and MTR suspensions in the second half of last year. At that time, traffic was paralysed, schools had to suspend class, emergency rescues were blocked. To enable people to cope with the situation with accurate and updated information, establishing a COP has been advocated. It should include updates from the Police, the Transport Department (traffic condition), the Highways Department (road closure and under repair), the Fire Services Department (emergency services underway), the Hospital Authority (updated clinic and hospital services available), the Information Services Department (refute rumour), the Food and Environmental Hygiene Department (assuring food supplies, public cleaning), the Education Department (school arrangement), the Environmental Protection Department (air quality), and the Leisure and Cultural Services Department (closure of facilities) [46].
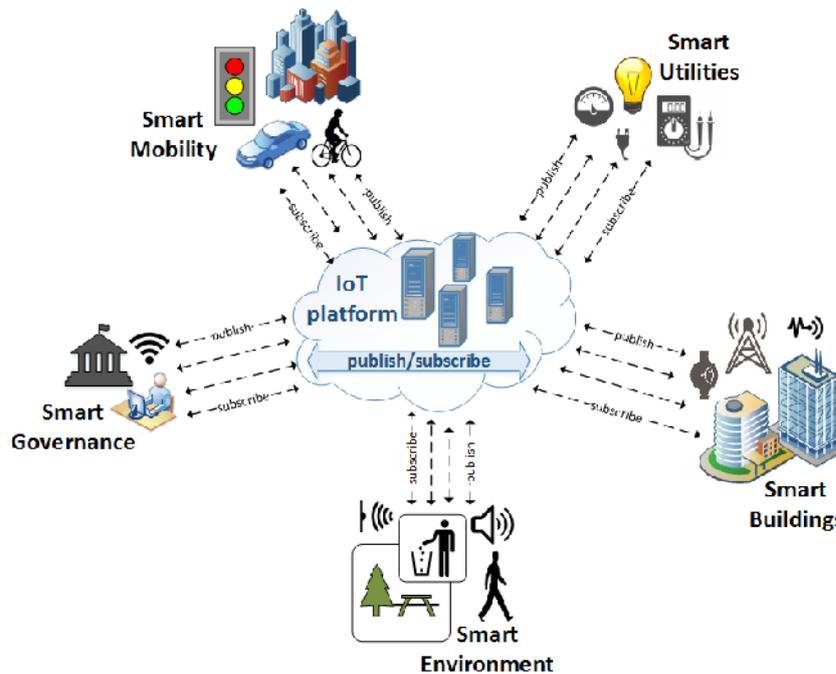
This is actually not new to the government. The Geotechnical Engineering Office has already implemented a COP, which intergrates information from various departments, including data from 90 rain gauges and landslide reports. Information is uploaded to the cloud server for integration, and the distribution of emergencey events is displayed on a big screen for coordinating the response.

Due to the increasing need for networked systems we can observe departmental budgets increase and an advancement in deploying ICT-solutions in various sectors. However, most of the developed systems are custom-tailored solutions for specific problems and application areas, leaving a big challenge for the ITB with a set of diverse frameworks and KPIs. The result will be a jungle of heterogeneous ICT systems and sub-systems developed under silos hence making it very difficult to find common interfaces for interconnecting the underlying data for operating with each other, especially in supporting the smart city development objectives (Antonić, Marjanović.& Žarko, 2017)

Figure 6: A challenge in common interoperable data interfaces

---

[45] https://www.chinadailyhk.com/articles/28/24/38/1577632118670.html?newsId=116999
[46] https://www.scmp.com/comment/letters/article/3038663/hong-kong-protests-disrupt-workday-keeping-information-flowing

Source: (Antonić, Marjanović.& Žarko, 2017)

Appoint a Chief Data Officer for overseeing the CSDI and open data projects

And finally, we are in support of the Audit Commission's report[47] titled "OGCIO's programmes and projects in promoting the wider use of it in the community." published in April 2018 that more departments and bureaus should be encouraged to release their data in a CSDI-ready. In our previous advisory report in 2016, we have also suggested of creating a new position of Chief City Data Officer who could be given the authority to manage the CSDI and other open data projects within the government.

Promoting the wider use of ICT in our community

Further to provision of more open data, we are also in support on the following recommendations made by the Audit Commission of the same report that specifically request the OGCIO for details of the strategy and programme of the work of the ten initiatives in promoting the wider use of ICT in our community to be more transparent and fully addressed in the new *Smart City Blueprint*

> *"…that Audit noted that only three (i.e. Wi-Fi Connected City Programme, PSI portal and technology start-ups supporting initiatives) of the ten key initiatives in promoting the wider use of IT in the community were mentioned briefly in the Smart City Blueprint for Hong Kong. The initiatives were only featured briefly in the Blueprint without details of their strategy and programme of work. The Innovation and Technology Bureau (ITB) and the OGCIO need to update regularly their strategies and work programmes on promoting the wider use of IT in the Executive Summary — xii —*

---

[47] https://www.aud.gov.hk/pdf_e/e70ch06sum.pdf

community, taking into account the Smart City Blueprint for Hong Kong and other policy directives and strategies on innovation and technology promulgated by the ITB (paras. 5.2, 5.3, 5.5 to 5.7)."

As discussed earlier, it is important that the strategic plans, programme objectives and its progress are to be fully documented and communicated in the future blueprint.

The need for regulatory reform and regulatory sandbox

Regulatory Sandbox – Fast-Pass programme

Following a recent report[48] on the progress of smart cities project in Korea, the Korean government does recognise the need to allow for commercialization of strategic industries particularly getting their nations ready for the fourth industrial revolution technologies. While the Hong Kong industry landscape and associated challenges are not the same as Korea, it is worth considering the following statement from the report.

> *"Existing regulations require prior authorization of new and disruptive business models, a process that can be lengthy and expensive. Burdensome regulations have led to specific examples of innovative Korean companies losing out to international competitors that were able to get to market quicker, unhindered by the need to secure licences for activities where there were no specific regulations in place."*

We are recommending developing a Fast-Pass programme that could be introduced to different categories in our smart city development effort. In this Fast-Pass programme proposal, we see that while the laws and regulations are by designed normally introduced after the introduction of certain innovations, it is however difficult for ground-breaking solutions to find its market and application unless the government allows room for such developments. Such contention and disconnect is hampering the pace of technological innovation that could be potentially impactful in achieving smarter mobility in Hong Kong.

Engage other members of community to be part of the steering committee

With the concept of Fast-Pass, it is proposed that the HKSAR Government can grant short term permits for eligible businesses to trial their smart city projects under a more relaxed regulatory environment. This Fast-Pass programme can also be extended to other smart city categories for projects that are of public interest. Priorities are given to those that could create more impact to our society and the issuances of such permits could be limited. In order to mitigate risk, measures could be devised such that there are options to terminate trials when it is determined that a project's risks outweigh its benefits. Such Fast-Pass programme could be implemented in new cluster development such as the Lok Ma Chau Loop Innovation and Technology Park.

The benefits of this programme could help reduce time-to-market uncertainties by easing potential regulatory hurdles otherwise faced by first moves. It could improve access to finance by promoting investor confidence in the ability to

---

[48] https://www.intralinkgroup.com/getmedia/9e2bf792-458f-41f8-9a79-d11d284f4116/Korea_Smart-Cities-full-report_v2

execute proof-of-concept. It also helps promote willingness to invest in the research and development of innovative products and solutions and improve the ability to access insurance coverage. Such sandbox programmes have been successfully introduced to our financial sector with the Hong Kong Monetary Authority with their Fintech Supervisory Chatroom[49] and their Fintech Supervisory Sandbox (FSS)[50]. Such Fast-Pass programme could benefit the various use cases such as the use of blockchain distributed ledger technology on a permission basis for building the foundation of the smart data framework discussed earlier.

And as a final recommendation, we would also like to recommend the HKSAR Government to consider inviting several of our legislators and industry professionals to join the Steering Committee of Innovation and Technology in smart city development chaired by our Chief Executive. We believe the smart city development requires good leadership, trust and building consensus amongst stakeholders (Vangen and Huxham, 2003) which could only be resulted from extending the leadership from internal of the government to include external parties such as industry professionals with domain knowledge, academia with substantial R&D insights and legislators which help gives the proper governance on behalf of the society as a whole.

---

[49] https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/fintech-supervisory-sandbox-fss/fintech-supervisory-chatroom-chatroom
[50] https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/fintech-supervisory-sandbox-fss/

6. Smart Environment

To enable a truly smart environment, Hong Kong needs to engage every citizen to be involved from conservation of the use of energy and water resources to public health. Hong Kong is also facing tough times amid the local protests and the new coronavirus epidemic, so is the public health system. Despite such setbacks, a resilient society needs to continue to engage the public and various industry stakeholders on strategic roadmap with mid-term and long-term impact.

The Climate Action 2030+ plans that was released in Jan 2017 by the Environment Bureau and the recent consultative engagements led by the Council of Sustainable Development are both great examples of long-term planning and a willingness from the HKSAR Government to collaborate with the industry stakeholder and build consensus towards a working agenda - setting targets and mitigation plans. Following the Climate Action 2030+ framework, the recent long-term decarbonisation strategy public engagement exercise which successfully closed on Sep 2019 had made great progress in both creating awareness with stakeholders and setting the agenda towards achieving the sustainable environment targets.

In the supply-side of electricity, decarbonisation through phasing down the use of coal, while increasing the use of natural gas and alternative energy such as renewable, landfill gas, and waste to energy and solar energy is a commendable effort. We have observed both the HK Electric and the China Light & Power in making progress in implementing the Feed-in Tariff (FiT)[51] [52] and Renewable Energy Certificates (REC) programme[53] [54] to promote the use of alternative energy.

Demand-Side management of electricity consumption should be promoted

Widespread demand side management of electricity to achieve savings and foster the energy transition

In the demand-side of electricity, there are new innovative technology solutions and Smart IoT devices that can be widely deployed in our homes, retrofitted to blend into our current living environment. In our original advisory report, we have pointed out and suggested that Hong Kong's utility companies could follow the examples of energy companies like United States' Reliant, Green Mountain Energy and National Grid. The authority in Hong Kong can offer rebate and subsidise the installation of smart thermostats[55] and use big data and algorithm to help residential consumers control the various spilt-air conditioners and fans already bought and installed at residential customers and

[51] https://www.hkelectric.com/en/customer-services/smart-power-services/feed-in-tariff-scheme
[52] https://www.clp.com.hk/en/community-and-environment/renewable-schemes/feed-in-tariff
[53] https://www.hkelectric.com/zh/customer-services/smart-power-services/renewable-energy-certificates
[54] https://www.clp.com.hk/en/community-and-environment/renewable-schemes/renewable-energy-certificates
[55] https://www.theverge.com/2013/4/22/4253594/nest-adds-extra-features-and-rebate-in-power-company-partnerships

semi-commercial buildings. The source of funding can come from the existing Scheme of Control Agreements' energy efficiency fund that are managed by the two utility companies. Instead of just making these funding available for building owners and property managers and business enterprises only for energy audit, the funding can also be used in the residential market for installing smart IoT sensors and control devices.

Another example of demand response management for smarter electricity consumption can be a solution like those deployed in France by Voltalis. This system is already operating in millions of appliances in Europe. When the electrical system needs it, many short interruptions are generated on selected appliances in the equipped households and buildings. Smart algorithms aggregate those load reductions to deliver significant reduction of power consumption, tailored to the electric system requirements. Because the interruptions are targeted and limited in times, no loss of comfort is felt by the end users, making their participation in the scheme effortless. Currently, more than 100,000 households in France are equipped with this technology which has been certified by the Technical Standard Order (TSO) since 2008. Furthermore, this system could be potentially developed together with various electronic appliance manufacturers[56] in the Greater Bay Area (e.g. Shunde and Foshan) forming an alliance to define a new electrical appliance standard of reporting the power consumption through chipsets. This could be introduced through existing or new standard body to work on reporting these connected appliances' electricity consumption.

Creating a standard of electricity consumption reporting through chipsets and IC firmware

Conversely, this demand-management solution can also be used to trigger consumption when energy is easily available, for instance Electric-Vehicle charging when renewable energy generation is at its daily peak. This benefits individual participants as well as the power grid. This ecosystem and data-driven analytics can help predict the consumption of electricity and the customers can enjoy effortless energy savings and are also given access to a dedicated standardised electricity management interface that allows the electrical appliance[57] to take remedial action such as auto-shutdown or power-off to lower standby mode, thereby further optimising their power consumption. These standardisation efforts should be a great policy to push forward with government and industry support and add value to the entire manufacturing industry in the GBA.

According to Climate Action Plan 2030+, we need to reduce our carbon intensity by about 65-70% by 2030 when compared with 2005 level. As environment is a multidisciplinary domain, we are facing various local, yet interconnected challenges. We trust that through technology innovation, interaction and collaboration, we can contribute to all the relevant sustainable development goals. Some of our selected thoughts are presented as follows, corresponding to the four pillars of:

• Environmental protection,
• Energy saving,
• Climate change mitigation, and

---

[56] *The need for electricity reporting standard in modern day smart homes* *https://bit.ly/2Um4kgX*
[57] *Smart ecosystem proposal* *https://bit.ly/2SezxQy*

- Sustainable development.

We have listed down some suggestions below for the four pillars: -

Environmental protection - The HKSAR government should enhance pollution monitoring by establishing micro grid using low cost sensors to recognize the source, the flow of air and noise pollution in order to identify energy efficient solutions. Most of the existing solutions are very accurate but very expensive therefore only installed in a few locations. There are also running costs for maintenance and data analytics. In Northern Europe, there are innovative IoT and Cloud-based analytics solutions which offer low-cost, low-maintenance options making it possible to have a dense grid of adequately accurate measurements on air quality and noise levels in many neighbourhoods with advanced analytics support. The Environmental Bureau can also enhance environmental planning and public engagement processes by recommending the appropriate type of immersive technologies. For example, various building contractors and bureaus can consider upgrading the current provision to 4D+ virtual reality technology to help architects, engineers, etc. in applying innovative mitigation designs for residential developments.

Energy saving - One of the means to increase available energy is to harvest ambient energy by integrating sensing and harvesting technologies in building materials and infrastructure for building envelopes, street furniture and city assets. This also reduces pollutant entering residential premises. In the US, there are systems embedding solar harvesting installations on or as part of a building envelope, which are able to concentrate light energy towards photovoltaic cells while minimizing the loss in illumination due to shading.

Climate change mitigation - The HKSAR Government can also promote electricity for operating the city's transport system including land-based vehicles, marine and aerial vessels by installing associated charging-enabling facilities as city assets. In 2018, the International Maritime Organization (IMO) launched its initial strategy to reduce greenhouse gas (GHG) emissions, outlining a series of short-, mid-, and long-term milestones to achieve its ultimate decarbonization target of halving GHG emissions by 2050, as compared with 2008 levels. In Hong Kong, with public engagement and pilot trials, switching ferries from diesel-powered to all-electric and hybrid is one way forward.

Sustainable development - SCC is in support of the development of circular economy through wider use of technologies such as asset tagging, reconditioning various equipment and appliances. One of the methods is to provide asset tagging technologies which can provide information such as the condition and availability of products, components, or materials for maintenance or upgrade. Integrating with spatial analytics, such information can help extend the useful life of an asset, increase its utilization, loop or cascade it through additional useful cycles, and help reuse of natural resource.

The next topic specifically refers to how Hong Kong can lead and set itself as an example for many other countries by following the early proposed public policy in modernizing our public toilets to promote a cleaner and hygienic environment in Hong Kong.

Smarter Toilets for better hygiene

In 2019, a report[58] from the HKSAR's Audit Commission has made some key recommendations to the management of public toilets by the Food and Environmental Hygiene Department (FEHD). Today, the FEHD manages a total of 798 public toilets with a flushing system. In the 2018 Policy Agenda of the Chief Executive of HKSAR, a comprehensive refurbishment works would be carried out and we are recommending the use of latest sensors technology to support the ongoing measurement of the hygiene conditions and the success of the refurbishment. Following the Audit Commission's advisory, we recommend that the HKSAR Government should take the lead to show the world that our public toilets can be modernised with the latest sensors, control, hygienic and connectivity solutions and one for which the investment could also be effectively measured.

Figure 7. A Smart Toilet Use Case with radar sensors
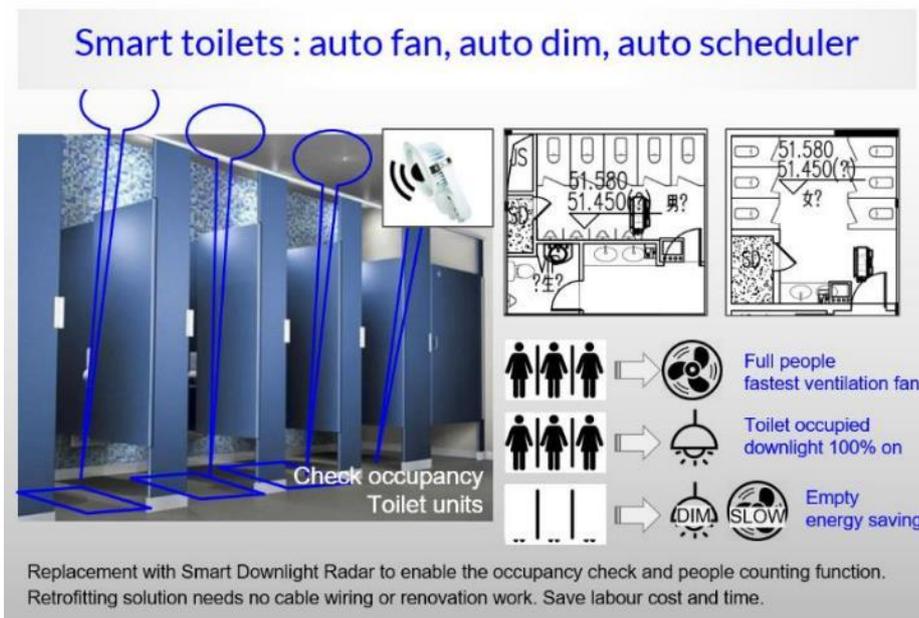
Source: Internet

Smarter Toilets and better hygiene

These smart toilets can choose indoor radar sensors (Figure 7) and replace the infrared sensors which has been reportedly inaccurate[59] and have considerable variances in the Audit Commission's report. These indoor radar sensors can provide a more accurate means to determine occupancy data. When such sensors are combined together with odour, water leakage, temperature and humidity sensors, this real-time sensing of the facility can trigger the additional ventilation fan operating or have additional cleaning through demand-

---

[58] https://www.aud.gov.hk/pdf_e/e73ch01sum.pdf
[59] https://www.aud.gov.hk/pdf_e/e73ch01.pdf

management notifications for FEHD's contractors or attendants to provide on-demand job scheduling for cleaning. The notion of providing a better bathroom experience and more importantly a sustainable hygiene environment for our citizen and tourist is a very compelling vision. Our Financial Secretary has already pledged a fund of HK$500 Million[60] to the refurbishment works project in the 2019's Fiscal policy. It is advised that ITB could also provide guidance to the FEHD in adopting such IoT sensor technologies for both operations and measurements of these facilities. With the ongoing saga of the deadly coronavirus, it is also an expectation of the public at large that the HKSAR Government should invest more resources in improving public hygiene and ensure our public toilets are upgraded. Other measures including regular sample testing of the quality of the fresh water supplies, adequate supply of cleaning solutions and contactless drying solution should also be considered. In some cases where the public toilets are a stand-alone building and owned by the HKSAR Government, it is also worth considering erecting solar panels and other prevalent alternative energy to supply the electricity for own use.

In addition to upgrading our public toilets, we also recommend putting in place additional measures to make hand-washing more accessible to the public. The HKSAR Government through FEHD can consider dispatching mobile trucks equipped with handwashing basins supplied with freshwater taps and soap at high-traffic streets in different districts in Hong Kong. During this intense period of epidemic nature, this is practical, creates awareness of hand hygiene, provides a most needed public service and definitely leaves a positive public image in times of uncertainty.

Figure 8: Mobile handwashing trucks

Dispatch Mobile Handwashing trucks

Source: Internet

---

[60] https://www.scmp.com/news/hong-kong/health-environment/article/2187556/hk500-million-expected-0budget-upgrade-hong-kongs

7. Smart Mobility

Traffic is closely related to the daily life of our citizens, the 2019 Policy Address proposed to jointly develop a new Traffic Data Analytic System with the Transport Department (TD) to analyze various real-time data and quickly respond to incident handling and information dissemination. We welcome this proposal and believe this measure can help the public cope with future situations with accurate and updated information. Considering the direct impact of transport and logistics on economic and trade activities, the Policy Address proposed to set aside $1 billion for the establishment of the Smart Traffic Fund, and explore the introduction of a pilot scheme to encourage the logistics industry to enhance its productivity through the application of technology. These are all good news well received by the public.

Currently in Hong Kong, we are beginning to see smaller and less expensive Electric Vehicles (EV) being sold in the market and the need for interoperability and installations of EV chargers at various sites across new and old buildings will continue to grow. It is well understood that it will take an excruciatingly long time to a complete transition to EVs, but that shift has begun and will continue over the next decade. There is a need to mandate the EV charging operators to have a common standard for EV charging. This supports all the different car makers in order to ensure faster adoption of the EV and therefore clean energy with zero carbon emission.

Electronic Road Pricing pilot scheme

We are in support for the TD's plan to implement intelligent traffic management system[61]. On April 2019, the TD has released its plan to have a pilot scheme for electronic road pricing (ERP) in the central district of Hong Kong. This ERP is critical to alleviating traffic for all kinds of vehicles entering the central district and potentially other districts. While we do not have data on hand about the success of ERP, similar programme has been enforced in many cities such as Singapore with their own ERP and in Jakarta with their enforcement of odd and even number plates alternatively using the city roads. Part of the process is to gather enough data to allow better traffic management at different times of the day. In addition to ERP, part of certain roads in certain districts could be changed to pedestrian and autonomous vehicle (AV) uses only. With reduced traffic and complications, it should be possible to allow AV to be operating under a pilot-scheme environment as well. New projects such as AV will need to be properly governed and will require TD to allow these technologies to be deployed within a safe environment such as our proposed Fast-Pass programme.

Opening traffic data, API for an integrated app ecosystem

---

[61] https://www.erp.gov.hk/download/PAPER_EN.pdf

Currently, the TD operates different mobile apps for the convenience of road and public transport users. In fact, bus companies and the Mass Transit Railway also have their own apps, bigger private parking operators have their own as well. For a start, there may be a need for the TD to look into providing more data to the data.gov.hk so that these public traffic data and analytics could be used by third party through API. Furthermore, the TD may also need to consider integrating the different apps through one holistic mobile app or destination portal so that our road users and logistic industry can plan their routes with an integrated smart app infrastructure (e.g. HKeMobility, KMB, MTR, HKG MyFlight). In addition to the traffic data from the TD, there is a need to tap the resources from 1823 where road incidents are reported and could be fed into the entire database linked to the apps[62]. The Efficiency Office (EO) has been operating the 1823 service which takes input from ordinary people on just about anything and these data has not been filtered and codified to be part of the supply chain for traffic use as well as for the data.gov.hk. As of the writing of this report, the EO is only supplying the number of calls, web inquiries, etc to the data.gov.hk portal. Furthermore, we believe that transport-related open data should also include ferry services such as Star Ferry and other outlying islands ferry services.

It is also worth considering having specific crowd sourcing algorithms which can mine the various social media websites for latest incident reports which are very common as there are a lot more people consuming and documenting what they have experienced on location. The accuracy and usefulness of such information could be easily validated and enhanced by designing machine learning algorithms and big data analytics. It is our hope that the new proposed budget for Smart Traffic Fund can support the ITB and TD to work together to unleash these trapped data and citizen's input. Indonesia offers examples of how such a system incorporating data from the public could work. Twitter has been used in the capital Jakarta for reporting flash floods, while through the country's intelligent platform Qlue[63], local authorities have been able to engage the citizens and application developers to address traffic and other urban incidents.

Public parking spaces and metered-street parking

In a report by the Auditing Commission in April 2019, it was recommended that TD should streamline the sale process of the monthly car passes using information technology. We believe the ITB should take the lead to create a standard for this application process using industry compatible application programming interface (e.g. Restful API) that also allows private car parking lot operators (temporary or more permanent ones) to be able to tap this resource of a monthly parking application portal through balloting. This portal would alleviate overnight queueing at these facility as well as ensuring a fair distribution of application and sale process through "online" balloting. The Leisure and Cultural Services Department (LCSD) has been pilot testing the online balloting of booking turf football pitches since June 20, 2018 and it has

---

[62] https://www.scmp.com/comment/insight-opinion/hong-kong/article/2177058/hong-kongs-people-are-great-source-smart
[63] https://www.techinasia.com/jakarta-smart-city-social-media-week

curbed the illegal resell of the booking of these scarce resources making the entire process transparent, equitable and efficient. Our suggestion is to learn from this great user experience and successful case and apply the same "online balloting" mechanism to the management of the sales process of monthly and termed parking spaces managed by TD. In addition, if this portal also has the capability to share with car parking lot operators for a fee, this promotes a seamless user experience. By sharing this online balloting capability through API to smaller private car parking lot operators for a small fee, we can ensure these companies can also pass back the savings to car owners. This overall campaign can also receive a wider impact in the smart mobility sector.

Besides TD's monthly operated parking spaces and parking meters, there is a significant amount of trapped resources under management by various property managers and private property managers. If there is a way to support the local start-up companies and corporates to help the TD define the API, this will promote our business ecosystem. We have already seen innovative start-up companies like Let's Park[64] which comes up with the idea to unleash these trapped resources through the mobile app ecosystem. Operator such as Wilson Parking offers its customers a simple-to-use interface for checking and booking available spaces after deploying this advanced techology.

Figure 9: Mobile Apps (Let's Park, Wilson Parking, FlowBird, Source: Internet)
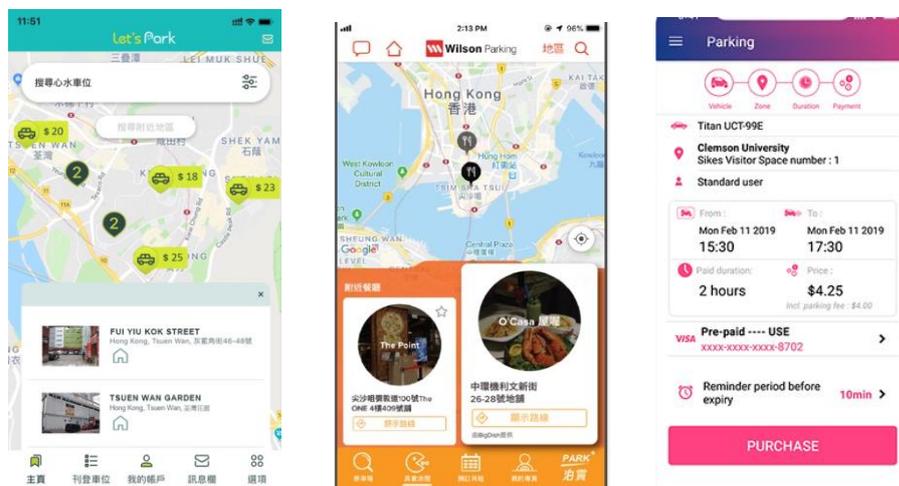
Source: Internet

In 2019, Hong Kong Telecom and a joint-venture partner Flowbird has won a HK$682 Million 11-year contract[65] from the TD to install and operate the next generation meter system and this has been proposed earlier in the original HKSAR Smart City Blueprint. As details of the service offering are not publicly available, we would like to recommend that the estimated time availability (i.e.

---

[64] https://news.microsoft.com/en-hk/2019/10/16/microsoft-and-lets-park-reinvents-parking-with-booking-app-covering-60-facilities-across-hong-kong/
[65] https://www.thestandard.com.hk/breaking-news/section/2/128082/HKT-venture-wins-HK$600m-deal-to-fix-smart-parking-meters

how much longer does an on-street parking space can become available) would be more useful than whether a specific parking space is currently available or not. This is because an on-street parking space is often waited for by other motorists in the locale already, knowing that there is a space available will only attract more cars to look for the same parking space.

In the area of adopting AV technology, we support TD to have further consultation with the industry to undertake more research in connected car technology and pilot testing routes planning with different scenarios (e.g. off-peak usage for public roads, restricted area such as Discovery Bay, Disneyland and Ma Wan). Such off-peak pilot testing have also been undertaken in other countries[66].

---

[66] https://taf.ca/peel-region-launches-off-peak-delivery-pilot/

8. Smart Living

In the area of Smart Living, we are in the opinion that it will need to be broaden the scope and covers much more than digital persona and digital payments – one that could encompass the social inclusion, welfare, affordable housing, town planning, well-being, public healthcare and ageing with dignity. A liveable city means there are enough resources matching the growing needs from citizens of all ages.

In the next 20 years, many Hong Kong citizens will be facing one of most challenging times ahead with our building stock becoming old and an ageing population (Ling & Lee, 2019). According to the projections, the elderly population (65+) will increase from 15.3% in 2015 to 30.6% in 2043 (Elderly Commission, 2017) and this will put our healthcare, public transport, social welfare, elderly long-term care and service support to a stretch mode. At the same time, while the building stock in Hong Kong is ageing, the dwellers themselves are also ageing. According to the HK2030+ study, the number of private housing units aged 70 or above was only 1,100 in 2016, but this number would multiply by 300 times to reach 326,000 in 2046, seriously affecting the quality of life of residents living in the decaying building (Planning Department, 2016).

Develop age-friendly and healthy living community with integration of design and technologies

According to Professor K.K. Ling of the Hong Kong Polytechnic University's Jockey Club Design Institute of Social Innovation (JCDISI), population ageing and building stock ageing are usually tackled as two separate subject matters and each has already received a lot of attention. However, the Hong Kong community at large is not fully aware of the combined impact of population ageing and building ageing - which is now referred as the concept of "double ageing". Double ageing is a much more complex issue to address and if it is not tackled properly and in a timely manner, it is a socio-economic issue that will have significant impact on the sustainability development in Hong Kong.

A strategic policy framework to tackle the complex issue of double ageing is still lacking. We are recommending city managers, town planners and technology companies to come together to help articulate the socio-economic challenges of double ageing first by becoming the facilitator and later advance to next level by coordinating interdisciplinary efforts to tackle the issue. The notion of an integrated, people-centric "double-smart" approach to leverage the merits of smart ageing and smart city in tackling double-ageing and bring positive changes for the city is proposed.

While it is commendable that the HKSAR Government's effort in using financial subsidies to encourage building owners to invest in repair and upkeeping of their ageing buildings, this policy does not acutely target the urban cores with a high concentration of ageing population with low income living in ageing building stock. The notions of using smart ageing technology and gerontechnology are to help those with physical and cognitive decline to support themselves and live independently and healthily longer. From an empirical study carried out by The Jockey Club Age-friendly City Project – and data collected from 9,785 questionnaires and 739 focus groups, there are

sufficient evidence to support the argument that our current old and future old citizens would welcome the opportunity to participate in the collaboration process that can provide them healthy ageing[67] opportunities. The evidence-based research can support the government in implementing a holistic policy framework that explores how we can integrate smart city technologies (Chun, 2019) and design in both the public and private sectors to develop products, services, solutions and systems to improve the quality of life of our seniors to meet the challenges of an ageing population.

Figure 10: Double-Smart Approach to solve Double Ageing problems (Ling & Lee, 2019).
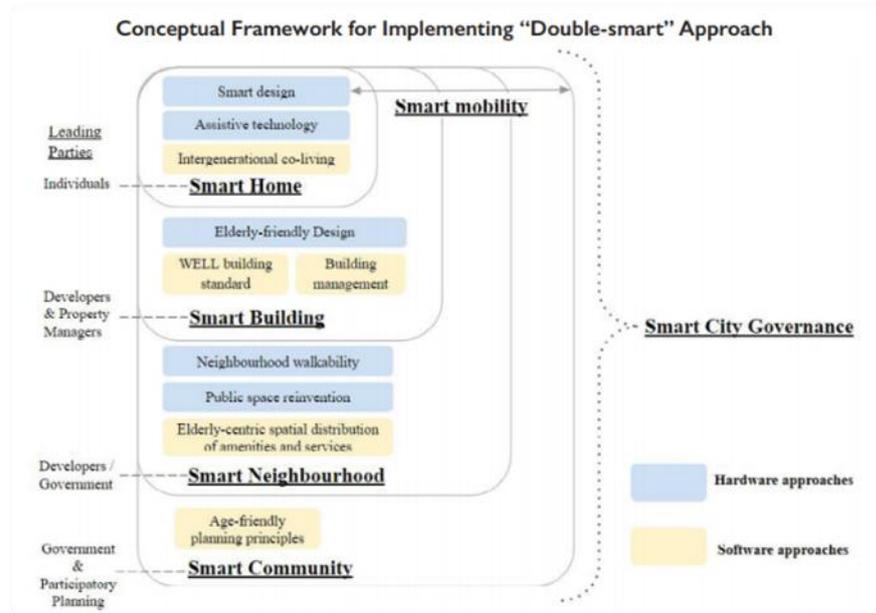
In our previous advisory report, we have also proposed the concept of *Proactive*, *Predictive* and *Preventative* healthcare policy framework for Smarter Living.

In order to facilitate healthy ageing in Hong Kong, we believe there could be opportunities to create *Proactive*, *Predictive* and *Preventative* living environments with a holistic smart health system that links up families, neighbours, caregivers and doctors together, to keep our citizens safe, healthy and happy at home. By adopting these three pillars, we could improve the senior citizen's well-being while distributing resources equitably to those in need. These three pillars are explained below.

i) *Proactive Smart Health Monitoring* - An indoor and outdoor smart IoT network could be deployed to sense delta change of real-time individual's health status, biometric measurements, living habit and social behaviours. These could be integrated to any smart home devices and ecosystem and could also link up with an individual doctor's clinic and hospital – providing comprehensive health data and knowledge management for everyone. Additional datasets like the amount of exercise being carried

---

[67] *WHO defines Healthy Ageing as "the process of developing and maintaining the functional ability that enables well-being in older age" (WHO, 2015).*

out, sleeping profile, dietary intake, would be also useful for health practitioners and for medical research.

ii) *Predictive Smart Health Analysis* - a big data analytic platform will be designed for digital healthcare professionals to share and discover correlations between environmental changes and associated health risks by integrating raw data and digital health records, with a proprietary algorithm developed to predict acute diseases and provide real-time advice for personalized medical treatment.

iii) *Preventative Smart Health Community Network*: this intelligent ICT solution would involve Government emergency units, medical professionals, and the support from local community organizations. With the availability of electronic health records sharing to authorized professionals, tele-medical consultation could become feasible for patients with chronic illness at home, saving their time and effort to make regular visits to doctors. Precise and personalized medication will also be possible for medical diagnosis based on individuals' living habits. In the case of any emergency, the Smart Health community network could also deliver immediate alerts to the nearest neighbor to locate the person in need.

The notion of smart living can now expand in scope to cover the ability for our citizens to have self-caring capability with the support of predictive and preventive community-based care supported by sensors and data analytics platforms that could also complement the eHRSS through APIs.

Gerontechnology is a growing field that local and overseas research centres had been focusing lately in their R&D effort. The HKSAR Government has also specifically provided funding for projects under the Social Innovation and Entrepreneur Development Fund[68] which also has a stream in developing a gerontechnology ecosystem together with the elderly care industry stakeholders. Companies such as the PineCare group is actively exploring the use of such smart devices, thermal sensors, indoor radar sensors, anti-wandering wearable devices with RFiD tags, GPS trackers and integration to measure blood sugar, blood pressure, temperature and weight[69].

In particular, we are in the opinion that the HKSAR Government should provide fiscal policy support and power to the Elderly Commission to put in place a strategy framework and develop a financing scheme through leasing or rental schemes for any our future old to gain access to future assistive elderly care technologies or equipment. The Elderly Commission has already set up a working group to deliver the Elderly Services Programme Plan (Elderly Commission, 2017) and our proposed strategy framework to help finance the use of assistive technologies can be included in this working plan to prepare ahead. This working plan can adopt the Fast-Pass programme proposed earlier to become part of the double smart approach we are proposing to tackle the double ageing issues.

---

[68] https://www.sie.gov.hk/en/what-we-do/gerontech.page
[69] SIE Fund Sharing Session: Development of Gerontechnology Ecosystem https://youtu.be/kx7tw5qfqS0

5G & IoT for Smart Living infrastructure – data / city data

5G and IoT networks to enable smarter living

In 2019, the 5G frequency and licenses[70] were issued by the Office of the Communications Authority (OFCA). We have seen how our lifestyles have changed with the advance of mobile communications in the past. With the new 5G technologies and the growing variety of IoT devices and sensors connected to the network, we will soon benefit from a network of sensors collecting all kinds of essential city data and communicating with each other and to the central host computer in the cloud. Once collected, all these city data will be further analysed using latest artificial intelligence and provide us the best answer through machine learning, algorithms, deduction and intelligence that would help us live our lives better. With all these IoT connected devices installed in our community with smart property technologies, we will need to look deeper into the digital security, safety and performances standards of these devices.

Setting International standard, exporting our Smart City services

As our mobile data networks become more pervasive, it is also critically important for all network connected devices to be standardised. One of the trending uses of smart devices is in smart health, smart home, living environment monitoring, sensing, measurements and control. In the wake of this growing trend, one of the leading standardization efforts led by the Vice-President of SCC - Ir. Dr. K.F. Tsang, who is chairing the IEEE P2688 Internet of Things Maturity Index[71]. The scope of this standard is to measure the maturity of objects connected in the IoT networked environment.

This IEEEP2688 standard defines the mechanism and specifications for evaluation, grading and ranking of the performance of IoT objects by using indicator values, referred as IoT Index (IDex). IDex will classify the objects into multiple levels of performance and give a quantitative representation and indication of the performance of objects. IDex will manifest guidance on blending of IoT objects to evolve into better performance. It is exciting to report that the IDex task force was originated by experts in Hong Kong and augmented by international renowned experts. The IDex was inaugurated in Hong Kong in August 2019 at the HKSTP[72] and well received internationally.

---

[70] https://news.now.com/home/finance/player?newsId=373248
[71] IEEE P2688 IoT Maturity Index https://sagroups.ieee.org/2668/
[72] https://www.hkstp.org/en/about-us/event-and-activities/conference-on-sensors-and-iot-siot-standard-for-smart-city-cum-inauguration-of-ieee-p2668-iot-maturity-index-idex/

9. Conclusion - The Way Forward

We welcome the *2019 Policy Address* announced in October 2019 by the Chief Executive with a commitment to actively optimize smart city services through innovative technology applications to improve the quality of lives. The document also promotes several measures to deepen the support to science and technology which will benefit the construction of smart city, foster economic development and thereby enhance Hong Kong's competitiveness.

In the past two years, the government has vigorously encouraged innovation and technology. According to the latest annual survey by Invest Hong Kong and the Census and Statistics Department, the number of local start-ups has increased by 42.8% to 3,184 since 2017, which are mainly in the computer information and technology industries such as FinTech, e-commerce, supply chain management and logistics technology, etc.

Building a smart city requires considerable supports from the ICT industry. SCC welcomes the various measures in the *Policy Address* to deepen the support of R&D activities and a start-up ecosystem in Hong Kong, such as the expansion of the Technology Talent Admission Scheme, new funding scheme for R&D, the licensing of 5G communications, innovation labs at both OGCIO and EMSD and new cluster development like the Lok Ma Chau Loop Innovation and Technology Park, etc., covering all technology companies which conduct R&D in designated technological areas. Together with the expansion of the Public Sector Trial Scheme, which provides funding support for all technology companies to commercialize R&D results, these measures will facilitate and promote the R&D activities in Hong Kong.

The optimization of smart city service measures mentioned in the *Policy Address*, including the introduction of robotics to improve public services, the automatic processing of various government forms and public enquiries, the upgrading of government services involving applications and approvals, as well as the establishment of an "iAM Smart" platform provides one-stop personalized digital government services are in progress. The series of initiatives not only enhance urban management, but also benefit the citizens.

The notions of Smart-City-As-A-Service

Taking an example on how Singapore has taken the lead to round up some of the ASEAN countries and set up the ASEAN Smart Cities Network (ASCN) in 2019[73], collectively, they have selected 26 cities as pilot cities and this is encouraging as it allows more advanced cities to take the opportunity to start exporting some of the best smart city products and solutions for other cities. Hong Kong is also presented with similar opportunities with the Greater Bay Area (GBA) developments now. In November 2019, Chinese mainland and ASEAN had also issued the "*ASEAN-China Leaders' Statement on Smart City*

---

[73] *https://asean.org/storage/2019/10/Investing_in_ASEAN_2019_2020.pdf*

Co-operation Initiative", and a special announcement was made to include eight cities, have pledged their support to form an alliance to assist with their smart city development. The Hong Kong smart city development effort could be part of this initiative and allows the exporting and knowledge transfer of our Smart-City-As-A-Service.

The Hong Kong trade industry professionals have long been involved in supporting the economic trade worldwide - especially where there is an increasing adoption of information communication technologies (ICT), sensors, 5G networks and IoT devices. The IDex discussed previously can be one of the best examples of how Hong Kong can step up in standardizing various fragmented industries working together to create an economy of scale and exporting such service platform and standards to overseas countries. We should now look ahead on how to engage our industry experts to contribute more in the standardization of digital healthcare, IoT, electronics component, data management and industrial manufacturing standardization for supporting sustainability development initiatives (e.g. ESG, Green financing) and there by keeping Hong Kong as a value partner for the region.

The *Hong Kong Smart City Blueprint 1.0* was announced by the government two years ago. This paper makes an attempt to provide an objective review of the status quo as well as providing a forward-looking solutions and recommendations. We sincerely look forward to the announcement of the *Hong Kong Smart City Blueprint 2.0*, for reviewing the latest developments in government measures and launching future planning directions. SCC will, as usual, act as a bridge between the industry and the government by collecting the industry's comments and submitting them to the government after consolidation. SCC will continue with active cooperation with the government, in order to develop a people-oriented smart city.

10. Appendix

"Fast-Pass" Proposal from the HKGCC Smart City Working Group

What is the Smart City Fast Pass Programme?

▶ Grant short term permission for eligible businesses to trial their smart city projects in a defined area or space under a more relaxed regulatory environment.

▶ Projects that are considered to be of public interest should be prioritised.

▶ Issuance of such permits are limited. (Only a small number of businesses would be granted such permits.)

▶ Feature risk mitigation measures (which includes the option of terminating trials when it has been determined that a project's risks outweigh its benefits).

Benefits of the Smart City Fast Pass Programme

▶ **Reduce time-to-market** uncertainties by easing potential regulatory hurdles otherwise faced by first movers.

▶ **Improve access to finance** by promoting investor confidence in the ability to execute proof-of-concept approach.

▶ **Promote willingness to invest in and develop innovative products and solutions.**

▶ **Improve ability to access insurance coverage**

A Precedent Exists - Fintech Supervisory Sandbox (FSS)

▶ Launched by the HKMA in September 2016.

▶ Allows banks and their partnering technology firms to conduct pilot trials of fintech initiatives involving a limited number of participating customers without the need to achieve full compliance with the HKMA's supervisory requirements.

▶ Upgraded to FSS 2.0 in 2017 with the following features:

  ▶ A Fintech Supervisory Chatroom to provide feedback to banks and tech firms at an early stage on their fintech projects ;
  ▶ Tech firms can access the Sandbox by seeking feedback from the HKMA through the Chatroom without going through a bank; and
  ▶ The sandboxes of the HKMA, the Securities and Futures Commission and the Insurance Authority are linked up so that there is a single point of entry, if needed, for pilot trials of cross-sector fintech products.

▶ Similar sandbox programmes have also been adopted by the Singaporean government to provide a real-life environment to trial new products in Fin-Tech, Energy, Healthcare and environmental services sectors.

11. References

Antonić, A., Marjanović, M., & Žarko, I. P. (2017, June). Modeling aggregate input load of interoperable smart city services. In *Proceedings of the 11th ACM International Conference on Distributed and Event-Based Systems* (pp. 34-43).

Chun, D. (2019) To what extent can Smart City technologies solve problems with our ageing populations. The Hong Kong Institute of Planner Journal Vol. 33 Page 28-32

Elderly Commission (2017), Elderly Services Programme Plan, Download at https://www.elderlycommission.gov.hk/en/download/library/ESPP_Final_Report_Eng.pdf

Ling, K. K. & Lee, K. (2019) Tackling Double-ageing with Double-smart. The Hong Kong Institute of Planner Journal Vol. 33. Page 4=20

Planning Department. (2016), "Baseline Review: Population, Housing, Economy and Spatial Development Pattern", Hong Kong 2030+: Towards A Planning Vision and Strategy Transcending 2030, p. 26. Download at https://www.hk2030plus.hk/Ebook/Hong%20Kong%202030+%20PE%20Booklet%20-%20English/index.html

Quah, J. S. (2018). Why Singapore works: five secrets of Singapore's success. *Public Administration and Policy*, *21*(1), 5-21.

Vangen, S., & Huxham, C. (2003). Nurturing collaborative relations: Building trust in interorganizational collaboration. *The Journal of Applied Behavioral Science*, *39*(1), 5-31.

World Bank. (2020). Government Effectiveness data, Retrieved on 10-Jan, 2020 at https://govdata360.worldbank.org/indicators/h580f9aa5

World Health Organization (2015), World Report on Ageing and Health, p. 28. Download at: https://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811_eng.pdf?sequence=1