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Feature Paper

Tackling Double-ageing with Double-smart

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Introduction

Population ageing and building stock ageing are usually tackled as two separate subjects and each has already received much attention. However, the Hong Kong community at large is less aware that the combined impact of population ageing and building ageing, i.e. “double ageing”, is a much more complex issue to address. If not tackled properly and in a timely manner, “double ageing” as a socio-economic issue will have significant impact on the sustainable development of Hong Kong, significantly affecting the liveability and resilience of the city.

A strategic policy framework to tackle the complex issue of double-ageing is still lacking. The first objective of this paper is to elaborate on the problems and evaluate existing efforts in tackling the challenge. As problem identifiers and solution advocates for the city, town planners ought to articulate the socio-economic challenges of double-ageing in the strategic policy agenda and play a facilitating role in coordinating interdisciplinary efforts to tackle the issue. This paper advocates 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.

Double-ageing: the unique challenge for Hong Kong

Population ageing

Double-ageing is an issue forewarned in the latest version of strategic plan of Hong Kong, “HK2030+: Towards a Planning Vision and Strategy Transcending 2030” (HK2030+). As a population with the highest life expectancy in the world, Hong Kong’s population is ageing amongst the fastest of all economies (Elderly Commission, 2017). The increase in life expectancy means that bulge of the largest age cohort at present, 50-54 year olds, is projected to move upwards to 80-84 by 2044 (see Figure 1).

According to 2015-2064 population projections, Hong Kong’s elderly population (65+) will increase from 15.3% of the total population (1.12 million people) in 2015 to 30.6% (2.51 million) in 2043 and 35.9% (2.58 million) in 2064 respectively, putting massive pressure on the already gridlocked medical, social welfare and elderly support services system. If we take 85+ as the benchmark that a certain degree of caring services is almost unavoidable, the cohort would increase almost five-fold from 2.2% in 2014 to 10.1% in 2064. Society at present tend to focus resources on addressing the needs of the elderly

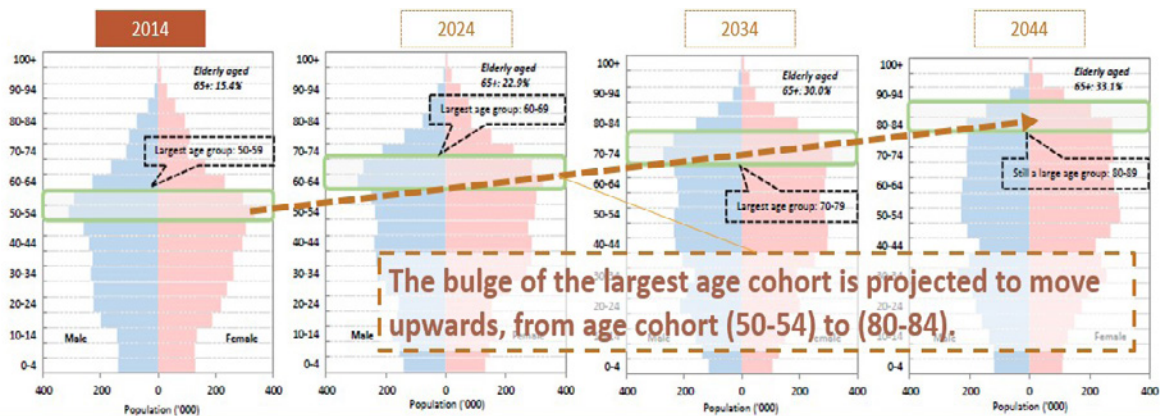


Figure 1 Population forecast of age cohort 50-54 within a 30-year window (Source: Elderly Commission, 2017)

with chronic health problems such as dementia, physical disability or mental health issues, but underserve elderlies with geriatric syndrome, such as falls, frailty, functional decline, delirium and dizziness. This and a shrinking household size and working population suggests an increasing dependency of old-olds on young-olds and the working population to care for them. Assuming other factors such as health and socio-economic factors remain unchanged, the demand for long-term care services (LTC) for old-olds will rise even faster than the rate of growth of the elderly population (Elderly Commission, 2017).

Census statistics not only paints a clear picture of how fast our population is ageing, it also highlights the need for the society to cope with social changes and the ever-changing needs of its population. According to the 2016 By-census, there were over 152,000 “older persons”, i.e. elderly aged 65+, living alone, constituting 13.1% of the overall population of “older persons”. The 2016 Census also highlighted that 293,000 (25.2%) are “elderly doubletons”, i.e. “older persons” living with their spouses (Census and Statistics Department, 2018). If the “older persons” do not have family members or carers who can assist and care for their daily living, this will increase their demand for LTC. Coupled with the shortage of

land supply, the shrinking labour force and the long lead time to plan and deliver the required care services, there is urgency to review the needs of the old-olds and young-olds and to ensure adequate resources will be made towards the specific needs of the ageing population.

Dilapidating housing stock

Meanwhile, the building stock in Hong Kong is ageing concurrently with its dwellers.

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 (PlanD, 2016). If the quality of the ageing housing stock cannot be maintained, upgraded and refreshed in a sustainable and timely manner, this will significantly affect the livelihood of our citizens and the liveability of the city.

Hong Kong’s ageing building stock is complicated by two factors: **ultra-high building density**¹ and **multiple ownership**.

The “undivided shares” mechanism² invented by Hong Kong developers in the 1950s has

¹ *The Making of Hong Kong: from Vertical to Volumetric* (Shelton et al, 2011) discussed comprehensively the building density control problem in the city. The building code before 1956 controlled building density by specifying building height in proportion to street width, permitting a ratio of 2:1. However, as building technology improved and rapid increase in housing demand, the building code changed to allow buildings to rake back a maximum of 76 degrees from the centre line of the abutting street to control their shadow on the street. In some cases, buildings have maximised the plot ratio up to 20.

² Against the convention of selling a building erected on the lot(s) in whole, Hong Kong developers in the 1950s invented the “undivided shares” mechanism where the selling of individual flats within a building to large number of property owners who collectively owned the lot(s) on a pro rata basis. It has since become a common phenomenon that a high-rise high-density building in Hong Kong would include hundreds of small property owners creating a situation of multiple ownership, which in legal terms is known as “stratified titles”.

successfully helped to address the acute housing problem in Hong Kong. However, such development pattern, coupled with the ultra-high building density in 1950s and 1960s³, has also left the city with the following issues regarding how to improve the functionality and integrity of ageing housing stock:

1. Unattractive gain in development potential: Redevelopment of these buildings is usually very costly. A huge effort and lengthy time is required to deal with a large number of small property owners.

2. Poor building management and maintenance: The general absence of owners' corporations may bring about health and safety issues, in particular maintenance, hygiene and building safety issues.

3. Hefty liability for property owners: The high repair and maintenance cost may also be considered by many small property owners as unaffordable and/ or not worthy of investment;

4. Degrading condition of building structure: This may be made worse by large scale presence of illegal structural additions and alterations, affecting the structural integrity of the building;

5. Inadequate or unsatisfactory vertical accessibility: The old building code allowed non-provision of lift services for buildings of not higher than 9 storeys. Even if lift services are provided, to maximise the provision of shopping frontage lift lobby may only be provided at the mezzanine or the basement level where users will need to go one-floor stairs up or down the ground level reaching the lifts. One typical example is the Golden Building built above the Golden Computer Arcade in Sham Shui Po where the residents need to go down 45 flight of very steep, small steps from the ground floor level to reach the lift lobby. Residents' mobility and willingness to leave their home will drop as they age or as they become increasingly frail. (See Image 1).

The government has been applying multiple strategies to tackle building stock ageing by improving the functional performance of buildings



Image 1 Golden Computer Arcade and Golden Building lift lobby on lower ground level

to extend the building life. Most buildings, unless declared as monuments or having special values, would unavoidably come to a time needing demolition and redevelopment. Even with the government's efforts in expediting redevelopment and subsidising rehabilitation it is not adequate to counteract the issues brought about by the astronomical increase in the number of ageing buildings in the city. The problem is most intense in old urban cores: over 70% of Hong Kong's ageing building stock is located within the oldest districts in Hong Kong, namely, Sham Shui Po, Yau Tsim Mong, Kowloon City, Wan Chai and the Eastern District (PlanD, 2016).

The complexity of redeveloping Hong Kong's old buildings is highlighted in the Urban Renewal Authority (URA)'s on-going District Study for Yau Ma Tei and Mong Kok ("Yau Mong District Study"), which aims to review and develop a new approach and strategy to trigger urban renewal in densely built and heavily populated areas. Whilst

³ Compared with the maximum plot ratio of 8/9/10 for domestic buildings and 15 for non-domestic buildings permitted under the present Building (Planning) Regulations of the Buildings Ordinance

the report is not officially available when this article is written, the complexity of the Yau Mong project is noted from various sources:

1. More than 800 buildings within the study area lack redevelopment potential as the overall plot ratio has reached the permitted development capacity (URA, 2017).

2. There are about 2,300 buildings with a building life of 30 years+ that have not used up the plot ratio allowance. However, as they are scattered around the Yau Mong area a basket of planning tools will need to be deployed to create potential for redevelopment (URA, 2019).

3. There are about 200 buildings with relatively good development potential. If developers take up the redevelopment responsibility for those with plot ratio gain leaving the rest to the URA, the planning and redevelopment potential of the project will be low and the impact sporadic (Ibid).

4. The estimated total acquisition cost of the

Yau Mong project is over HK\$1.1trillion (Ibid). Given that the plot ratio would usually need to be increased by more than a double to cover the cost of urban renewal projects (Bastillepost, 2018), URA would face a HK\$200 billion deficit if it were to continue using the present model to redevelop the Yau Mong area (URA, 2019), causing a massive drain on public resources.

The issues above highlight that redevelopment will not be a financially sustainable way to trigger urban renewal in the city. In any case, the rate of improving the functional performance of the building stock through demolition and redevelopment can hardly catch up with the rate of building stock ageing. **Building rehabilitation** is gaining momentum to become the key strategy adopted by the government to combat urban decay and improving the quality of life of the citizens in Hong Kong. At least HK\$10.35 billion of public funds have been allocated to existing schemes and subsidies through different mechanisms (Table 1).

Administrative Organisation	Name of Scheme	Building Eligibility	Use of Subsidy	Public Funds Allocation (HK\$)
URA	Common Area Repair Works Subsidy	Private residential/ composite building aged 30 or above	Common area	(No data available)
	Operation Building Bright 2.0	Private residential/ composite building aged 50 or above	Common area	3 billion
	Fire Safety Improvement Works Subsidy Scheme	Composite building not under single ownership	Common area	2 billion
	Lift Modernisation Subsidy Scheme	Private residential/ composite building	Lift modernisation works	2.5 billion
	"Smart Tender" Building Rehabilitation Facilitating Services	Private residential/ composite building	Common area	300 million
	Mandatory Building Inspection Subsidy Scheme	Private residential/ composite buildings aged 30 years or above	Common area	500 million
	Home Renovation Interest-free Loan	Private residential buildings aged 30 years or above (excluding buildings of 3 storeys or below)	Private area (individual units)	(No data available)
	Home Renovation Hardship Grant	Private residential buildings aged 30 years or above (excluding buildings of 3 storeys or below)	Private area (individual units)	350 million ⁴
Hong Kong Housing Society (HKHS)	Building Maintenance Grant Scheme for Elderly Owners	Private domestic building/ composite building	Private area (individual units)	1 billion
Buildings Department	Building Safety Loan Scheme	Private residential/ commercial/ composite/ industrial buildings	Common parts and Private area (individual units)	700 million
			Total	10.35 billion

Table 1 Summary of existing assistance and subsidy schemes for building rehabilitation (updated until March 2019)
(Sources: URA, HKHS, Buildings Department, LegCo documents)

⁴ from 2008/09 to 2012/13

Evaluating existing efforts against the true societal cost of double-ageing

The government's effort in using financial incentives to encourage owners to invest in the repair and upkeep of ageing buildings was commendable.

Nonetheless, double-ageing is most acute in **old urban cores** with a high concentration of ageing population with low income living in ageing building stock. Some residents may be more affected by the effects of double-ageing due to the following circumstances:

1. A time-consuming process with high uncertainty: Under the multiple ownership pattern, coupled with the absence of owners' corporations, obtaining the consensus of all owners to carry out comprehensive repair and renovation of the common areas and facilities is unavoidably a time-consuming process.

2. Bulk of the financial assistance is to subsidise repair and maintenance of common areas and facilities within the building: Whilst these schemes have relieved substantially the heavy financial burden of the elderly owner-occupiers on their pro-rata cost, the remaining cost they need to bear may still be significant for many as a lot of the occupiers in old buildings are retirees or near retirement.

3. Limited subsidies for renovation and refurbishment of the private units: Whilst the external conditions and outlooks of many old buildings benefitted from these schemes are substantially improved, the elderly owner-occupiers may not be able to afford to simultaneously upgrade the internal conditions of individual units, which have a more direct impact on their daily living and quality of life.

4. Physical constraints of old buildings: Little can be done to retrofit lift facilities for overcoming issues of unsatisfactory vertical accessibility for the elderly residents. This remains one of the most difficult issues for enabling ageing-in-place, especially in terms of improving elderly residents' physical health and social connectedness with the community.

5. Diminishing neighbourhood support: About 60% of sub-divided flats were found in these districts, with Sham Shui Po and Yau Tsim Mong accounting for 40% of such units (Census and Statistics Department, 2016). The occurrence of a large number of sub-divided flats will not only bring about building safety issues, it also weakens the neighbourhood network and diminishes neighbourhood support.

Ageing is a process. To a person, it is a process of diminishing functional abilities for self-care. To a building, it is a process of declining functional performance for its inhabitants.

Imagine Hong Kong in 30-years' time: large number of people aged 85+ with self-care abilities diminishing to a critical stage and living in high-rise, high-density buildings of declining functional performance. The conventional wisdom that a property is an asset may not hold any more as the high repairing and maintenance cost to upkeep its functional performance may turn such an asset to liability. The conventional belief that home is a safe and comfortable place may also not hold any more if access to such home becomes a difficult everyday endeavour and the poor building condition degrades the quality of life. This is especially problematic for "hidden" vulnerable elderly, in particular those with geriatric syndrome and frailty issues but are not supported and cared for under the medical and social welfare system, and lone elderly and elderly couples without strong familial support.

A "Double-smart" Approach

All is not grim, however.

To tackle double-ageing we have to understand not only the present olds, but also the future olds. As noted in the Elderly Commission's 2017 Elderly Services Programme Plan, the socio-demographic characteristics of the elderly population in Hong Kong are changing rapidly. The future elderly are expected to be more health conscious, more financially capable, better educated and more attuned to information and technology development than the old-olds at present. As they are more likely to be receptive to smart technology and want to live independently

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for longer, there is room to explore how we can integrate technology, innovation and design in both the public and private sectors to produce products, services, solutions and systems to improve the quality of life of our seniors to meet the challenges of an ageing population. Smart ageing technology and gerontechnology will be able to help those with physical and cognitive decline to support themselves and live independently for longer.

Other than being more technologically literate, our seniors are also becoming more willing and capable to participate in the decision-making process. The data collected from 9,785 questionnaires with the elderly and 739 focus group participants by The Jockey Club Age-friendly City Project⁵ has helped to develop a solid, evidence-based baseline for the 18 districts to undertake continual improvements to promote an age-friendly city (Jcafc.hk, 2019b). More importantly, this is a major step to help Hong Kong move from “Smart Governance”, which is driven by data and evidence-based policy making, to what Pereira et al (2018) called a “Smart City Governance” model characterised by collaboration, citizen participation and data-based evidence policy making process to improve

the quality of life in cities through changes in the built environment. This is essential in creating momentum and developing innovative solutions to address double-ageing in Hong Kong.

Although there is no panacea to resolve the building stock ageing problem, planners can contribute to improving the quality of life and wellbeing of citizens by carefully considering the needs of our aging population in the urban renewal process, especially in terms of extending the years our seniors can remain independent and socially active in society. Moreover, scholars from different disciplines are also increasingly aware of the importance of open space in enhancing social interaction, promoting active ageing⁶ and reducing mortality amongst our ageing population as part of the frailty prevention and management regime in Hong Kong (Yung et al, 2016; Wang et al, 2017). This provides a spatial dimension where we can tackle double-ageing from a self-care and wellbeing management angle.

In recognition that the elderly will require support and backup from the physical environment to compensate for functional and intrinsic capacity decline and biological changes associated with ageing over time (Lawton, 1986), embedding ageing-in-place ideals in the planning framework will work in synergy with existing strategies, such as healthy ageing⁷, active ageing and age-friendly city, to enhance the liveability of Hong Kong. This will also contribute towards future-proofing

⁵ The Jockey Club Age-friendly City Project was developed with three clear objectives, namely:

1. Assess the age-friendliness of each district and build momentum in developing an age-friendly community;
2. Recommend a framework for districts to undertake continual improvement for the well-being of senior citizens; and
3. Arouse public awareness and encourage community participation in building an age-friendly city

Besides empowering older adults to champion age-friendly campaigns, the Jockey Club Age-friendly City Project has also funded a total of 84 district-based programmes, involving a total amount of funding of about \$16.2 million and more than 74,000 expected number of direct beneficiaries. The study highlights “quick wins” such as how to retrofit or develop maintenance regime for public space and facilities, such as uneven pavement surface and adding non-slip treatment, better lighting, barrier-free access and wayfinding.

⁶ Active ageing is “the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age” (WHO, 2002).

⁷ WHO defines Healthy Ageing as “the process of developing and maintaining the functional ability that enables well-being in older age” (WHO, 2015).

the city and making Hong Kong more resilient against the effects of “double ageing”. Habitat III⁸, WHO’s “Global Age-friendly Cities: A Guide”⁹ and UN Sustainable Development Goals (SDGs)¹⁰ together provide a useful, universal framework for community planning and social innovation.

DISI promulgates that an integrated approach of “double-smart”, namely “smart ageing” and “smart city”, be developed to facilitate the transition of the city and empower our ageing population to “age-in-place”. The ultimate goal is to sustain the self-care abilities of the elderly by applying different types of smart ageing and smart city technology to each layer of the elderly’s activity sphere. An age-friendly “double-smart” city is indeed an inclusive city, friendly to all ages.

Building on urban strategist Boyd Cohen’s smart city model (2015), which sets out smart living, environment, economy, mobility, governance and people as the six key aspects for city development, DISI believes that a user-centric smart city model should benefit all, including the elderly. Smart ageing-centered assistive technology and smart city principles should be adopted in “smart home” and spatially extends to “smart building” (smart living), “smart neighbourhood” and “smart community” (environment and economy). **Smart mobility** (mobility), which will increase elderly’s level of confidence and willingness to venture out and participate in the community, and **smart city governance** (people and governance) will be key in ensuring that the enhanced built environment and user-centric infrastructure are accessible and truly benefitting the elderly groups. This “double-smart” model will encourage the community to think wider and deeper about how they can assist older people in maintaining greater functional capacity, enjoy their independence and provide them with a choice to continue to contribute to society, should they want to. This collective

thinking and co-creation process will be a leap forward from an age-friendly city concept as it future-proofs our city for the benefits of everyone.

Implementing “Double Smart” Solutions

As noted by Pereira et al (2018), the governance of a smart city is not focused on the use of technology and data within the government alone. Cities should aim to move beyond a technology and data-driven model, which he calls ‘Smart City 2.0’, to ‘Smart City 3.0’ where citizen participation and improving the quality of life of citizens is at the core of city governance framework. The “double-smart” model championed by DISI focuses strongly on co-creation, collaboration, governance and “software”, i.e. who is responsible for driving the changes and the tools to enable smart city governance to steer Hong Kong towards ‘Smart City 3.0’. Moreover, as actors can use different hardware and software approaches to drive changes under different spatial domains, this framework encourages adaptation depending on the local context and innovation through participatory design and community planning.

Below we will highlight how user-centric technology, innovation and smart city governance could help finesse/ scale up/ integrate existing studies/ guidelines/ initiatives/ strategies under a **humanistic, integrated double-smart framework** to combat double-ageing in Hong Kong. **Figure 2** presents a conceptual framework of the “Double Smart” approach, formulated by consolidating some key concepts to redefine smart city from an elderly-centric perspective.

Smart Home

An “elderly-centric” smart city must start with their immediate living environment, i.e. their home.

⁸ United Nations Conference on Housing and Sustainable Urban Development, October 2016

⁹ Published by the World Health Organisation (WHO) in 2007. The guide identified eight domains to promote active ageing, namely, outdoor spaces, transportation, housing, social participation, respect and social inclusion, civic participation and employment and communication and information

¹⁰ Particularly relevant SDGs are: SDG 1 No Poverty, SDG 3 Good Health and Well-Being, SDG 8 Decent Work and Economic Growth, SDG 9 Industry, Innovation and Infrastructure, SDG 10 Reduced Inequalities, SDG 11 Sustainable Cities and Communities, SDG 16 Peace, Justice and Strong Institutions and SDG 17 Partnerships for Goals (United Nations, 2019).

Conceptual Framework for Implementing “Double-smart” Approach

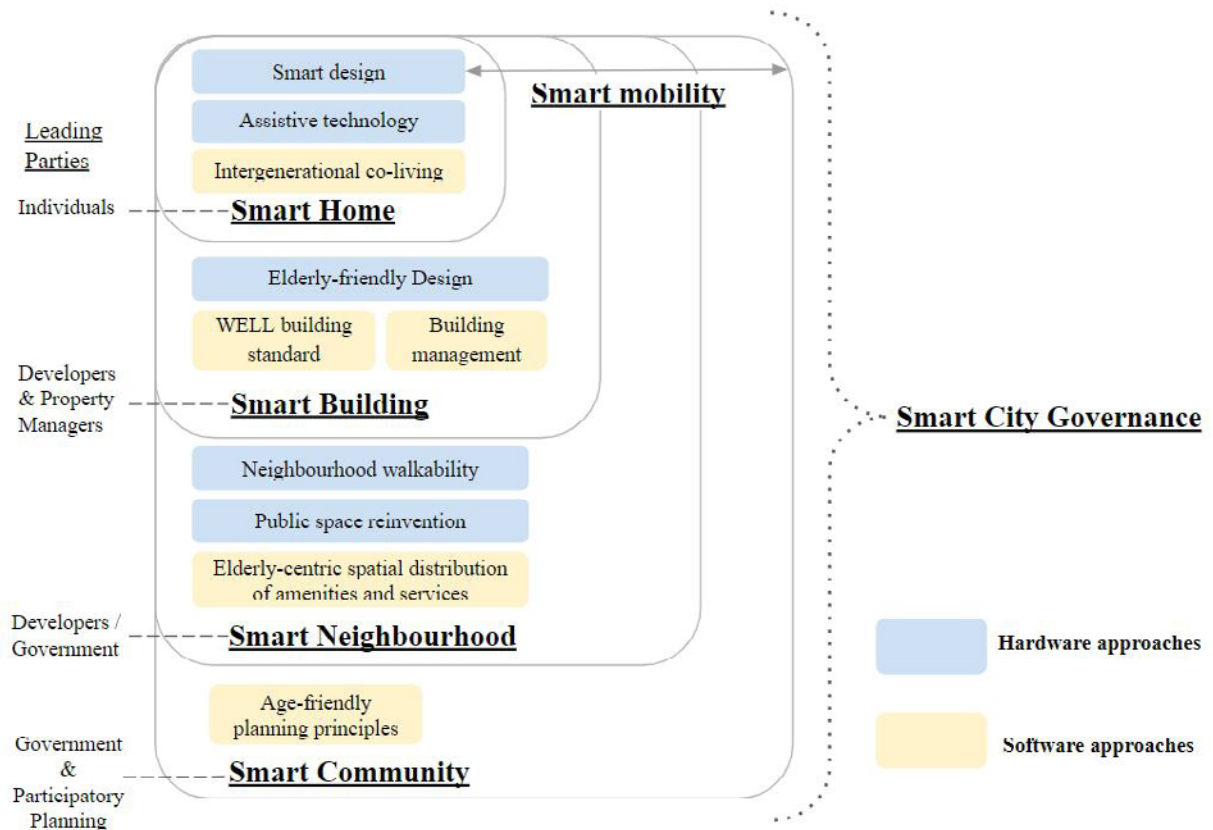


Figure 2 Key concepts in re-defining smart city from the elderly-centric perspective

Smart home, which involves both smart design and assistive technology, is a rather well-developed smart solution to ageing in Hong Kong. HKHS's Ageing-in-Place Scheme¹¹, Senior Citizen Home Safety Association's Smart Home for Seniors Pilot Scheme¹² and The Hong Kong Polytechnic University's Jockey Club Smart Ageing Hub¹³ are key projects leading assistive technology and smart ageing designs in Hong Kong. Mechanical cabinets that can be lowered for elderlies in wheelchairs and automated pill dispenser are examples of smart design. Smart technology, which includes installation of remote sensing equipment on beds, floors and refrigerator for sleep monitoring, fall detection and nutrition monitoring respectively,

can help seniors to live more independently. These solutions are effective in enabling seniors live at home for longer and reducing the need for intensive care from helpers or other members of the family, and/ or long-term care services.

The integration of home modification/ adaptation to promote ageing-in-place is still not prevalent due to costs, stigma, and availability of information. In most cases, individuals will be the leading force in deciding and installing assistive technology based on needs, financial constraints and physical conditions of the elderly residents. It is worthwhile to step up the subsidies and implementation of

¹¹ HKHS's Ageing-in-Place scheme rides on the trusting relationship and nearby location of estate-based social workers to proactively reach out to the needy elderly residents and line-up timely, accessible, affordable and appropriate services for them. (<https://www.hkhs.com/en/our-business/elderly-housing/ageing-in-place>)

¹² Senior Citizen Home Safety Association's Smart Home for Seniors Pilot Programme provides 1-year free trial of smart home technology for 1000 seniors aged 50 or above. (https://www.schsa.org.hk/en/services/smart_home/index.html)

¹³ The Smart Ageing Hub at the Polytechnic University of Hong Kong showcases new technology and assistive equipment to enable elderlies to avoid injury and live independently, such as key chain with tracker for dementia patients and AI medical assessments. (<https://www.polyu.edu.hk/Ageing/en/ourprojects.php>)

such effective solutions to promote ageing-in-place.

HKHS has been helping their elderly residents with living space upgrades and has been successful in helping their elderly residents to age-in-place. This model may be scaled-up for elderly singletons and doubletons living in Public Rental Housing to help with their daily living, especially in terms of hazard management and fall detection to reduce injury and hospitalisation. This should include subsidised or free installation of handrails in bathrooms, upgrade of stove and washing basin with infra-red/remote sensor to remind the elderly to switch off the appliances and activity-triggered night lights to help elderly to get out of bed/ go to bathroom at night. These elderly-friendly smart design and technologies are mature and rather inexpensive. Their benefits to the seniors are huge, especially in terms of enhancing their wellbeing and quality of life, without intruding their privacy.

Besides hardware, it is also important to explore software approaches to improve the quality of life and wellbeing of our seniors, especially in face of loneliness.

Intergenerational co-living is one such way that could rebuild the neighbourhood support network of the elderly and increase their sense of self-worth and confidence. This “smart living” arrangement does not need to be confined to families, encouraging the elderly living in isolation to reside with university students also helps the development of social capital to support the community and improve the sense of self-worth and belonging of the elderly.

This alternative housing model has proven benefits on the wellbeing of residents of all ages in foreign countries (Garland, 2018). Spain is one of the countries where intergenerational co-living is actively promoted, and, indeed, prescribed as a medical intervention to combat elderly loneliness, anxiety and depression. Students are encouraged to reside with and care for their elderly housemates as a service to secure free

accommodation. This socially innovative way to combating loneliness does not only help the elderly living in isolation, improve their wellbeing and reduce the risk of premature death associated with delayed medical intervention, it is also effective in helping young people who struggle to get on the housing ladder to secure affordable accommodation. In Hong Kong, households close to universities have potential to experiment with this model, especially exchange students that are keen to know more about the local culture and language.

Smart Building

The Elderly-friendly Design Guidelines (2019) recently published by Architectural Services Department (ArchSD) provides some key overarching principles to design elderly-friendly buildings and public spaces. Simple design inventions such as logical floor layout, non-glare windows and sensible choice of materials and finishes to prevent fall and confusion have been highlighted in the document. The document also emphasises the importance of building in socialising spaces and a variety of spaces within a building complex to promote social interaction and resting. This forms the basis for promoting smart mobility within buildings – and with the external environment – to promote an active lifestyle and facilitate social interaction for all age groups, especially the elderly.

The URA and HKHS have led the way in designing buildings with future users in mind by incorporating Smart Living concepts in the construction of new buildings¹⁴ and installing emergency alarms in bathrooms. In particular, HKHS’s trail to install seats and handrails in elevators to encourage the elderly to go out should be adopted as a standard practice in all new buildings to benefit people of all age groups. The low cost intervention will increase the elderly’s willingness and confidence to venture out of their home and encourage physical activity and social participation (Image 2).

¹⁴ URA advocates the smart concept in the design, environment, information, management and convenience aspects in order to create a smart living. URA’s Smart Living buildings focuses on home energy and water consumption system, home health and wellness system, smart display, home waste management system, building information modelling, and building management system (URA, 2019)



Image 2 Elevators with seats and handrail
(Source: HKHS, 2019)

Moreover, smart living should not stop at improving user experience and meeting residents' needs. DISI believes that smart living should empower our seniors to live independently and, at the same time, extend the service life of the entire building. WELL building standard originated in the US can be adapted to help champion elderly-friendly smart buildings in Hong Kong (see **Image 3**).

WELL building standard offers a framework for optimising building design and operations for more effective estate management. It also focuses on improving human health and well-being, which is particularly effective in promoting and

enabling ageing-in-place as it is built upon seven key concepts for healthy building for residents, including air, water, light, nourishment, fitness, comfort and mind (see example in **Image 4**). For instance, if internal air, water, light and comfort are monitored and can be remotely adjusted by their loved ones according to the needs the elderly, the weather and their physical condition, this may reduce the need for their relatives to visit them throughout the day for temporal control. This will be particularly effective in extreme weather conditions, especially for elderly who want to save costs, or those that have geriatric syndromes and dementia and cannot sense the temperature difference easily.

Without a doubt there is a heavy reliance on developers and property managers to initiate and drive elderly-friendly design and smart-ageing enabled smart buildings. A localised version of the WELL building standard integrating concepts highlighted in the ArchSD's Elderly-friendly Design Guide could be further developed to promote elderly-friendly smart buildings and combat double-ageing in the city.

Moreover, the role of caretakers and housing



AIR

- Quality
- Purification
- Humidity



WATER

- Quality
- Treatment
- Drinking Promotion



LIGHT

- Natural Access
- Color
- Dimming/Circadian Rhythms



NOURISHMENT

- Selection/Availability
- Serving Size
- Information



FITNESS

- Fitness Centers
- Stairs
- Bike Room
- Incentives Programs



COMFORT

- Ergonomics
- Sound Reduction
- Olfactory Comfort



MIND

- Collaboration
- Quiet Rooms
- On-site Child Care
- Health & Wellness Library

Image 3 Seven concepts for healthy buildings – WELL standard (source: Air Equipment Company, 2019)

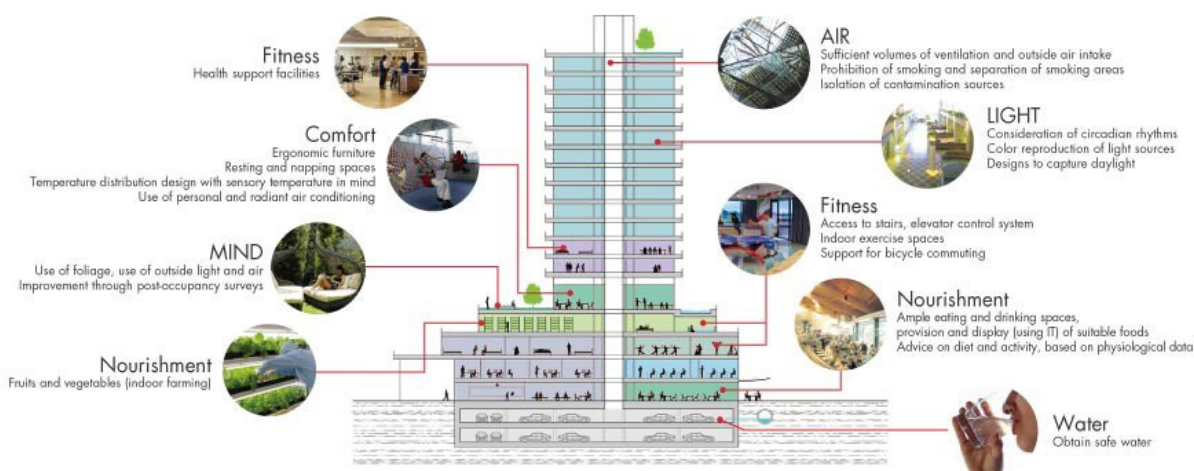


Image 4 Descriptions of WELL building standard (Source: Nikken Sekkei)

managers can be strengthened as part of the software approach to support the WELL concept, especially about the mind, fitness and comfort attributes. A study led by Professor Rebecca Chiu shows high level of trust towards housing managers among residents of large housing estates (The Hong Kong Institute of Housing, 2018). Indeed, many elderlies do rely on building security guards whenever they need immediate help since their assistance is often the most timely and accessible, such as requesting help for electric works and running errands. The HKHS Ageing-in-Place Scheme experimented with the service of estate-based social workers, which demonstrates how housing management service can extend beyond estate management and play a significant part in meeting the daily needs of elderlies. As elderlies and caretakers have often built a close relationship with each other, with more professional training for building managers, they can become a reliable resource of support for the elderly in promoting ageing-in-place. This smart city governance ecosystem will also alleviate the community's heavy reliance on social services and volunteers to look after the frail but otherwise relatively healthy elderly groups.

Smart Neighbourhood

The term 'neighbourhood' lacks a universal definition. For elderlies this may be determined by the physical distance they can overcome by walking from home to nearby destinations where amenities and services they need. The neighbourhood perceived by elderlies usually

covers a smaller spatial area due to their diminishing walking capability (Bödeker, 2018). This implies the importance of elderly-centric design in neighbourhood planning to maintain their social interaction with the community. Elderly-centred smart neighbourhood will also give the elderly a sense of autonomy and independence to carry out their desired activities without the help of others.

Public space reinvention and revitalisation is important in creating smart neighbourhoods. According to the estimate by Planning Department, about 90% of our population lives within 400 meters from a park (PlanD, 2016). While accessibility, convenience and safety are considered basic principles of designing public spaces, encouraging and facilitating social participation should be a key design criteria to promote social inclusion, intergenerational interactions and enjoyment.

From a strategic planning point of view, outdoor space is more important than ever in mitigating the effects of double-ageing. There is also a need to revitalise public spaces in old urban areas where social infrastructure are scarce and under pressure. Private individual buildings in old urban cores tend not to have common recreational space of their own, occupants are highly reliant on local and district level parks for their leisure and recreation needs. Moreover, residents in old urban areas tend to be seniors and they are dependent on public spaces for their social and recreation activities and exercises. With limited

scope to increase open space provision, there is a need to improve access to and the quality of the open space to increase public enjoyment of park facilities. Co-management, as a smart city governance approach, is also essential in ensuring that the open space is well-managed, accessible, clean and conflict-free to increase people's enjoyment and utilisation of the space.

In an attempt to reimagine and reinvent open space in Hong Kong, combat the effects of double-ageing and promote ageing-in-place to enhance the age-friendliness of the city, JCDISI partnered with ArchSD, HKHS and Leisure and Cultural Services Department to explore reinventing two open space sites in Kowloon Park and Prosperous Garden to leverage the physical, mental and psychological benefits of intergenerational play. JCDISI will further explore integrating smart technologies and clinical requirements into outdoor play equipment to achieve rehabilitation through exercise and interactive play. It is hoped that the redesigned parks and the new play equipment would together boost physical activity of elderlies and stimulate sensory integration children, achieving the purpose of self-care, wellbeing management and health monitoring in a smart neighbourhood. This user-centric, inclusive play space design concept would encourage "creative play", promote social cohesion and support ageing-in-place, including for those that have more serious geriatric syndromes and chronic diseases.

Nonetheless, creating a walkable environment

is crucial in helping elderlies to stay physically active and support their participation in society, whether it is in the form of leisure, recreation, civic participation or sustaining their employment. The Walkability Study commissioned by the Transport Department – with heavy input from the Planning Department – to look at ways to improve the walkability and connectivity of the urban core is an excellent smart city governance model to develop smart mobility solutions for the city. It is essential for the government to explore a strategic mechanism to deliver more "quick wins" to accelerate enhancing the walkability of the city, especially in reducing street clutter, improving pedestrian safety and wayfinding at the neighbourhood level to increase elderly mobility.

At the moment the barrier-free access walkways programme only covers public walkways managed by the Highways Department (see Table 2). The successful implementation of the programme implies the possibility to expand the scope to walkways managed by other departments or parties¹⁵ to enhance vertical circulation within housing estates, and their connectivity with the wider neighbourhood. This would be particularly beneficial to the elderly residing in ageing housing estates to improve their social connectedness with the community and reduce isolation.

Smart technology can play a part in addressing mobility issues of elderly in the neighbourhood. GPS-fitted insoles and app such as SmartSoles allow carers to send a message to the carer's smartphone as soon as the person with dementia

Progress as at 31 December 2018	Original Programme	Expanded Programme	Second Phase	Sum of all Phases
Total no. of items	145	57	47	249
Completed	91	14	0	105
Under construction	45	41	0	86
Formulating design schemes and implementation programmes	9	2	47	58

Table 2 Progress of Retrofitting of Barrier-free Access Facilities for Grade-separated Walkways

Sources: Highways Department, 2018

¹⁵ such as Home Ownership Schemes estates and Tenants Purchase Scheme estates under the Hong Kong Housing Authority and Housing Department

walks beyond a defined area, such as a care home or a garden (Plimmer, 2019). This would help carers to feel more comfortable allowing the demented elder to wander and enjoy a sense of freedom, knowing that they will be able to find them and help them return home. However, it has to be admitted that there are ethical controversies and concerns within the society on the use of GPS for people with dementia. This underlines the need for clearer policies and practical guidelines for smoother implementation of these technologies.

Smart Community

A community usually considers a larger geographical area than neighbourhood. Urban integration will be key in coordinating, balancing and managing public spaces, public services and smart mobility to support and connect different smart neighbourhoods into networked smart communities. A networked smart community will increase elderlies' willingness to travel

A networked smart community will increase elderlies' willingness to travel beyond their neighbourhood, enhance their civic participation, maintain their independence and, should they want to, continue to work, realising the ideals of an age-friendly city.

beyond their neighbourhood, enhance their civic participation, maintain their independence and, should they want to, continue to work, realising the ideals of an age-friendly city.

A much longer planning horizon is needed to form effective plans for community revitalisation/upgrades projects, smart city governance through community planning is essential. JCDISI advocates the need to develop a bottom-up, age-friendly chapter in the Hong Kong Planning Standards and Guidelines to flesh out some guiding principles to steer the development of age-friendly smart communities. The adaptation of the "Five-in-One City Green Space"¹⁶ concept now used for new town developments and new ways to secure provision of community facilities to create a more vibrant and supportive neighbourhood¹⁷ are some concepts that would be included in the scope of study to tackle double-ageing in the urban core and promote ageing-in-place in Hong Kong.

Although the approaches suggested above would require major changes in policies and holistic inter-departmental coordination in the masterplanning stage, the long-term benefits of this integrated planning approach will be significant. This will also help safeguard spaces within the community to enable long term social service planning. This approach will not only create a more vibrant and supportive neighbourhood, it may also generate employment and volunteer activities for senior residents, further promoting civic participation within the community and enabling ageing-in-place.

¹⁶ Ling, 2017. Unpublished presentation to the Council of Asian Shopping Centres (CASC) Conference 2017, October 2017, Hong Kong. The "Five-in-One City Green Space Framework" will perform functions of (1) an unobstructed pedestrian thoroughfare, (2) a part of the open space system, (3) shopping streets, (4) an air ventilation path and (5) a visual corridor. Centrally located public piazza within this framework will become part of the daily walking experience of the residents. The open space network master-planned in the Outline Development Plan for New Development Areas in Kwun Tong North, Fanling North and Tung Chung East are typical examples achieving seamless integration of the five functions. The key to delivering a successful "Five-in-One City Green Space" is the interconnectedness of both public and privately-owned public open space. In connection with the transit-oriented development model, this network of public space could become the centrepiece of socio-economic activities and vastly improve connectivity in the neighbourhood level.

¹⁷ Ling, 2019. Ling advocates allowing a maximum of 5% GFA exemption in all public housing projects for community facilities provision. This policy would benefit the community in four ways: (1) ensure steady increase in provision of community facilities with the construction of public housing estates, (2) adequate public transport services and public open space are available within public housing estates, (3) NIMBY effect could be minimised as the provision of community facilities is planned ahead of time, and (4) create employment opportunities for elderly residents in public housing.

Conclusion

It is time to recognise double-ageing as the focal issue in the planning and policy-making agenda, and combine existing, fragmented measures into a holistic strategic framework for the long-term battle ahead.

Ageing is not a new phenomenon of mankind, but longevity is. Cities emerged to perform their primary economic and defence functions were never built for the elderly population. Perhaps it is now the first time in human history that our cities need to accommodate such a high proportion of aged people. Internationally, The UN Habitat III Conference's New Urban Agenda (2017) called for a paradigm shift -- rather than viewing ageing from a negative perspective, we should harness it as an opportunity to enhance the quality of life of the urban population¹⁸.

“Ageing Tsunami” and “Silver Tsunami” are the terms coined to describe the unprecedented ageing trend in human society, particularly in cities of the developed economies like Hong Kong. Whilst the impactful force of ageing is an unprecedented challenge, it should not be described as a “tsunami”.

Tsunami is hard to predict and leaves us little response time to escape for survival; but the trend of ageing is highly predicable and thus provides us with sufficient response time to make adjustment and adaptation.

Tsunami-prone regions construct seawalls strong and tall enough hopefully to keep tsunamic swashes outside of human settlements; but for ageing we can only embrace its impact and live with it.

Tsunami causes destruction; but smart decisions and actions to tackle ageing can make our cities more liveable.

Tsunami, like other natural disasters, in ancient fables and myths were often regarded as

punishment to mankind; but ageing and longevity are blissful results of successes in maintaining public security, flourishing economy, enhancing nutrition, providing decent accommodation, improving public hygiene and health services.

The double-ageing phenomenon in Hong Kong is unique in the world in terms of its scale and complexity. The combined effect of double-ageing is one of the most difficult challenges that Hong Kong must overcome. Hong Kong as an “urban laboratory” provides unique opportunities for world-class urban research and “double-smart” solutions.

None of the ideas set out above are, admittedly, particularly ground-breaking. The “double-smart” approach is not a panacea for such a complex problem, but rather an advocacy for citywide contribution in co-creating smart solutions for the double-ageing challenge ahead.

The role of planners has never been more critical.

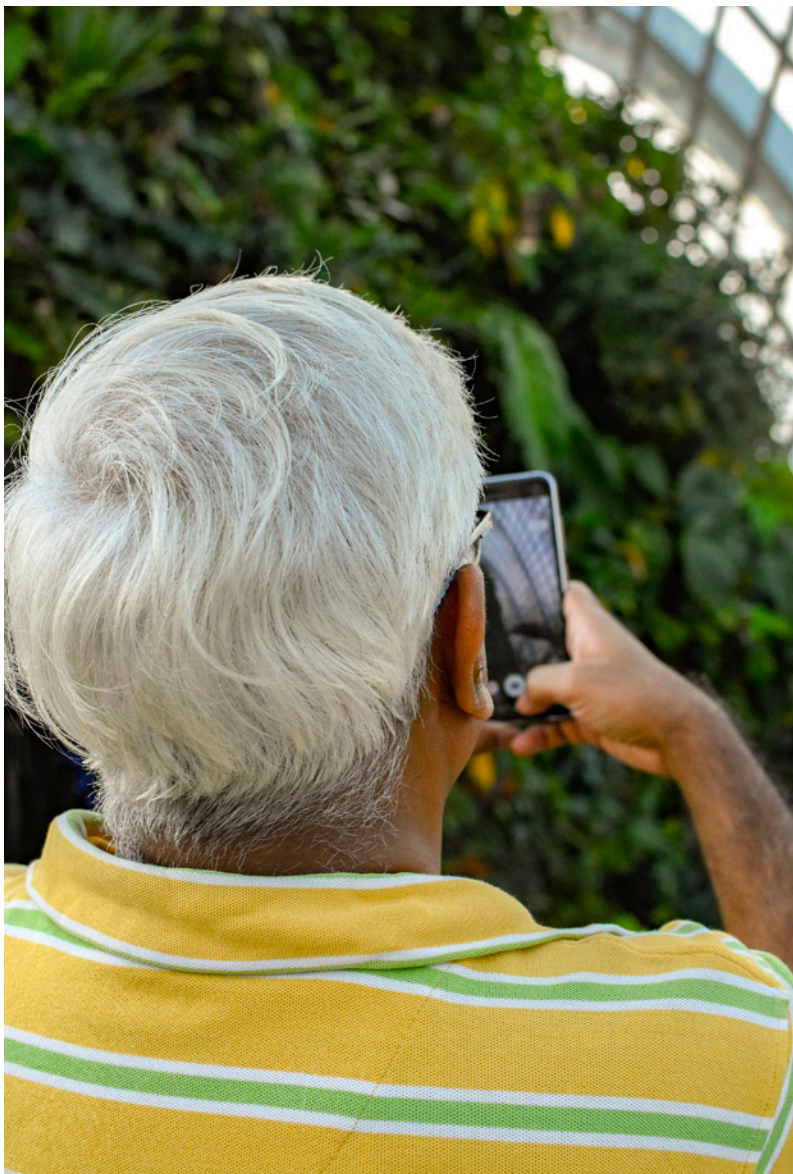
The role of planners has never been more critical. To ensure that changes are made systematically and different government departments are heading towards the same direction, planners will have to take the lead in refining current planning standards and formulating a much-needed strategic plan to promote the paradigm shift towards addressing double-ageing and developing “double smart” initiatives. Being visionary and proactive in leveraging cross-sector, cross-disciplinary knowledge and resources and going an extra mile with innovative thinking and coordination will be key in sustaining that effort.

Let us be proactive and creative in tackling double-ageing by integrating technology and our planning knowledge and skills to future-proof Hong Kong and increase the resilience of the city.

¹⁸The New Urban Agenda called for “addressing the social, economic and spatial implications of ageing populations, where applicable, and harnessing the ageing factor as an opportunity for new decent jobs and sustained, inclusive and sustainable economic growth, while improving the quality of life of the urban population” (United Nations, 2017).

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References

Architectural Services Department. (2019), *Elderly-friendly Design Guidelines*.

Bastillepost. (2018), “韋志成研市建為舊樓「鬆綁」爭取擴大油旺地積比率”. Available at: <https://www.bastillepost.com/hongkong/article/3192273-%E9%9F%8B%E5%BF%97%E6%88%90%E7%A0%94%E5%B8%82%E5%BB%BA%E7%82%BA%E8%88%8A%E6%A8%93%E3%80%8C%E9%AC%86%E7%B6%81%E3%80%8D-%E7%88%AD%E5%8F%96%E6%93%B4%E5%A4%A7%E6%B2%B9%E6%97%BA%E5%9C%B0%E7%A9%8D%E6%AF%94>

Bödeker, M. (2018), *Walking and Walkability in Pre-Set and Self-Defined Neighborhoods: A Mental Mapping Study in Older Adults*.

Census and Statistics Department. (2017), *Hong Kong Population Projections 2017-2066*. Available at: <https://www.statistics.gov.hk/pub/B1120015072017XXXXB0100.pdf>

Census and Statistics Department. (2018), *2016 Population By-census Thematic Report: Older Persons*. Available at: https://www.bycensus2016.gov.hk/data/16BC_Older_persons_report.pdf

Civic Exchange. (2018), *Open Space Opinion Survey*. Available at: <https://civic-exchange.org/wp-content/uploads/2018/10/Civic-Exchange-Open-Space-Opinion-Survey-FULL-REPORT-updated20181128.pdf>

Cohen, B. (2015), *The 3 Generations of Smart Cities*, Available at: <https://www.fastcompany.com/3047795/the-3-generations-of-smart-cities>

Devb. (2017), *Operation Building Bright 2.0*. Available at: https://www.devb.gov.hk/en/home/my_blog/index_id_253.html

Development Bureau. (2017), *Legislative Council: Panel on Development: “Operation Building Bright 2.0”*, LC Paper No. CB(1)343/17-18(04). Available at: <https://www.legco.gov.hk/yr17-18/english/panels/dev/papers/dev20171220cb1-343-4-e.pdf>

Development Bureau, Civil Engineering and Development Department and Planning Department. (2019), *Legislative Council: Panel on Development: “Studies related to Artificial Islands in the Central Waters, Lantau Conservation Fund and Work Progress of the Sustainable Lantau Office”*, LC Paper No. CB(1)729/18-19(03). Available at: <https://www.legco.gov.hk/yr18-19/english/panels/dev/papers/dev20190326cb1-729-3-e.pdf>

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

Garland, E. (2018), *Learning from Intergenerational Housing Projects in the USA*. Available at: <https://www.wcmt.org.uk/sites/default/files/report-documents/Garland%20E%20Report%202017%20Final.pdf>

Hong Kong Green Building Council. (2016), *BEAM Plus Neighbourhood Version 1.0*. Available at: https://www.beamsociety.org.hk/files/BEAM-Plus-ND-Draft-Manual-V1.0_16112016.pdf

Highways Department. (2018), *Legislative Council Panel on Transport: “Universal Accessibility” Programme*, LC Paper No. CB(4)179/18-19(03). Available at: <https://www.legco.gov.hk/yr18-19/english/panels/tp/papers/tp20181116cb4-179-3-e.pdf>

Info.gov. (2016), *LCQ21: Promoting active ageing for the elderly*. Available at: <https://www.info.gov.hk/gia/general/201606/29/P201606290651.htm>

Jcafc.hk. (2019a), *WHO Global Network of Age-friendly Cities and Communities*. Available at: <https://www.jcafc.hk/en/afc-concept/who-global-network>

Jcafc.hk. (2019b), *Project Progress: Baseline Assessment*. Available at: <https://www.jcafc.hk/en/project-progress/baseline-assessment>

Lawton, M. P. (1986), *Environment and ageing*. In *Classics in Ageing Reprinted Series I (Vol 1)*, New York, Centre for Study of Ageing.

Pereira, Gabriela & Parycek, Peter & Falco, Enzo & Kleinmans, Reinout. (2018), *Smart governance in the context of smart cities: A literature review*. Available at: https://www.researchgate.net/publication/325304603_Smart_governance_in_the_context_of_smart_cities_A_literature_review

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. Available at: https://www.hk2030plus.hk/document/Baseline%20Review%20-%20Population_Housing_Economy%20and%20Spatial%20Development%20Pattern_Eng.pdf

Plimmer, G. (2019) *Trackers help people with dementia stay at home for longer*. Available at <https://www.ft.com/content/a7172548-71ae-11e9-bf5c-6eeb837566c5>

Shelton, B, Karakiewicz, J and Kvan, T (2011) "The Making of Hong Kong: From Vertical to Volumetric", Routledge, New York

The Hong Kong Institute of Housing. (2018), *Livability of Large Housing Estates in Hong Kong: Contribution of the Housing Management Profession*.

Transport and Housing Bureau. (2016), *Long Term Housing Strategy: Annual Progress Report 2016*, LC Paper No. CB(1)350/16-17(01), p. 15. Available at: <https://www.legco.gov.hk/yr16-17/english/panels/hg/papers/hg20170109cb1-350-1-e.pdf>

United Nations. (2017), *New Urban Agenda*, p. 18. Available at: <http://habitat3.org/wp-content/uploads/NUA-English.pdf>

United Nations. (2019), *About the Sustainable Development Goals*. Available at: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

URA. (2017), "油旺地區研究：是難題、是承擔，也是機遇". Available at: https://www.ura.org.hk/tc/media/blog/blog_20171126

URA. (2018), "Managing Director's Statement", *Annual Report 17-18*. Available at: <https://www.ura.org.hk/f/publication/3042/%28MD%29%20URA%20annual%20report%2017-18%20English%20%28hi-res%29.pdf>

URA. (2019), "沉香揚芳馥 舊區建融和". Available at: https://www.ura.org.hk/en/media/blog/blog_20190616

Wang D, Lau KK, Yu R, et al (2017), Neighbouring green space and mortality in community-dwelling elderly Hong Kong Chinese: a cohort study
BMJ Open 2017;7:e015794. doi: 10.1136/bmjopen-2016-015794

WHO. (2002), *Active Ageing: A Policy Framework*, p. 12. Available at: https://apps.who.int/iris/bitstream/handle/10665/67215/WHO_NMH_NPH_02.8.pdf;jsessionid=A251E06C21AFD8466388682ED3DD7B-D7?sequence=1

WHO. (2007), *Global Age-friendly Cities: A Guide*, p. 1. Available at: https://www.who.int/ageing/publications/Global_age_friendly_cities_Guide_English.pdf

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