

Expanding Global Healthcare & Elderly Market Seminar”

Gerontechnology and Active Ageing **樂齡科技如何樂活耆年**

錢黃碧君 Teresa Tsien

Honorary Consultant

Institute of Active Ageing & Jockey Club Smart Ageing Hub

Hong Kong Polytechnic University

Contents

- ▶ **Hong Kong Ageing Demography and Projections**
- ▶ **Gerontechnology Developments and Challenges**
- ▶ **Gerontechnology - Solution to Active Ageing?**

STATISTICS

HONG KONG – A SUPER AGED SOCIETY

- ▶ 2022 20.9% (1.52m) 65+ 1 in 5
- ▶ 2036 33% (2.5M) 65+ 1 in 3
- ▶ 2050 40% 65+ 4 in 10
- ▶ Sept 2022
 - ▶ Total population: 7,488,865
 - ▶ M to F ratio: 839:1000
 - ▶ Median age: 45.6 (44.2M, 46.5F)
 - ▶ Life Expectancy : 85.16 (2022)
 - ▶ Dependency ratio: 438/1000 (2021)



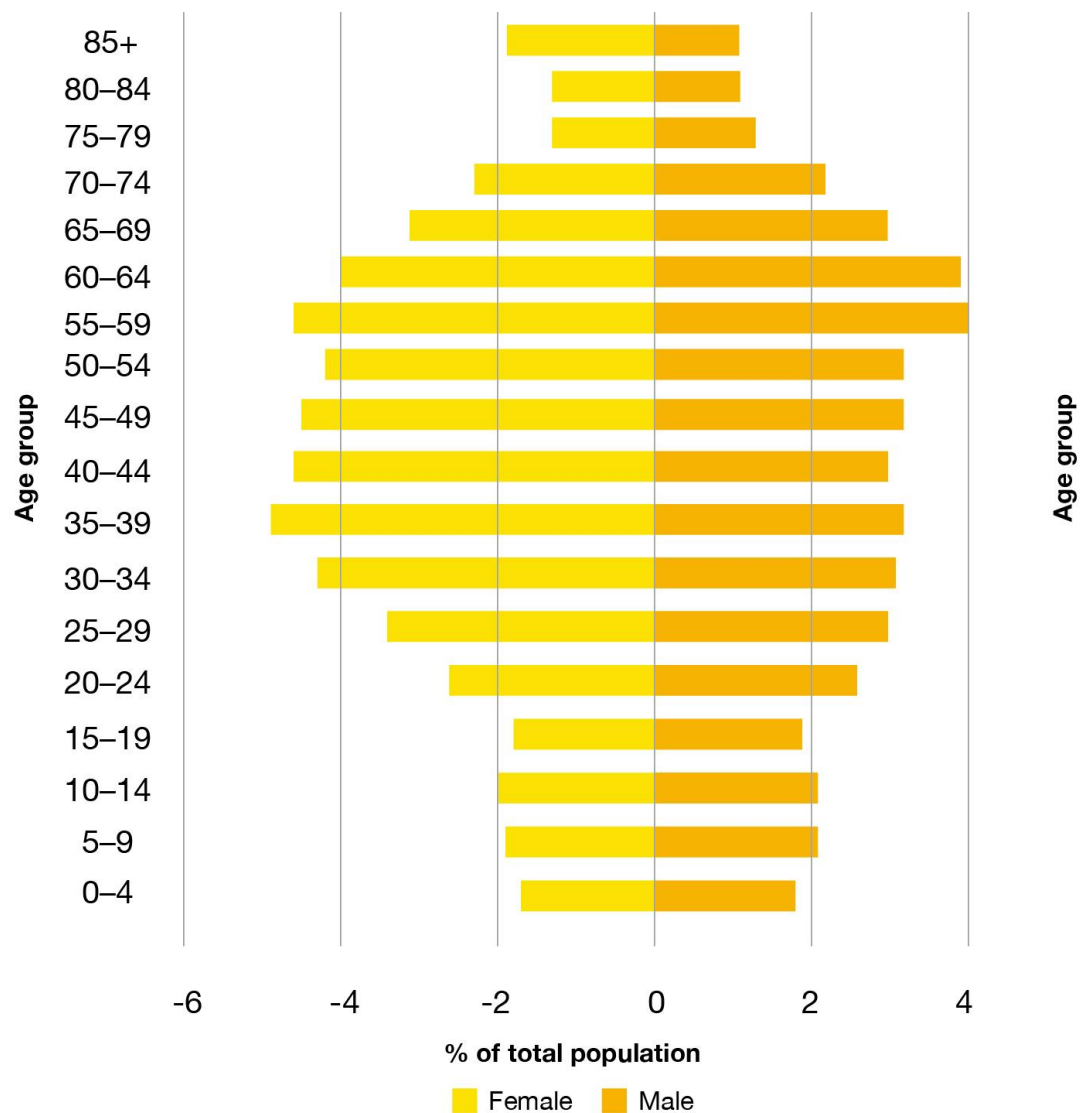
Expectation of Life at Birth by Sex

Hong Kong Population Projections

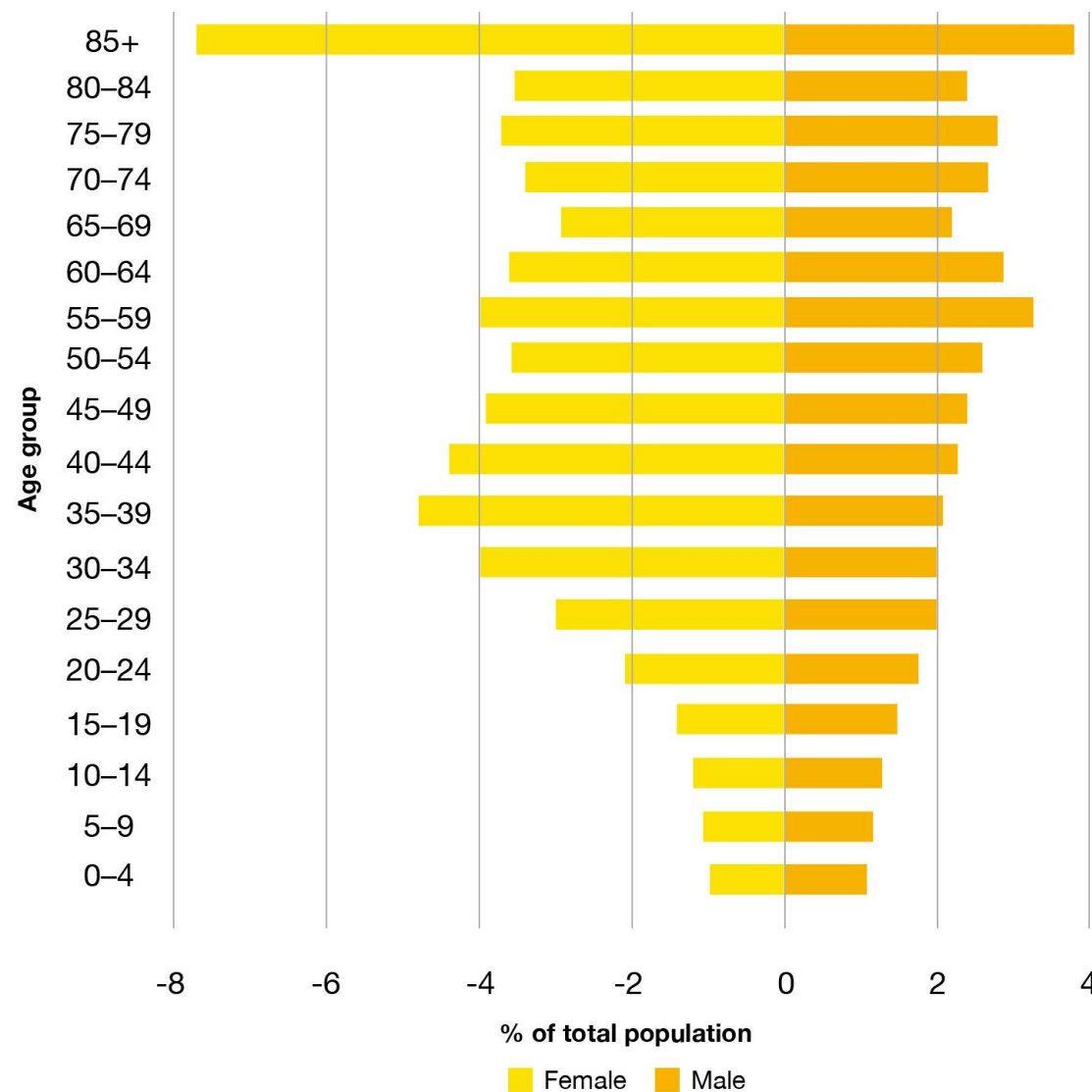
(Longest Life Expectancy in the world since 2010)

		2021	2029	2044	2064
Male		83.4	83.7	85.2	87.0
Female		88	89.2	90.8	92.5

Population by age group and sex, 2020



Population by age group and sex, 2069



HK Population Projection 2039

2039		
Age Group	Thousands	%
0-4	231.9	2.6
5-9	325.6	3.7
10-14	377.2	4.2
15-19	422.5	4.8
20-24	495.6	5.6
25-29	626.1	7.0
30-34	569.5	6.4
35-39	511.2	5.7
40-44	578.6	6.5
45-49	592.0	6.7
50-54	590.3	6.6
55-59	573.8	6.5
60-64	512.8	5.8
65-69	520.7	5.9
70-74	527.1	5.9
75-79	565.8	6.4
80-84	445.2	5.0
85+	426.8	4.8
Total	8 892.8	100.0

15 and below
10.5%

% of elderly to
HK population
1:3.89

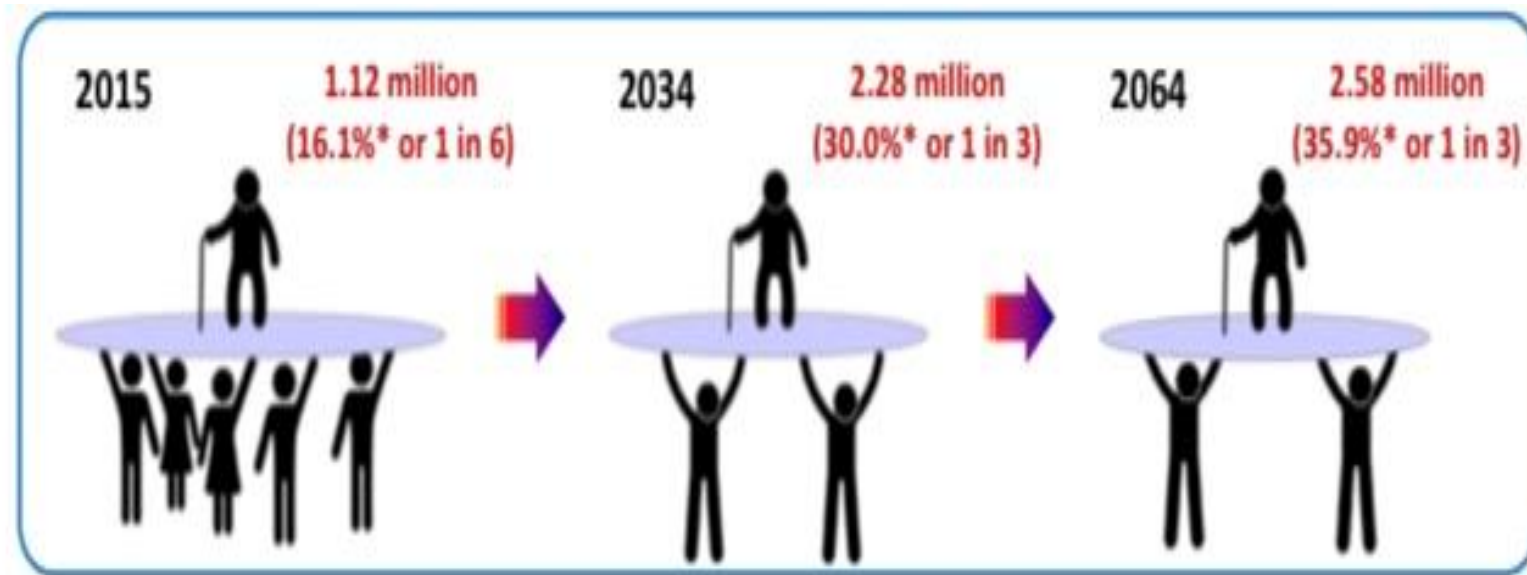
65 and above
28%



Reference:

http://www.censtatd.gov.hk/FileManager/TC/Content_803/population.pdf

No. of People Aged 65 +

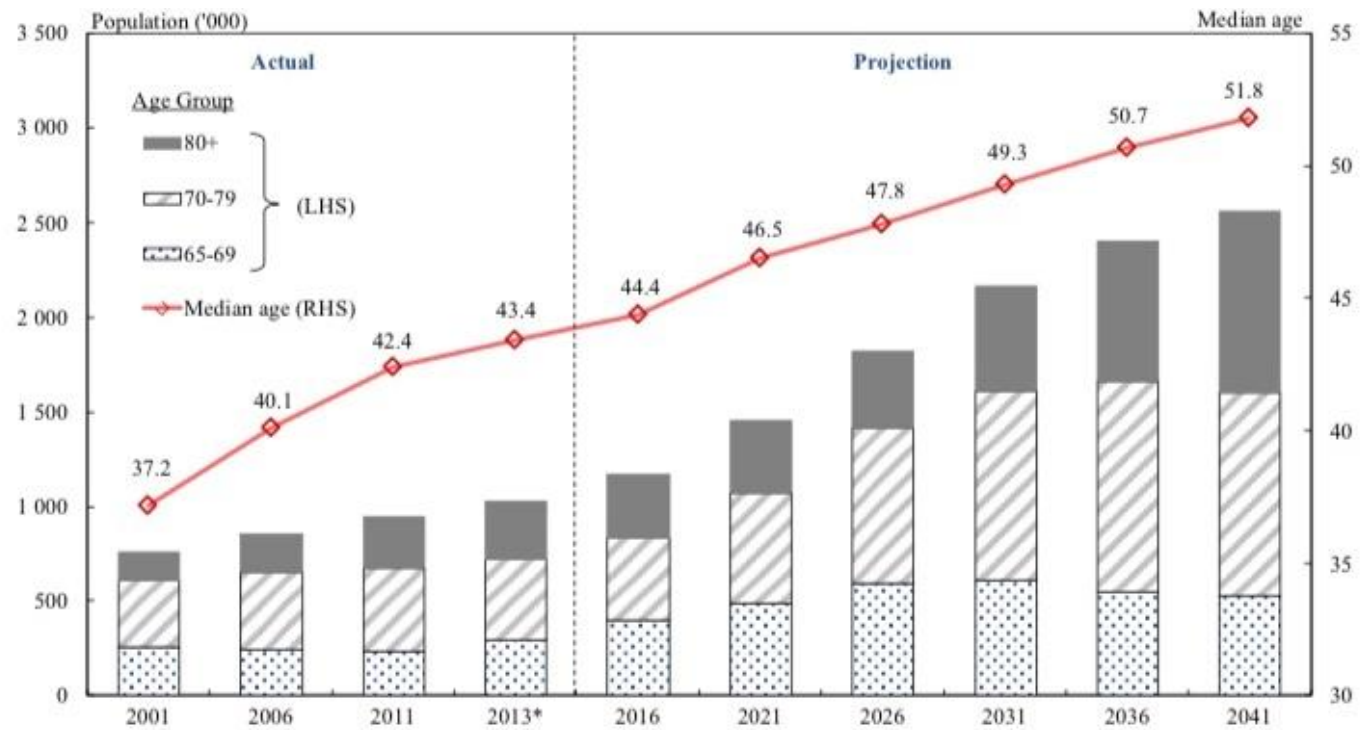


Note: (*) The figures represent the proportions of elderly people in total population.

Data source: Census and Statistics Department.

¹ See Census and Statistics Department (2015c).

Median Age



Notes : (*) Provisional figure.
Mid-year figures, excluding foreign domestic helpers.

Source : Demographic Statistics Section, Census and Statistics Department.

Summary of Ageing (65+) Profiles in HK

- ❑ There are more female than male, live longer by 5 years
- ❑ ≥ 85 , female outnumbered male 3X
- ❑ 15.7% live alone; 74% live with family; 91.9% live in community
- ❑ 63% are married, among 28% widowed (85% are female)
- ❑ 65+ 75% are suffering from one or more chronic diseases (diabetes, heart disease and hypertension, chronic bronchitis)
- ❑ Only 5.8% of people aged 65+ are working, more (men) prefer to work beyond retirement (part time, flexi time)
- ❑ Dementia 10% aged 70+, 33% over 85+, by 2040 (300,000)



Implications of the Future Older Adults

- ❑ Baby boomers tend to be better educated, more health-conscious, and financially independent
- ❑ Information technology usage

	Personal computer	Smartphone	Internet
Aged 45-64 (2020))	82%	98%	98%
Aged ≥ 65 (2020)	39%	68%	66%

- ❑ Led to the emergence of “silver market”, which creates many new opportunities for a wide range of business sectors and products (finance, tourism, design, **technology**, transportation, housing, etc.)

- ❑ *90% of elderly can perform self care*

What is Gerontechnology?

- a combination of elderly services and innovation and technology
 - Internet technologies, robotics, big data analytics and cloud computing
- ▶ promote **ageing in place** in the domains of housing, communication, health, safety, comfort, mobility, leisure and work
 - ▶ enhance the living quality of the elderly and relieve the pressure of their **caregivers**.
 - ▶ improve **service** quality and efficiency, mitigate human resources shortage, and enhance occupational safety.
 - ▶ open up vast business opportunities in the **silver market**.



Global Developments of Gerontechnology

- ▶ **1980** Eindhoven University of Technology Netherlands.
- ▶ **1991** first appearances in the Proceedings of the First International Conference on Technology and Aging
- ▶ **1996** adopted at Second International Conference on Gerontechnology
- ▶ **1997** the International Society for Gerontechnology was founded
- ▶ Exciting developments in different countries such as Japan, UK, Norway, Germany, Japan, Korea, China, Taiwan and US
- ▶ **HK**
- ▶ **1996** Senior Citizen Home Safety Association
- ▶ **2009** PolyU: Institute of Active Ageing
- ▶ **2012** BSc(Hons) in Apply Ageing Studies
- ▶ **2014** Elderly Services Programme Plan (ESPP).

Gerontechnology in Hong Kong (2014)

- ▶ The Government tasked the Elderly Commission (EC) to formulate an **Elderly Services Programme Plan (ESPP)**.
- ▶ EC has projected the future demand for long-term care services for the elderly based on the population ageing trends and other factors.
- ▶ One of the recommendations is the application of technology in elderly services
 - ▶ **train elderly persons** effectively use information and communication technology (ICT)
 - ▶ use of ICT for enhancing the **quality of care delivery**
 - ▶ promote the use of electro-mechanical equipment for enhancing the **occupational safety and health of frontline workers**.



Gerontechnology in Hong Kong 2017

"Landscape Study of Hong Kong's Gerontechnology" 2017 OHKF

Five major challenges

- ▶ **Lack of awareness** *Gerontechnology seen as supplementary rather than core*
 - ▶ **Lack of collaboration** *Stakeholders like universities, research institutes, NGOs and government rarely cooperate*
 - ▶ **Lack of test beds** *Products can only be tested in laboratory environment, without practical trial at real life settings*
 - ▶ **Lack of localized adaptability** *Due to cultural difference, products need to be locally adapted, but small market size deters such investment*
 - ▶ **Valley of death** *Hindrance faced by startups in ongoing research or commercialization of products*
- Gaps of Gerontechnology Development in HK



樂齡科技 博覽暨高峰會

Gerontech and Innovation
Expo cum Summit
2018

香港長者友善社區高峰會 暨
2018-2019 長者友善措施
致意行動頒獎典禮

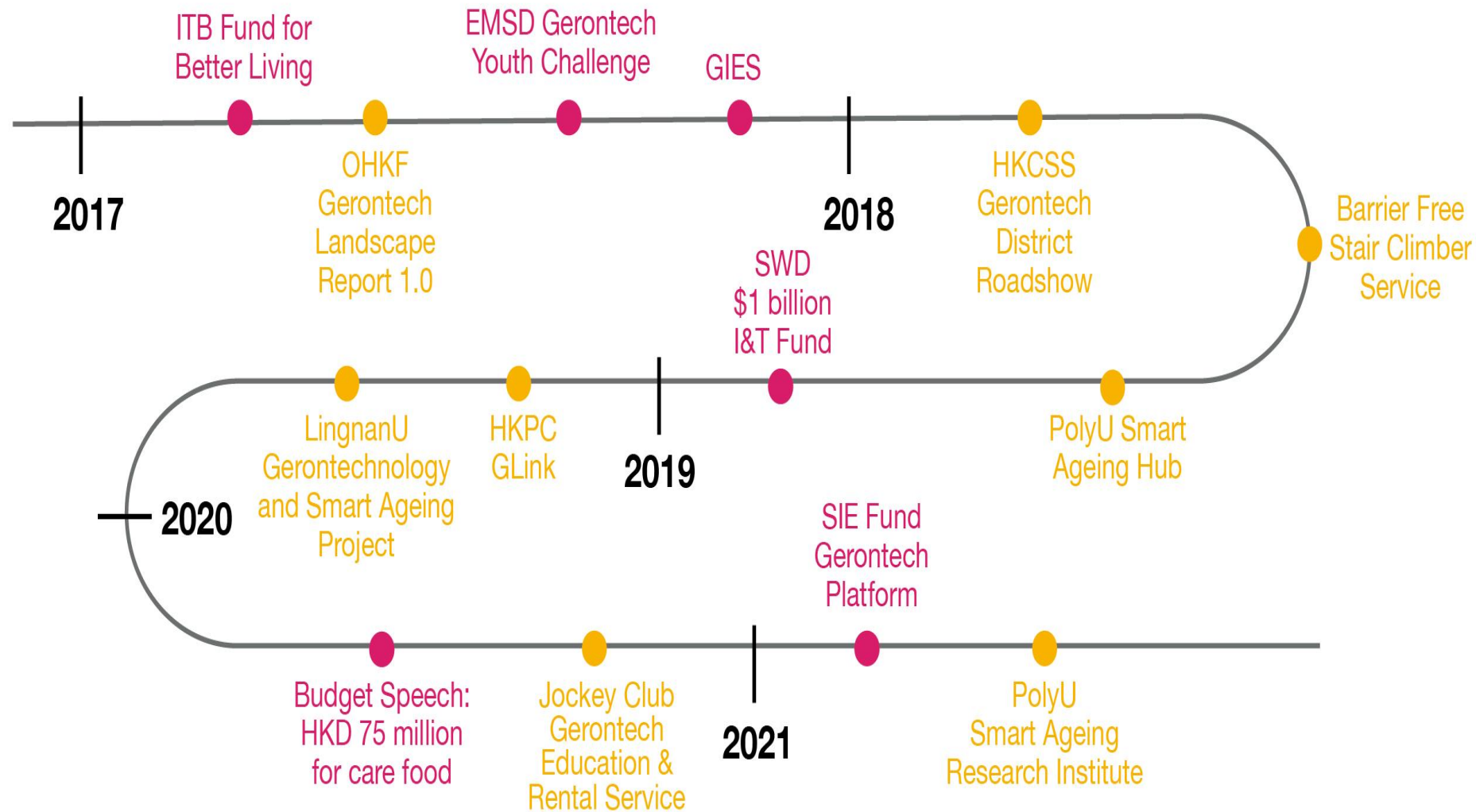
Age-friendly Hong Kong Summit cum
2018-2019 Age-friendly City Appreciation Scheme Recognition Ceremony

HKCSS

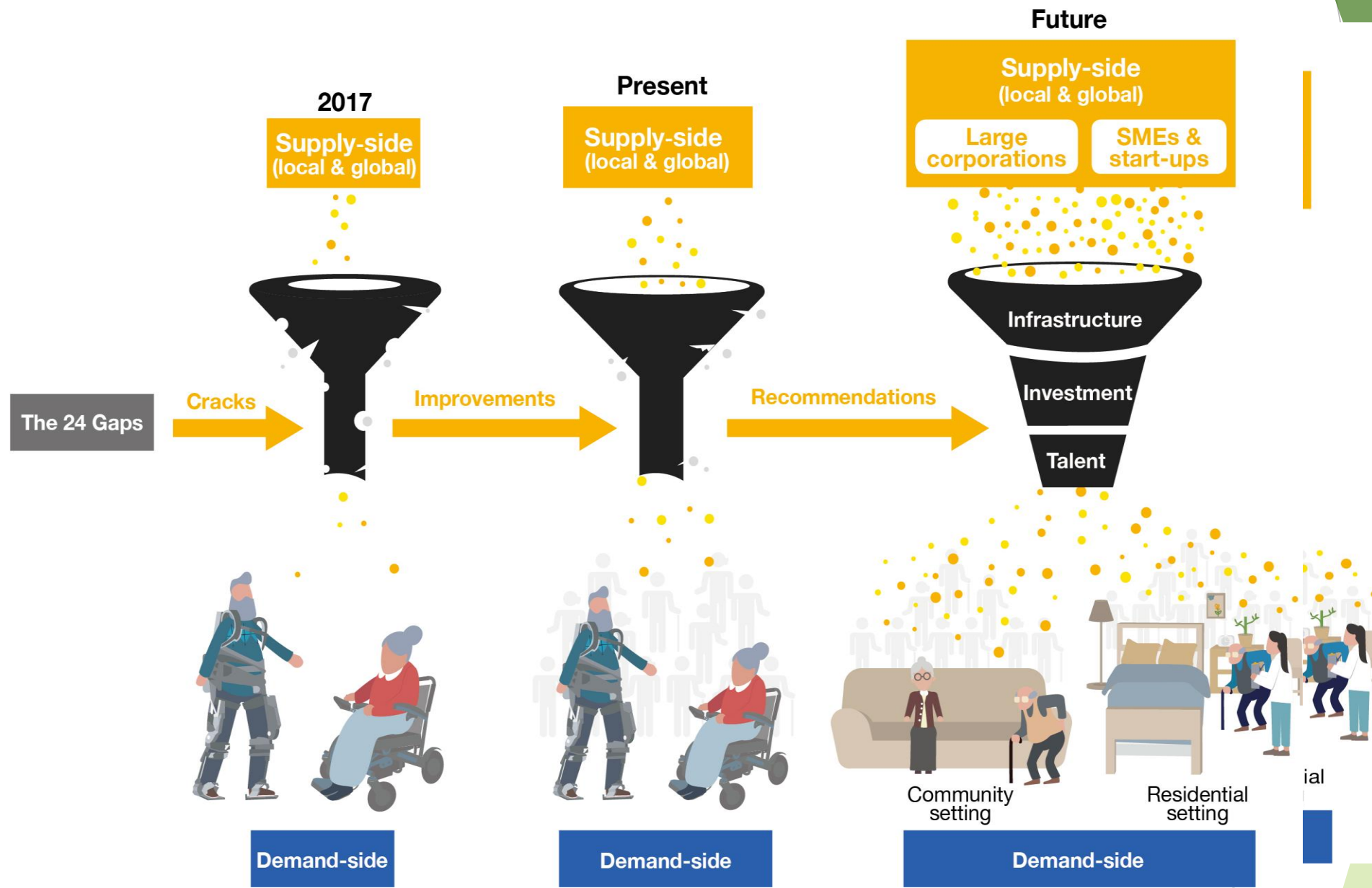


Funding Research and Development

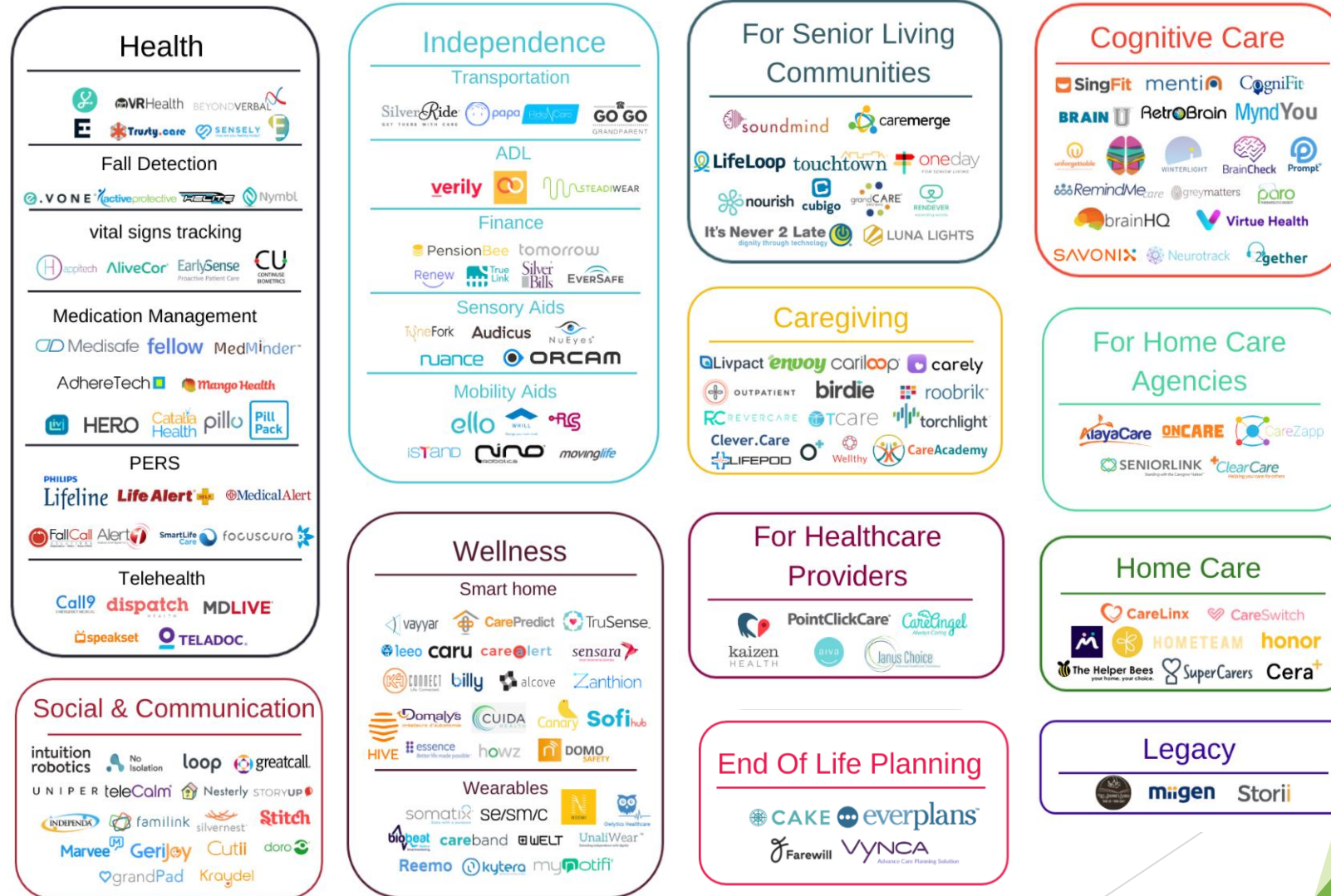
- ▶ **Innovation and Technology Fund (ITF)** provides funding support for universities, local public research institutions to conduct **research** on geontechnology
- ▶ **Innovation and Technology Fund for Better Living** in 2017 to fund NGOs, public bodies, professional bodies and trade associations to develop projects with the use of innovation and technology, that **improve people's daily life** or address the needs of specific community groups (including the elderly).
- ▶ **Innovation and Technology Fund for Application in Elderly and Rehabilitation Care** was launched in December 2018. The Fund will subsidise elderly and rehabilitation service units to try out and procure or **rent technology products**.
- ▶ The elderly service units of NGOs may also apply for various **charitable funds** (e.g. the Jockey Club Charities Trust) to improve the facilities of their centres and RCHEs, and procure more advanced electronic **technology equipment** with a view to improving the services provided for elderly persons



- Government initiatives
- Other parties' initiatives



Gerontechnology Market?



樂齡科技生活

- ▶ 醫
- ▶ 食
- ▶ 住
- ▶ 行



Source: OHKF 2017

- ▶ 早期診斷, , 治療更安全、有效和可靠
- ▶ 借助創新機械的發明和高科技 監察及治療的設備協助完成物理治療
- ▶ 預防 - 運用生物識別技術, 以測量和監察長者的各類健康參數, 如心跳 率、呼吸率、血壓、含氧量、血糖量、體重、睡眠行為
- ▶ 整天佩戴, 用以持續記錄健康數據
- ▶ 相關機構的協助, 定期檢查測量資料



智能呼吸腰帶和服裝



- ▶ 借助應變計來記錄腰帶的伸縮次數，從而計算呼吸率
- ▶ 固定在上身衣服的醫療級生物電流檢測器,提供長者的心跳率和睡眠行為

防跌腰帶



可充電電池

活動感應器

步行計算器

步行平衡力

非侵入性血糖監測系統

長者只 需把手指放在傳感器上，以
檢定血糖水平和血壓。



健康追蹤手帶裝置

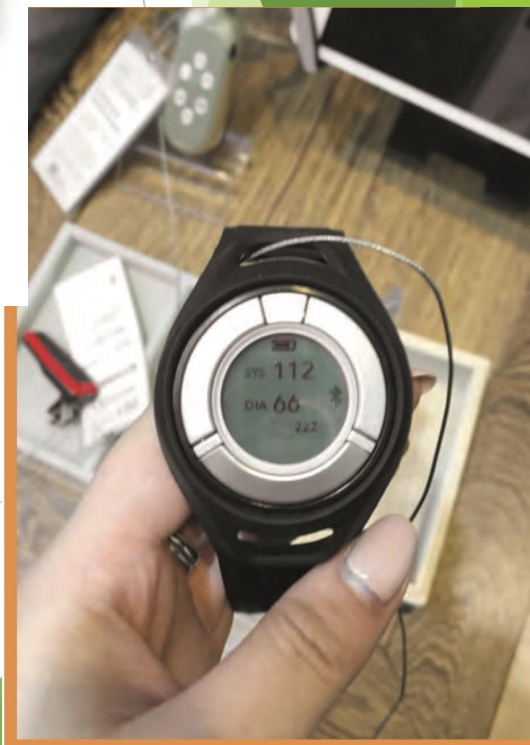


健康管家

健康管家，能於2分鐘內透過靜態心率測試分析身體健康狀況，並可透過3分鐘呼吸訓練降低血壓和釋放壓力。

穿戴型手帶

無袖帶血壓測量方式，讓長者和護理人員可隨時閱讀數據，便捷地追蹤長者的健康狀況



●醫療遙距服務



食

- ▶ 年紀愈大，咬食、咀嚼和吞嚥食物的能力亦隨之下降
- ▶ 視力變差會限制購買食物和煮食的能力
- ▶ 掉牙和味覺變弱則會減低食慾，食量和可選的食物類型也因而減少
- ▶ 百分之40.5的長者剩下牙齒少於20顆
- ▶ 臨時牙模,可快速短期使用 廉價和便捷假牙



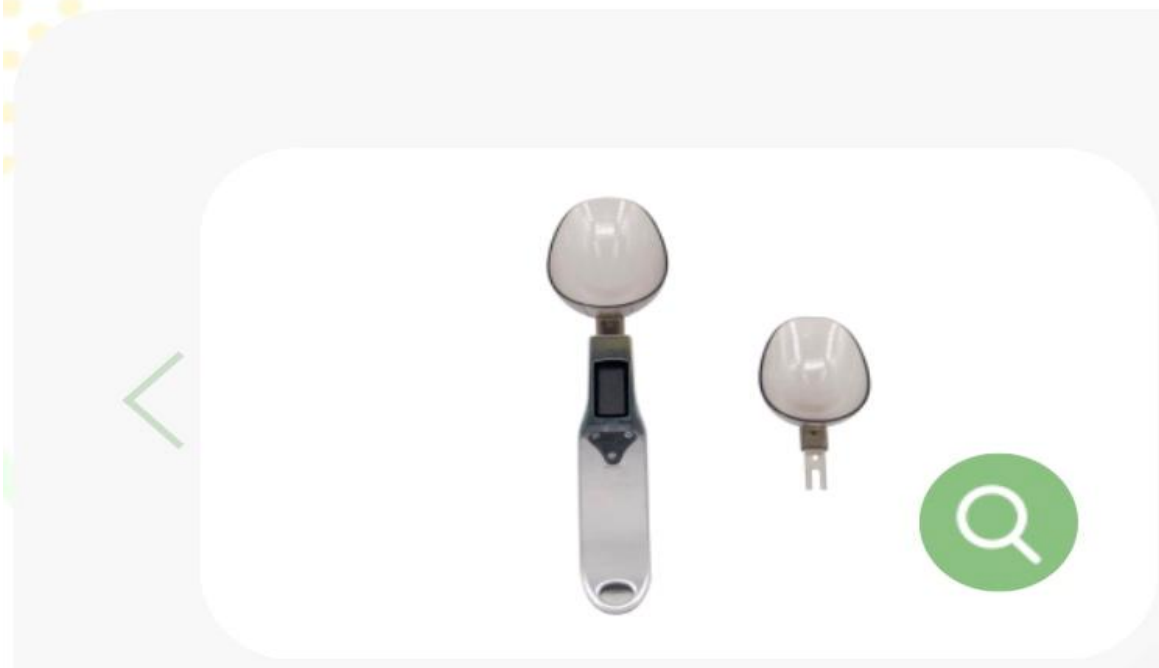
精緻糊餐





電子量度匙勺

Digital measuring spoon



住

-居家安老」概念是指讓長者能留在本身的社區居住

-1.智能傳感網絡和資訊及通訊技術
(例如監察和緊急輔助系統)

2.日常生活的基本活動產品(例如幫助使用浴室及維護個人衛生的產品)

3.日常生活活動用具(例如輔助溝通及閱讀等的附加儀器)



長者紅外線熱 傳感安全警報系統

- ▶ 採用紅外線傳感器技術，以偵測長者體溫。如傳感器在一段時間內辨識出靜止的體溫狀況，系統便會發出緊急警報



一線通平安鐘™ 產品

	無線平安鐘	平安手機	智守護APP	智能手錶
儀器				
特點	- 主機使用4G流動網絡 - 突破家居界限，無需固網電話線，毋須安裝 - 藍牙遙控求助掣，覆蓋範圍更廣，專業防水3重標準，保障沐浴者安全 - 適合任何人士使用，更自由、安全、輕鬆的生活。	- 全新一線通®4G平安手機® - 以三重定位(GPS、Wifi、LBS)追蹤位置精準 - 專為長者而設的手機 - 操作簡單 - 一鍵接駁至熱線中心 - 支援守護服務，主動監察和及時介入	- 手機應用程式 - 簡單使用介面 - 守護服務 - 服藥提示功能(以圖片提示，保存服藥記錄) - 代約門診 - 可追蹤位置 - 照顧者可通過智守護APP了解長者位置、服藥情況、覆診日期等	- 專為長者而設 - 五合一多功能裝置 - 快速電話撥號 - 一按緊急鍵接駁至熱線中心 - 守護服務 - 可追蹤位置 + 電子圍欄 - 測量心跳及行走步數
針對對象	- 較年長的長者 - 較少外出者	- 較年長但仍活躍長者 - 非智能電話使用者	- 初老長者 (60歲以上) - 善於使用智能手機 - 較活躍及獨立長者 - 對健康管理有認識或興趣的長者	- 較活躍及獨立長者 - 想要最快速一鍵求救 - 想要最精準位置搜尋 - 相對較受男士歡迎

廁所監察裝置

- ▶ 可追蹤並儲存用戶使用廁所的數據，只需把裝置固定在馬桶水箱旁，便能記錄水位變化。



智能藥盒



圖2.34：智能藥盒

資料來源：香港科學園及好好生活



小型追蹤器貼

- ▶ 在長者身上，並在屋內四周安裝傳感器，讓系統在不侵犯私隱的情況下，偵測長者的活動和位置



智能長者居家離床監測系統和守眠者關懷床墊系統

- ▶ 均透過壓力感應器來偵測長者是否留在床上。
- ▶ 居家離床監測系統可即時啟動警報系統
- ▶ 守眠者關懷床墊系統則通過流動應用程式向護理人員發送提示訊息
- ▶ 壓力感應墊小巧、方便攜帶的型號，適用於輪椅、沙發或椅子，當長者離開原來位置，重量便會下降，裝置亦會立即啟動警報



防撞衣服 智能鞋

- ▶ 是其中一種 結合創新技術的保護衣物，即使長者跌倒，衣物可吸收撞擊力，防止長者跌傷
- ▶ 智能鞋便會提醒長者，以防他們受傷



愛心機械寵物

- ▶ 日本研發的 機械海豹「PARO」- 長者的社交互動
- ▶ 「ZoraBots」能指導長者作簡單運動，鼓勵長者多加活動，並示範 簡單舞蹈
- ▶ 「Care-O-bot」屬於組合式 機械人，能夠協助烹飪、清潔等家務，並提供不同服務，如下訂單和 醫療保健管理，以及從儲物架提取或放置物品



認知遊戲



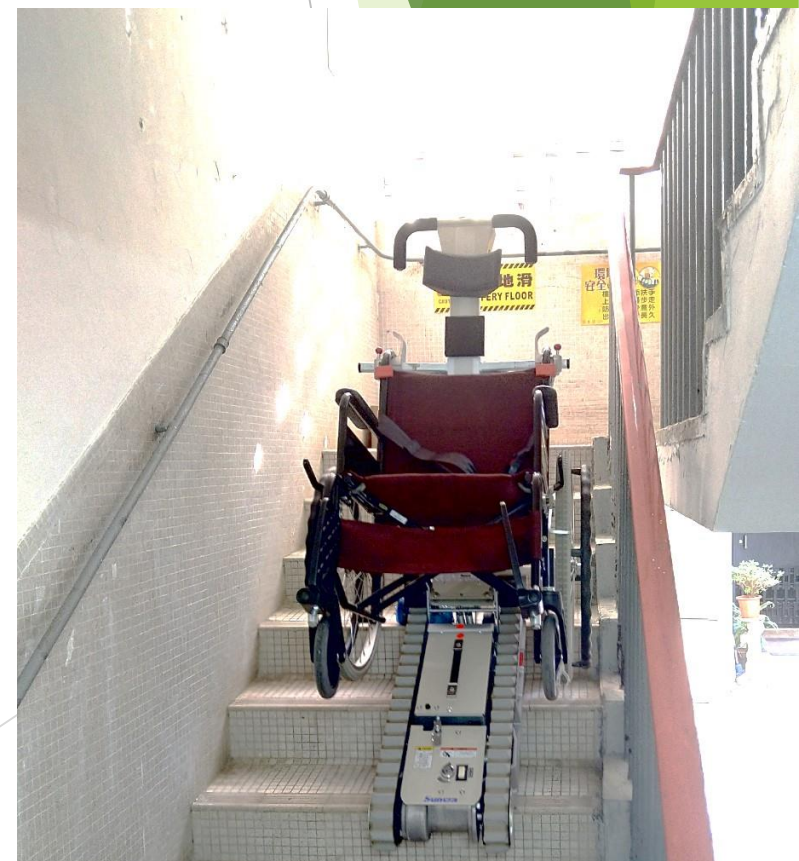
行

- ▶ 交通是 長者與外界保持聯繫的重要一環
- ▶ 創新的服務和技術可輔助長者的身體活動或預防受傷及避免意外，從而協助長者活動及獨立生活。
- ▶ 產品類型包括 輪椅和拐杖、運輸服務及定位設備。



關懷接載服務

- 點對點 駕駛接載服務，顧及輪椅使用者的需要。
- 車廂經過重新設計，以助輪椅與用戶直接上車並固定位置。
- 透過智能手機應用程式，在指定位置上落車



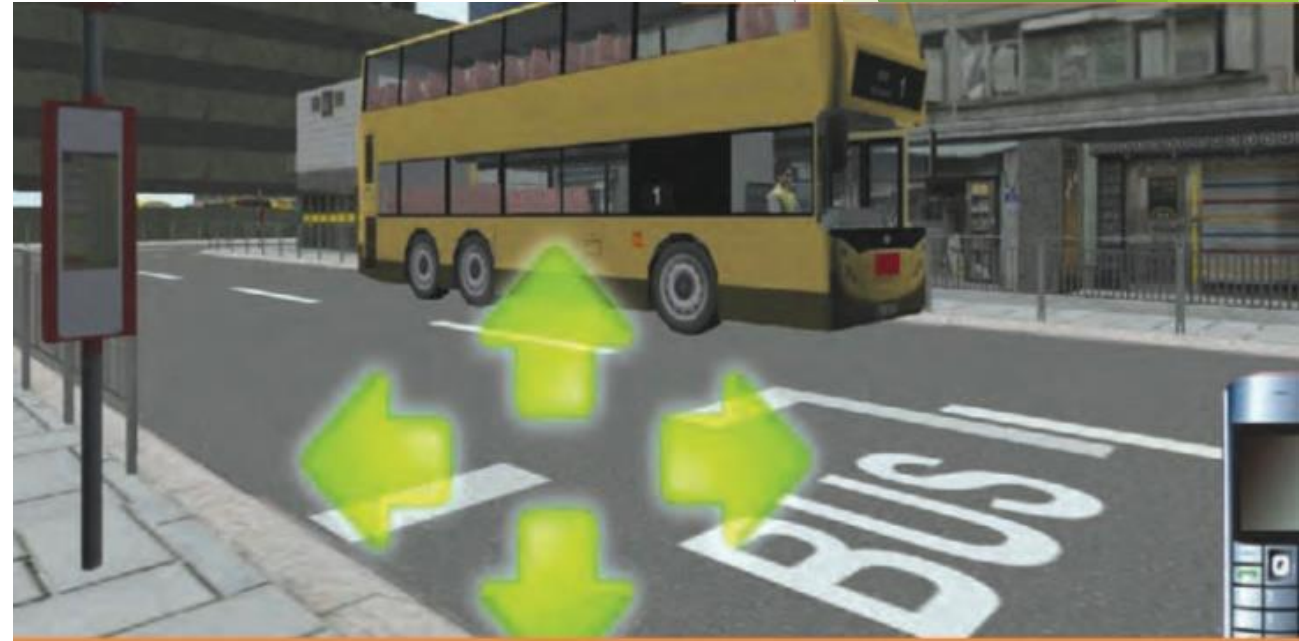
智能拐杖

- ▶ 需配合設有無線射頻辨識傳感器的道路和走廊，當視障人士途經相關標籤，拐杖上的讀取器會發出聲音導航，帶領用戶前往目的地
- ▶ 智能拐杖，拐杖除兼具電筒照明和警報器的功能外，更設有收音機



虛擬實景社區 生活技巧訓練系統

- ▶ 以虛擬實景技術訓練
認知障礙的長者長者完
成特定任務，如乘坐
不同公共交通工具和日
常購物

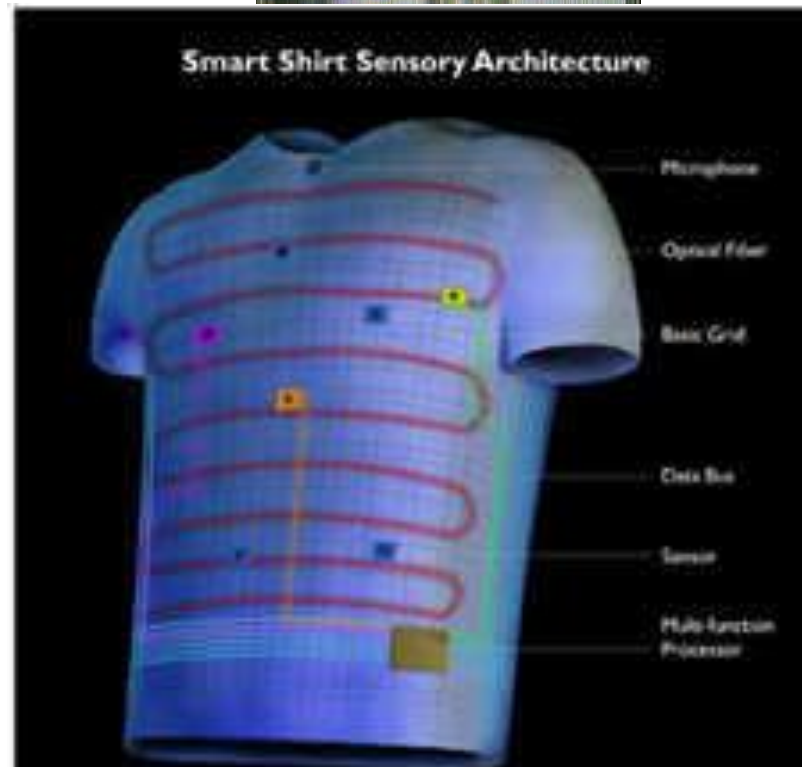
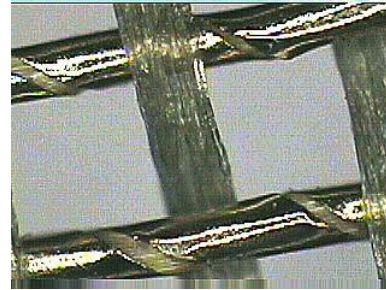




社會事

安老院實景模擬運動 長者踩單車「遊世界」

無線近距離無線通訊智能手帶 和 智能鞋墊和全球定位追蹤的背心



近距離無線通訊智能手帶

以助護理人員和家屬
迅速安全地尋回失散
或迷失長者



防長者走失 九巴「八達通尋人服務」



友里蹤跡」程式

香港樂齡科技發展的困難

- ▶ 對樂齡科技重要性的意識不足
- ▶ 風險
- ▶ 政府和工商界投資於應用科研的資金不足
- ▶ 缺乏人才（尤其是同時 精於醫療和科技的專業人才）
- ▶ 知識產權
- ▶ 初創企業的支援不足
- ▶ 產品設計未能滿足長者的消費需求
- ▶ 擔心私隱

總結

- ▶ 「Ageing Asia」銀髮商機指數 2020
- ▶ 亞太地區的老年人口及供養他們的子女的消費能力，包括住戶儲蓄及人均本地生產總值，為各經濟體評級
- ▶ 以銀髮市場潛力計算，香港位列第四
- ▶ 香港樂齡科技發展成功要素
 - 高科技，高人情味
 - 長者參與
 - 跨界別，不同持份者合作
 - 資金，人才支援



樂齡科技是一項投資，不是支出



Active Ageing In New Digital Era

Thank you

