

# Technology Innovations in Community Healthcare

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# Outline

-  **eHealth & Gerontechnology Examples**
-  **Benefits vs Adoption Rates**
-  **Barriers in Adoption**
-  **Proposed Solutions**

# Government Advocates



16-18 June 2017

Hong Kong Convention & Exhibition Centre Hall 3DE

樂齡科技  
博覽暨高峰會

Gerontechnology and Innovation  
Expo cum Summit





# 安老助弱



向兒童發展基金注資  
3 億，推出更多計劃  
幫助基層兒童

明年 4 月 1 日實施經優化的  
低收入在職家庭津貼  
計劃，使更多在職住戶  
受惠



推動樂齡科技，預留 10 億成立  
基金，資助安老服務單位試用  
及購置科技產品

# 智慧城市



投放7億推展協助  
發展智慧城市的  
重要基礎建設項目

為所有香港居民提供數碼個人身分

在選定市區地點進行  
多功能智慧燈柱試驗計劃



革新電子政府系統的開發技術及  
設立大數據分析平台

# Why GeronTech?

- 🌐 Older Generation – baby boomers / Silver Tsunami
- 🌐 Maximizing their independency
- 🌐 Aging in Place, Enriching their lives
- 🌐 Alleviate caregivers shortage
- 🌐 Abundance of chronic diseases, Reducing health cost



# 5 Roads to Gerontechnology

- 🌐 Prevent/Manage Health & Diseases
  - 🌐 Diet, Exercise, Healthy Environment, Lifestyles
  - 🌐 Equipment & Monitors
- 🌐 Enhance/Enrich Performance in Life Activities
  - 🌐 Work, Leisure, Social, Entertainment
  - 🌐 Communications tools

# 5 Roads to Gerontechnology

- 🌐 **Compensate Aged Related Impairments**
  - 🌐 Vision, Tactile senses, Hearing
  - 🌐 Aids, Accessibility tools
- 🌐 **Support/Assist Care Givers**
  - 🌐 Lifters, Ceiling Hoists
- 🌐 **Improving Research in Aging**
  - 🌐 Imaging, Gene studies



# Mainly 2 Major Camps

## Monitoring and Surveillance

-  Sensors

-  Alerts

## Assistive Technology

-  Independent Living

-  Enrich Lives

# Sensors



Figure 2.3 Sensara Senior Care Solution  
Source: Qorvo



Figure 2.1: The Infrared Thermal Sensing Safety Alert System For Elderly  
Source: UCHM Bed Centre



Figure 2.4: The Smart Elderly Bed Exit Monitoring System  
Source: Rondish Co. Limited

# PERS





# Assistive Devices

Figure 2.6: Sit and Shower Device  
Source: LSCM R&D Centre



Figure 2.7: Toilet Monitoring Device  
Source: LSCM R&D Centre



Figure 2.8: VT Care Real Time Wet Diaper Monitor  
Source: Hong Kong Science Park and HOHOLIFE



# Robots

**Figure 2.18: PARO robot**  
Source: AST (Japan) through idEMED



**Figure 2.19: BUDDY Robot**  
Source: Blue Frog



**Figure 2.20: ZoraBots**  
Source: OSMY



**Figure 2.21: Care-O-bot**  
Source: Fraunhofer Institute





# Bed & Chairs

Figure 2.22 Robotic Beds  
Source: Panasonic



Figure 2.47: Mobilet  
Source: Single Person Transport Design



Figure 2.48: Scalemobli S30  
Source: Scalemobli





# Health Monitoring

Figure 2.23: Smart Respiration Belt



Figure 2.24: HeHa Q1  
Source: HeHa



Figure 2.25: Heartisans Wearable  
Source: Heartisans



Figure 2.26:  
Kiss & Tell

Source: evana health



# Rehab



**Figure 2.29: The Hand of Hope**  
Source: Rehab Robotics



**Figure 2.30: The Smart Walking Cane**  
Source: The Smart Cane



**Figure 2.31: Rex**  
Source: Dextech Medical Limited

# Medications

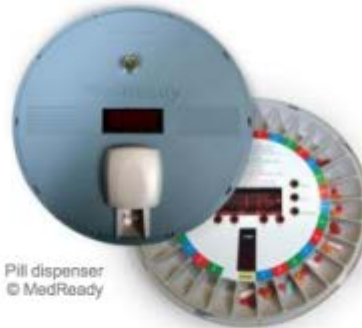
Figure 2.3b: Automatic Tablet Dispensing Packaging System  
Copyright © 2010, Pearson Education, Inc.



Figure 2.3c: Smart Medication Bottle  
Copyright © 2010, Pearson Education, Inc.



Med reminder watch  
© Cadex



Pill dispenser  
© MedReady



Pill dispenser © SentiCare



© MagneTrace

MagneTrace necklace



GlowCap pill bottle cap  
© Vitality



Med adherence app

2



© Proteus

Proteus Raisin microchip pill



3



© Xhale

Xhale SMART tracer system



# For Care-giver



Figure 2.39: HAL (Lumbar Type)  
Source: CYBERDYNE



Figure 2.40: ROBEAR Nursing Care Robot  
Source: RIKEN

# Location Devices




**Figure 2.53: RFID Tagged and GPS Tracking Vests**  
Source: The Hong Kong Research Institute of Textiles and Apparel





**Figure 2.54: NFC Smart Wristband**  
Source: Ningbo University




# Are they cost effective?

 Public Telesurveillance for 38 frail elderly: decreased LOS, decreased home care service, decreased 17-39% health cost (Vincent, 2006)

 Low Tech PERS 87 patients: reduced mortality 4x; reduced hospital utilization 59%; benefit : cost ratio 7:1 (Bernstein 2000)

 Trans European Network 426 Congestive Heart Failure patients: decrease 26% LOS, further 10% on top of call center service; 2.1 ROI (TEN-HMS 2005)

 NHS Sheffield 30 COPD patients reduce 50% of LOS and 80% of home visits (Sheffield 2008)



# Yet...

1. Many Systems have entered the market
2. Rate of adoption is VERY LOW despite the potential benefits are well-recognized
3. “it is still not really clear what seems to work and what doesn't work,”
4. By the time a study has been planned and funding has been acquired, the technology to be studied may be outdated

# Barriers

- 🌐 In 1970 Germany Developed PERS; In 1989 LifeCall first launched in USA/Canada; now in 2014 still only 5% needy elderly use PERS in Canada; in 2017 12% in UK, 6.6% in HK.
- 🌐 Even in the best case, in UK where NHS subsidizes everything, the adoption rate is lower than 15%

# Many gadgets have inconclusive results

- 🌐 Pedometers only shown significance in elderly
- 🌐 Telemonitoring only useful in Pulmonary & Cardiac Patients rather than Diabetes & Hypertension
- 🌐 Fitbit only showed association with more health awareness







# Barriers









- Some with impaired vision, hearing, dexterity 39%
- Phobias / skeptic on technology 35%
- Difficulty in learning new things 77%
- Afraid of being stigmatized
- Poor Awareness
- Too expensive
- No reimbursement

# Challenges

- Strategic prioritization and planning are critical
- Clinician does not physically touch patient
- **Limited or no reimbursement**
- **Lack of outcomes research, practice standards**
- **Business model not yet well understood**
- Significant workflow and care model disruption
- Disagreement on metrics
- Scalability and EHR integration issues
- Privacy/security, regulatory, legal issues
- **Health care consumer must be willing and able to engage**



# 10 Determinants of Adoption

-  Value
-  Usability
-  Affordability
-  Accessibility
-  Technical Support
-  Social Support
-  Emotion
-  Independence
-  Experience
-  Confidence

# Robust Examples



# 24 Gaps

- 🌐 SHUI Chi-wai Kenny *et al*, June 2017
- 🌐 Studied 72 Innovative Products in Living, Healthcare, Diet & Transport

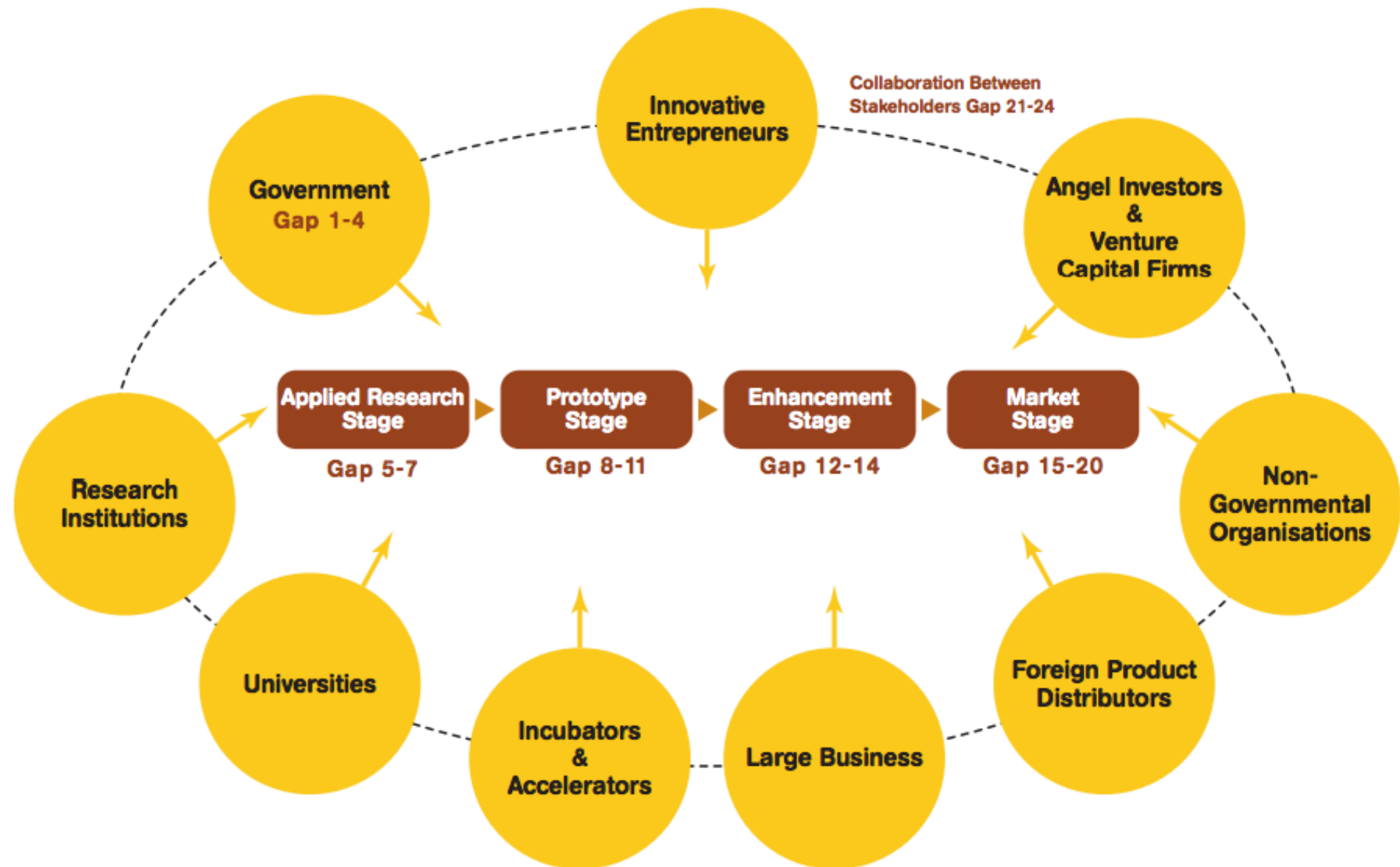


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團結香港基金

Gerontechnology  
Landscape Report

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# 5 groups

- **Society's Lack of Awareness in the Importance of Gerontechnology : Low Adoption & Switched Adoption**
- **Lack of Collaboration : especially SWD & HA & GP**
- **Valley of Death : \$\$ Dies before long incubation period ends**
- **Cultural Differences & Difficulties in Product Localization**
- **Lack of Testing Grounds for New Products : HA is too conservative and risk averse**

# HK is still a small market

- 🌐 <25% of senior citizens >60 years old attained Upper Secondary / Tertiary Education
- 🌐 Just 1.2 million elderly
- 🌐 BUT: HK ranked #2 in spending power in elderly in Asia Pacific region
- 🌐 Mainland China Market is huge
- 🌐 By 2040 HK has 2.6 Million elderly  $\geq 65$ , 30% disabled
- 🌐 High institutionalized rate, Shrinking work force



# Solutions?

- 🌐 HK Govt subsidy on long term care 0.3% GDP (vs 2% in Japan) – must be stepped up with more \$\$\$
- 🌐 Lack of collaborations between stakeholders: interdepartmental collaboration – break barriers
- 🌐 Good Leadership and with guts
- 🌐 Device – simple, accurate, cheap
- 🌐 Background service network – seamless & must be present
- 🌐 Perceived value to be boasted
- 🌐 Wait for 2 more decades till I get frail

# 一線通呼援服務中心



# Failure Example



Black



# Future Trends

- Most of these mass-marketed gadgets will drift into obscurity
- Doctors and patients will add to themselves confusion and anxiety
- Gadgets with high margin of error will bring unreliable data and interfere with management
- We need validation, improvement in accuracy, and concerted efforts
- Ultimately, all of us will be taken care of by Robots !

# Thank you

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