



Institute for
Biotechnology and Medicine Industry



Looking Beyond Covid-19: The Healthcare Ecosystem in Taiwan

錢宗良

Chung-Liang Chien, Ph.D.

Professor, College of Medicine, National Taiwan University
CEO, Institute for Biotechnology and Medicine Industry

OUTLINES

- 1. Precision Medicine and Precision Health**
- 2. Healthcare industry in Taiwan**
- 3. International Promotion Strategy**
- 4. Training program for interdisciplinary talents
of Precision Health**

Precision Medicine and Precision Health



【Precision Medicine】

Precision Diagnosis : NGS, Liquid Biopsy, Medical AI, POC devices , Digital Imaging Equipment *etc.*

Precision Treatment : Targeted Therapy, Cell Therapy, Immunotherapy, Surgical Robot, *etc.*

Medical Care: Smart Hospital, Smart healthcare, *etc.*

【Precision Health】

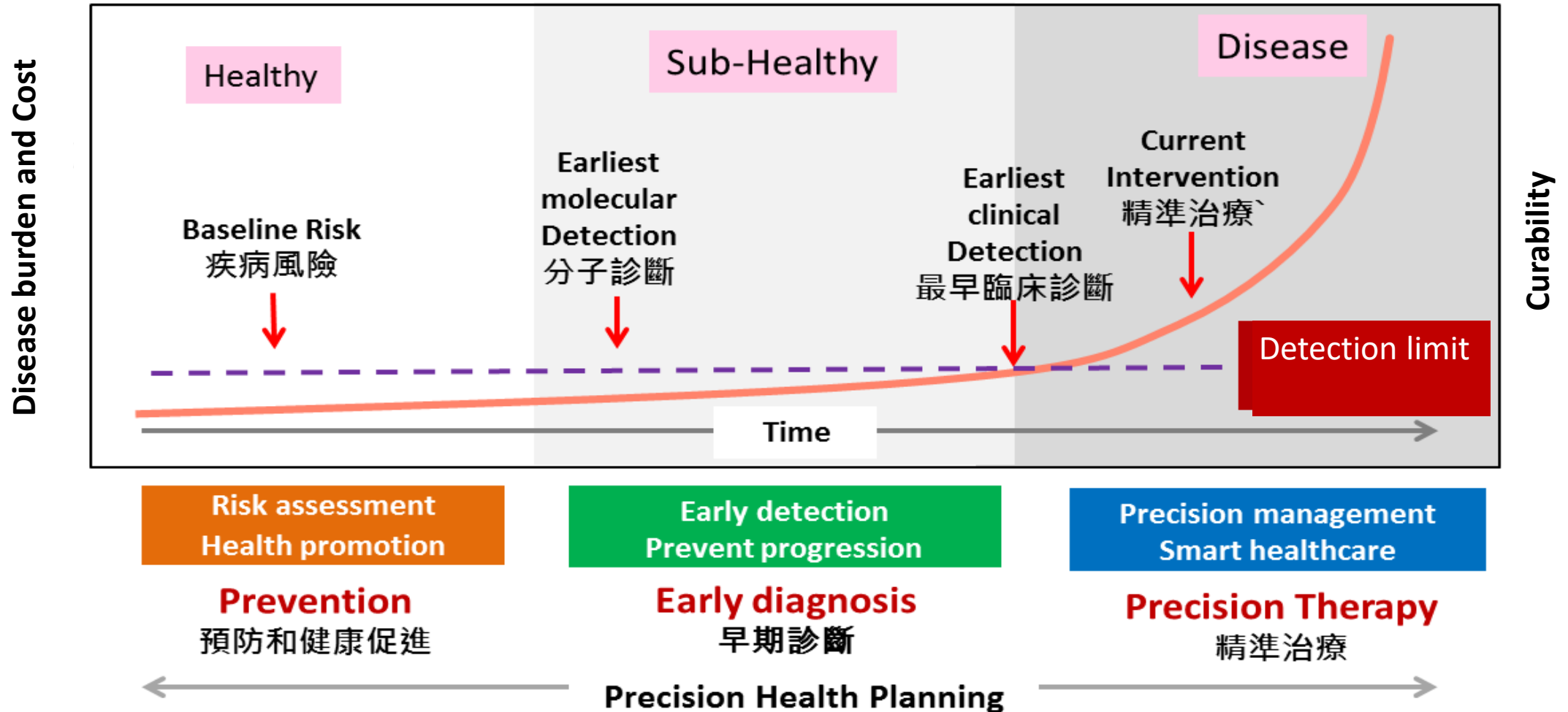
Risk Assessment : Genetic risk, Behavioral Patterns, family history *etc.*

Precision Prevention : Personalized Health Check 、 AI for Early Detection, Home Screening, Tele Health Consulting Services *etc.*

Health Promotion: Lifestyle, Environmental Adjustments, Personalized Diet, Sport and Exercise, Microbiota, Homecare and Wearable Devices, Health Management, *etc.*

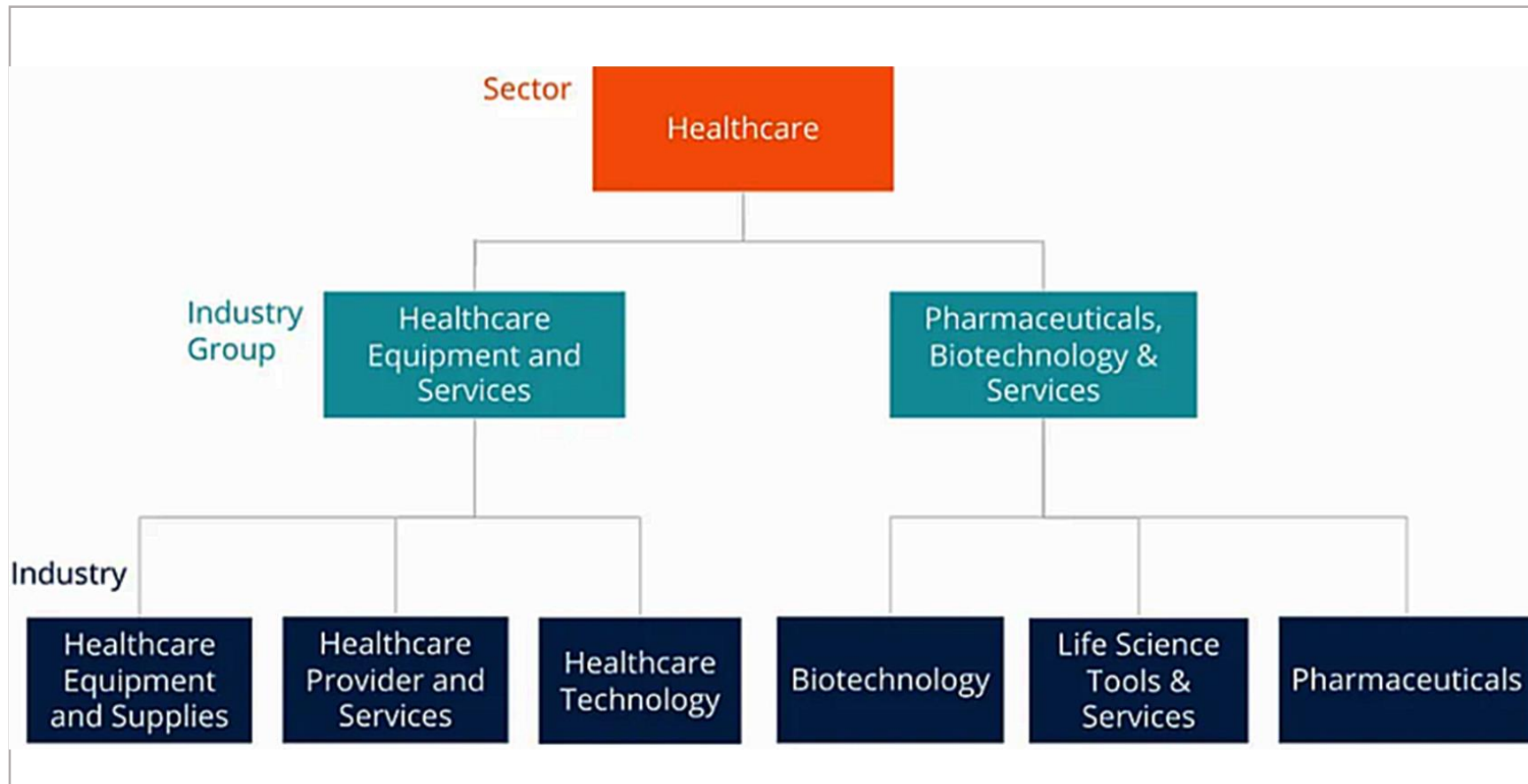
Healthcare from disease treatment to prevention

- Healthcare nowadays provides individuals with products and services ranging from prevention, health promotion, diagnosis to treatment.



Healthcare sector by GICS definition

- ❑ The healthcare sector includes the following subsections, as per Global Industry Classification Standard (GICS)

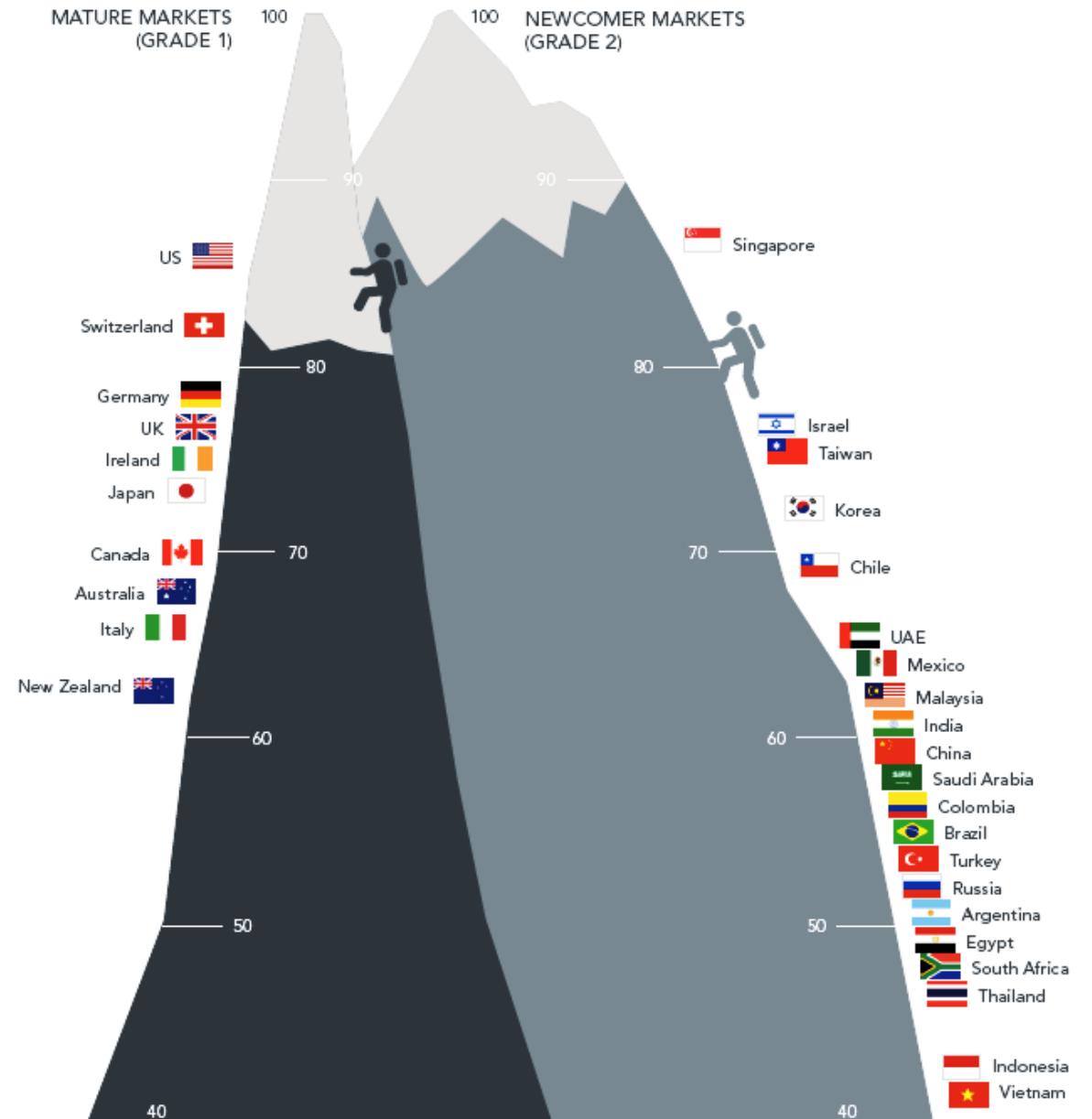


Global Markets:

- International Healthcare
- Bio-pharmaceutical
- Medical device
- Regenerative medicine
- Smart health
- Precision medicine
- Sports medicine

Taiwan Core Competences

- Taiwan ranks 3rd in the newcomer markets
- World-class quality of medicine and talent
- The best healthcare system and big data
- High quality clinical trials and R&D capacity
- Well-established research infrastructure
- ICT supply chain, talent and manufacturing
- AI and 5G R&D in national level



Source compiled by IBMI, RBMP (2021)

Medical Innovation by cross-industry collaborations



Advanced Medical Care



High Quality R&D and MFG

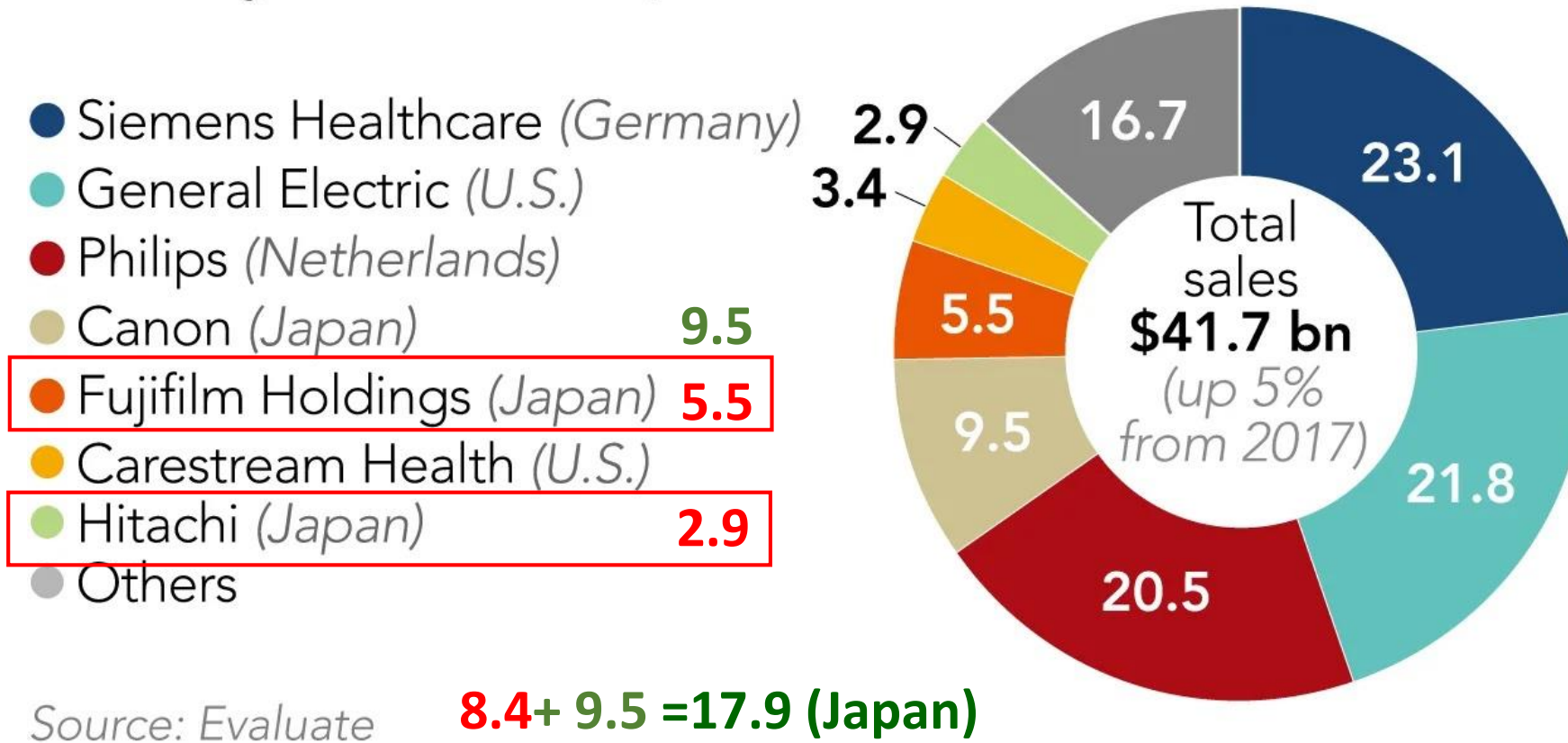


Strong ICT and Elec. Tech.



Fujifilm Healthcare acquires Hitachi Diagnostic Imaging in 2021

Diagnostic imaging equipment global market share by sales (2018, in percent)



Fujifilm Healthcare presented a complete and integrated portfolio of diagnostic products and services, including CT, MRI, X-ray, AI, PACS, endoscopy and ultrasound systems.

Fujifilm “One-Stop” solution partner for the Healthcare systems



Fujifilm has a wide range of products including diagnostic X-ray imaging equipment, ultrasound systems, endoscopy, in vitro diagnostics, CT, MRI, and by positioning medical informatics as an open platform, the company can offer a wide variety of solutions to healthcare systems.

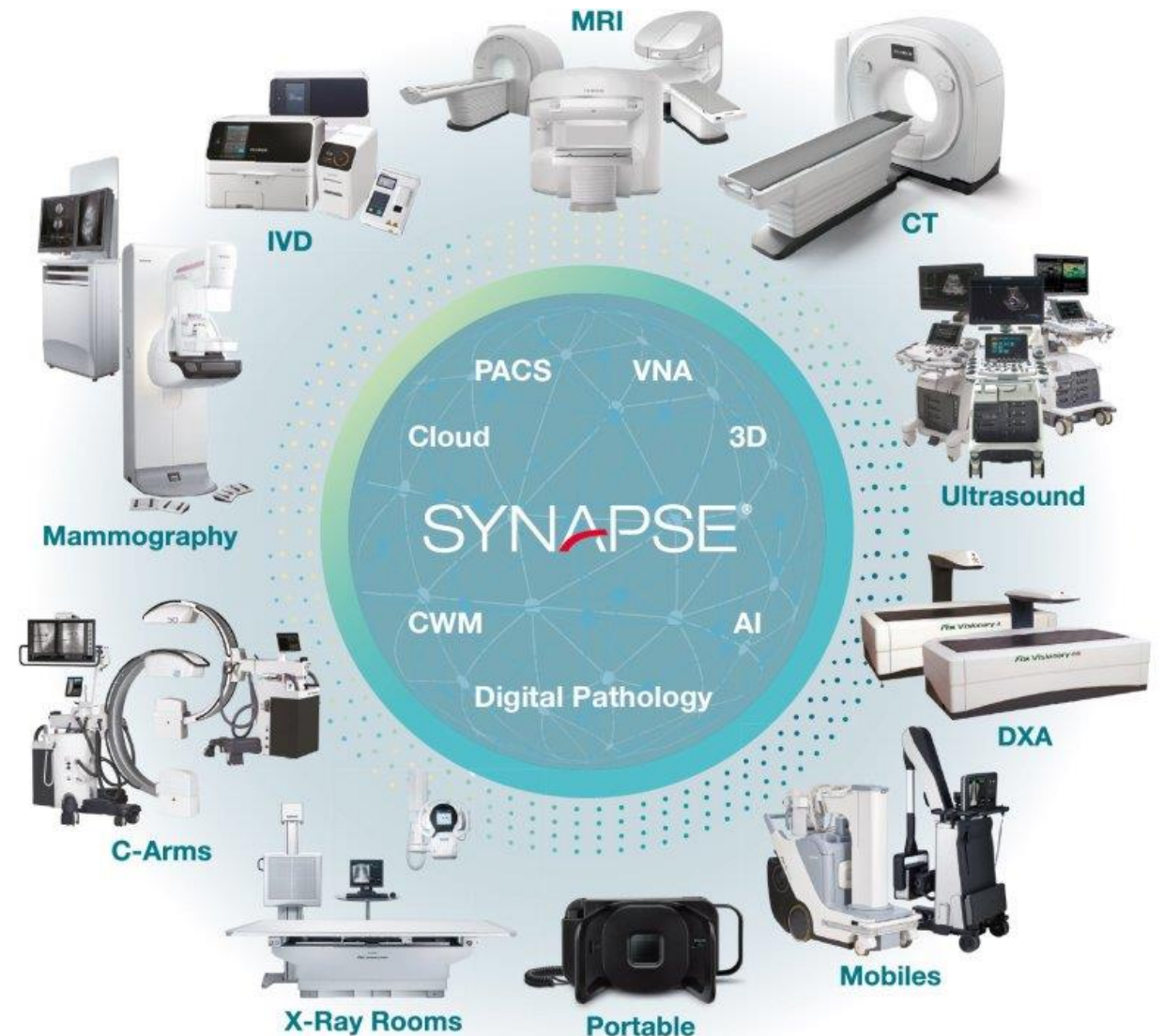


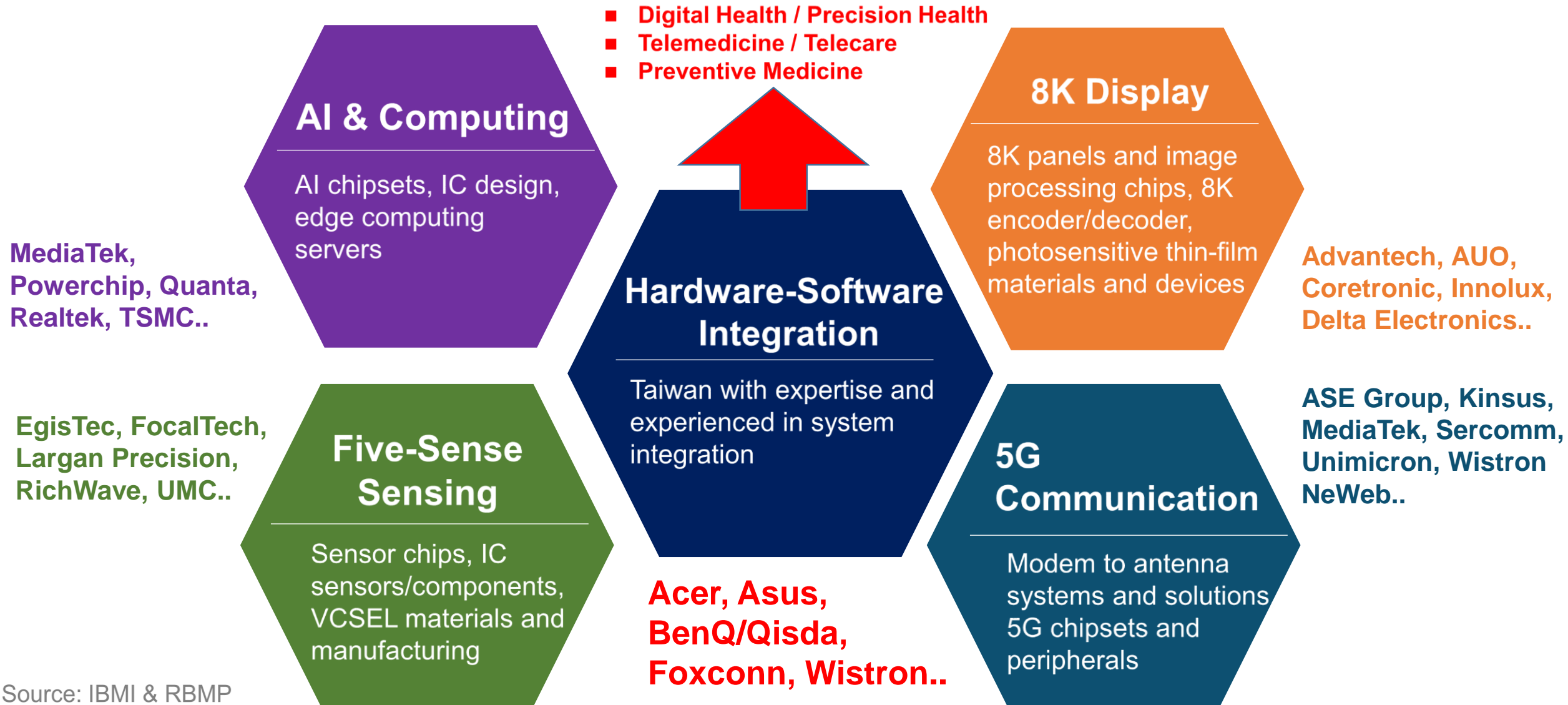
Image source: Fujifilm

Taiwan ICT companies setting foot in healthcare

| | Mobile health | Medical equipment | Smart hospital | Gene/cell therapy | Biomedicine | |
|----------------------|---|---|--|--|--|-----------------------|
| Companies | <div>acerCOMPAL</div> <div>FOXCONN</div> <div>Quanta ComputerTULhtc</div> <div>ASUSCoretronic</div> <div>LEADTEKMITAC</div> | <div>BenQ</div> <div>Qisda</div> <div>K LASER TECHNOLOGY INC.</div> <div>LRGNLITEON</div> <div>wistro5XLIX</div> <div>DELTA</div> <div>RITEK</div> | <div>wistron</div> <div>Quantia Computer</div> <div>MITAC</div> <div>BenQ</div> <div>Qisdahtc</div> <div>ADVANTECH</div> <div>iEi GROUP</div> <div>威強電集團</div> <div>英業達Inventec</div> <div>a value Technology Inc.</div> | <div>FOXCONN</div> <div>acer</div> <div>MetaTech</div> <div>COMPA</div> <div>英業達Inventec</div> <div>wistron</div> | <div>UMC</div> <div>Powerchip</div> <div>力晶科技</div> <div>MEDIA/TEK</div> <div>REALTEK</div> <div>TUL</div> <div>LEADTEK</div> | |
| Product pipelines | <div>■Telehealth</div> <div>■IoT solutions</div> <div>■Wearables</div> <div>■Health management</div> | <div>■X ray / ultrasound</div> <div>■Micro CT</div> <div>■Surgical / service robots</div> <div>■Capsule endoscopy</div> <div>■Hemodialyzer</div> <div>■Molecular pathology</div> <div>■Vital sign monitor</div> | <div>■Smart ward/operating room</div> <div>■Surgical VR</div> <div>■AI solution</div> <div>■HMS</div> <div>■EMR / EHR</div> <div>■Medical display</div> | <div>■DNA sequencer</div> <div>■DNA microarray</div> <div>■Protein & genetic testing</div> <div>■CTC system</div> <div>■Cellular therapy</div> | <div>■AI chip</div> <div>■Biochip for gene sequencing</div> <div>■RF & Wireless chip</div> <div>■Biosensor</div> <div>■Display component</div> <div>■Organic semiconductor</div> | |
| Areas of application | <div>IoT</div> | <div>5G</div> | <div>AI</div> | <div>VRAR</div> | <div>CLOUD COMPUTING</div> | <div>BLOCKCHAIN</div> |

Taiwan Industry Overview





Market Players and Focus Areas



Source: IBMI & RBMP

Taiwan Industry Overview

Digital Health R&D

| | Prevention & Detection | Monitoring | Diagnostics | Health Tech & Services |
|-------------|--|--|---|--|
| Company |  |  |  |  |
| Focus Areas | <ul style="list-style-type: none"> • MRI-based tumour image classification • Breast cancer recurrence risk assessment • Tumour metastasis and recurrence assessment • Early prediction of dementia • AI-assisted risk assessment of dementia • Analytical services for health risk • Auto-analysis of cardiovascular imaging system | <ul style="list-style-type: none"> • Chronic disease care platform • AI-assisted vital sign monitoring • AI-assisted dermatological disease monitoring • EKG software • AI in medication and wound care • Cloud-based health platform • Stress EEG assessment • Health promotion • Real-time heart rate monitoring • Mobile health application | <ul style="list-style-type: none"> • AI-based diagnostics for diabetic retinopathy • AI endoscopy lesion detection system • Metastatic brain cancer/acoustic neuroma diagnosis • Portable 12-lead ECG/EKG analysis • Non-invasive, AI-based thyroid neoplasm detection • AI-powered stethoscope • Detection software for breast ultrasound • AI-based detection of pneumothorax and Intracerebral hemorrhage • AI-based bone marrow smear differential counting • AI-based diagnostics of osteoporosis • AI-based flow cytometry analysis for leukemia • AI-assisted EEG analysis for mental health | <ul style="list-style-type: none"> • Decision support platform for antibiotic therapy • Decision support for hemodialysis • AI platform for remote critical care • Mental health platform • Sleep telecare • Therapeutic neuromodulation on-chip • AI-driven radiotherapy • Immersive 3D software for sleep disorders • Digital therapeutics for dementia • AI-based hearing aids • IoT in elderly care |

Cross-industry cooperation at a glance



- 1) AI medical platform
- 2) Telemedicine / remote care
- 3) AI-assisted arrhythmia diagnosis
- 4) AIoT device/equipment



- 1) Genome database for Chinese
- 2) Medical wearables
- 3) Epidemic management products
- 4) Proton therapy / 8K medical imaging



- 1) Innovative devices / AI diagnostics
- 2) Health & chronic disease management
- 3) Medical imaging for animals
- 4) Cell therapy / AIoT solutions



- 1) Miniaturization of medical equipment
- 2) Exoskeleton / assistive devices
- 3) AI dialysis / medical AI imaging
- 4) Digital pathology / health management



- 1) Telehealth / IoT products
- 2) Auto detection of CTC
- 3) Data integration of sports health
- 4) AI-assisted detection of disease

Big Data Analysis on Genetics

Cancer MoonShot 2020 Project



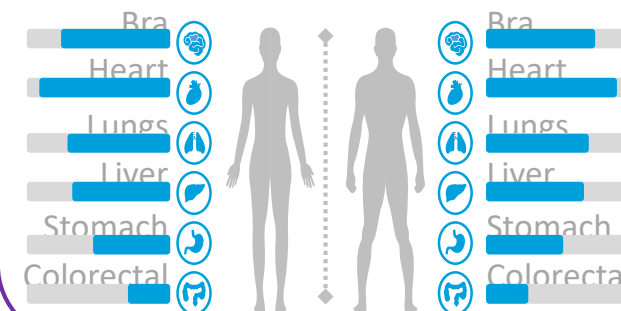
Chinese Genome Database

Cell Therapy

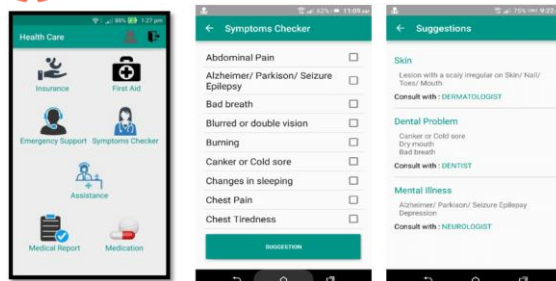


台大醫院
National Taiwan University Hospital

Precision Medicine



Healthcare Management



(a)

(b)

(c)

Molecular Detection



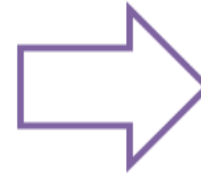
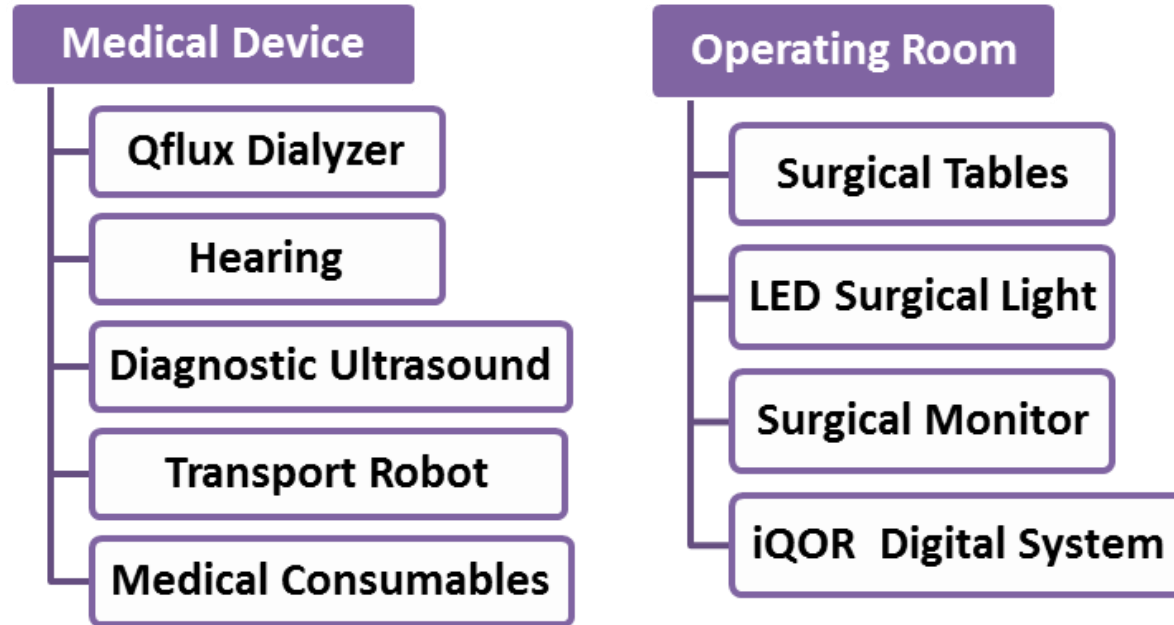
BioChip



睿軒檢驗科技
Rapidsure Tech

Food Science

Featured Products



Solutions

Smart Operation Room



ODM / OEM of
Medical Device

Other Smart Healthcare Solutions

Fitness System

Smart Wearables

Smart Ward

Health Management System

Long-Term Care Monitoring Solution

Taiwan Industry Overview

Successful Solutions

Acer



VeriSee DR

- The AI-powered software is designed to detect diabetic retinopathy (DR) by analysing retinal images.
- Approved in Taiwan, Thailand and Indonesia, VeriSee DR requires no internet connection, can be customised and seamlessly integrated into clinical workflow.

TeleMed for Home Care & Point of Care

- The solution provides a non-contact outpatient service which simulates the workflow in clinical practice for patients and clinicians.
- It is intended to improve efficiency and quality of telecare/remote care/long-term care and enhance the pandemic prevention measures.



Taiwan Industry Overview

Successful Solutions

Asus

全球首創 MRI腫瘤分類及乳癌復發預測系統




- 非侵入式
免除切片 0痛苦
- 節省93%檢驗時程
即早治療
- 精準腫瘤分類
輔助醫生治療規劃
- 乳癌復發風險預測
低風險患者免化療之苦

MRI Tumour Classification and **Breast Cancer** Reoccurrence Prediction System

The software analyses 3D images during a screening breast MRI, assisting radiologists recognise the location of tumours, classify them as well as evaluating recurrence risk with PAM50 (Prediction analysis of microarray 50).

EndoAim AI Endoscopy Lesion Detection System

The software is intended to assist clinicians to analyse polyps during a colonoscopy and classify them into non-adenoma or adenoma.

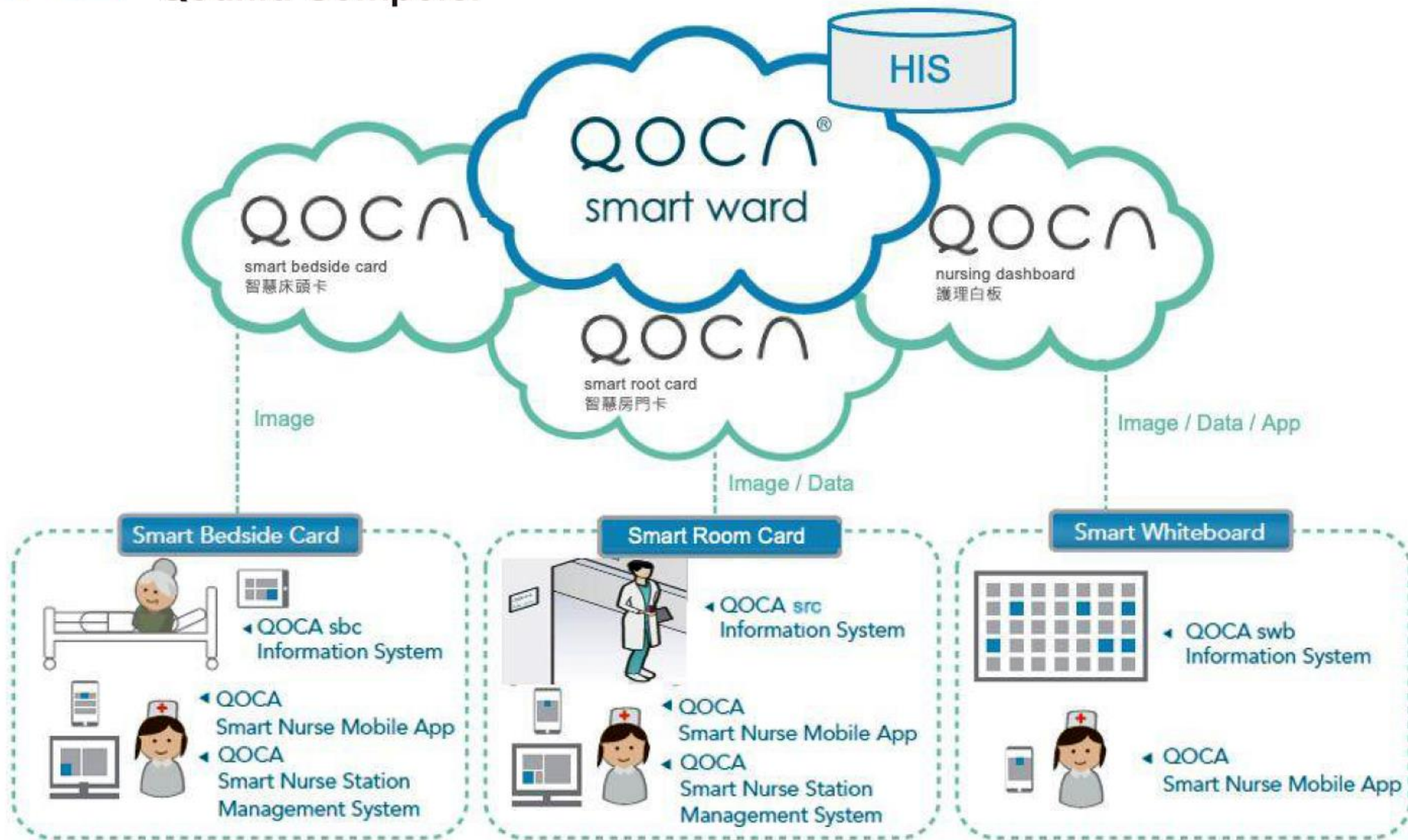


- 即時警示
病灶不遺漏
- 超過90%精準度
降低誤判
- 即時息肉分類
提供診斷參考



廣達電腦
Quanta Computer

QOCN®



Smart Ward: Bedside Infotainment System

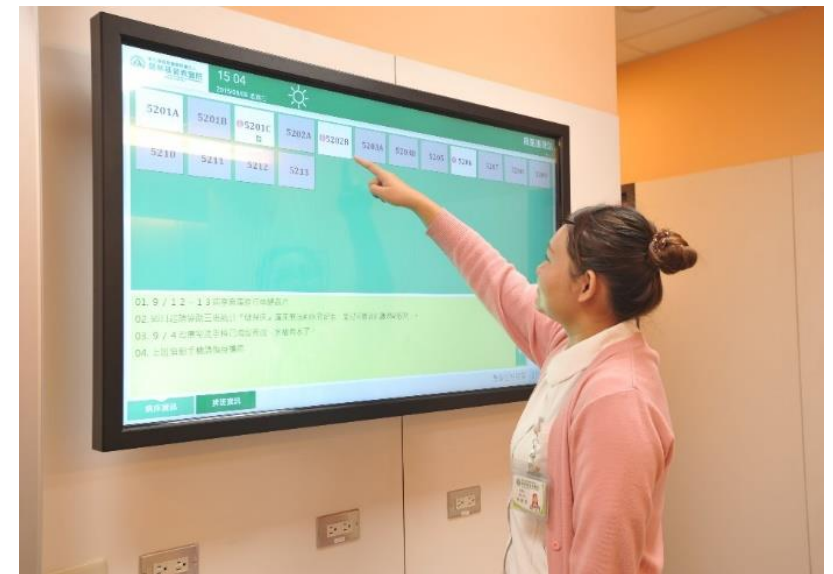
- ◆ Interactive environment
- ◆ Disclosure real-time information
- ◆ Treatment schedule



Smart Nurse Station: Nurse Dashboard

Improvement Nurse Care Quality and Work Flow

- Nurse dash board (No paper works)
- Real time patient information (location, activity, schedule)
- Real time nursing shifting
- Central nurse control panel
- Schedule, Work Flow, and Education



After seeing all these successful solutions...

Taiwan hospitals are expanding their productivity to be the solution providers.



彰化基督教醫院
CHANGHUA CHRISTIAN HOSPITAL



員林基督教醫院
Yuanlin Christian Hospital



U.S. Green Building Council
LEED Gold Level Certification on
Dec, 2015



ICT Players launch products and solutions:

- ◆ Smart Nurse Station
- ◆ Smart Ward
- ◆ Smart Clinic
- ◆ Smart Counter
- ◆ Smart Dialysis
- ◆ Smart Operation Room
- ◆ Multimedia interaction
- ◆ Accompany robot
- ◆ Logistics Management

⋮

International Promotion Strategy



**Taiwan-India Medical Cooperation Forum
in Bangalore, India**



**Medical industry collaboration
between Thailand and Taiwan**



**Visiting the CEO of Malaysia
Private Hospital Association**

Singapore :

The top-ranked countries in *Regulatory quality* are Singapore, Australia, Canada, Finland, Hong Kong, New Zealand, and the United Kingdom. Source data from *Scientific American Worldview* (<http://www.saworldview.com>)



**Medtech Connect in
Singapore, 2019-05-23**



SGInnovate interview: <https://youtu.be/3ktQSyfe7n0>



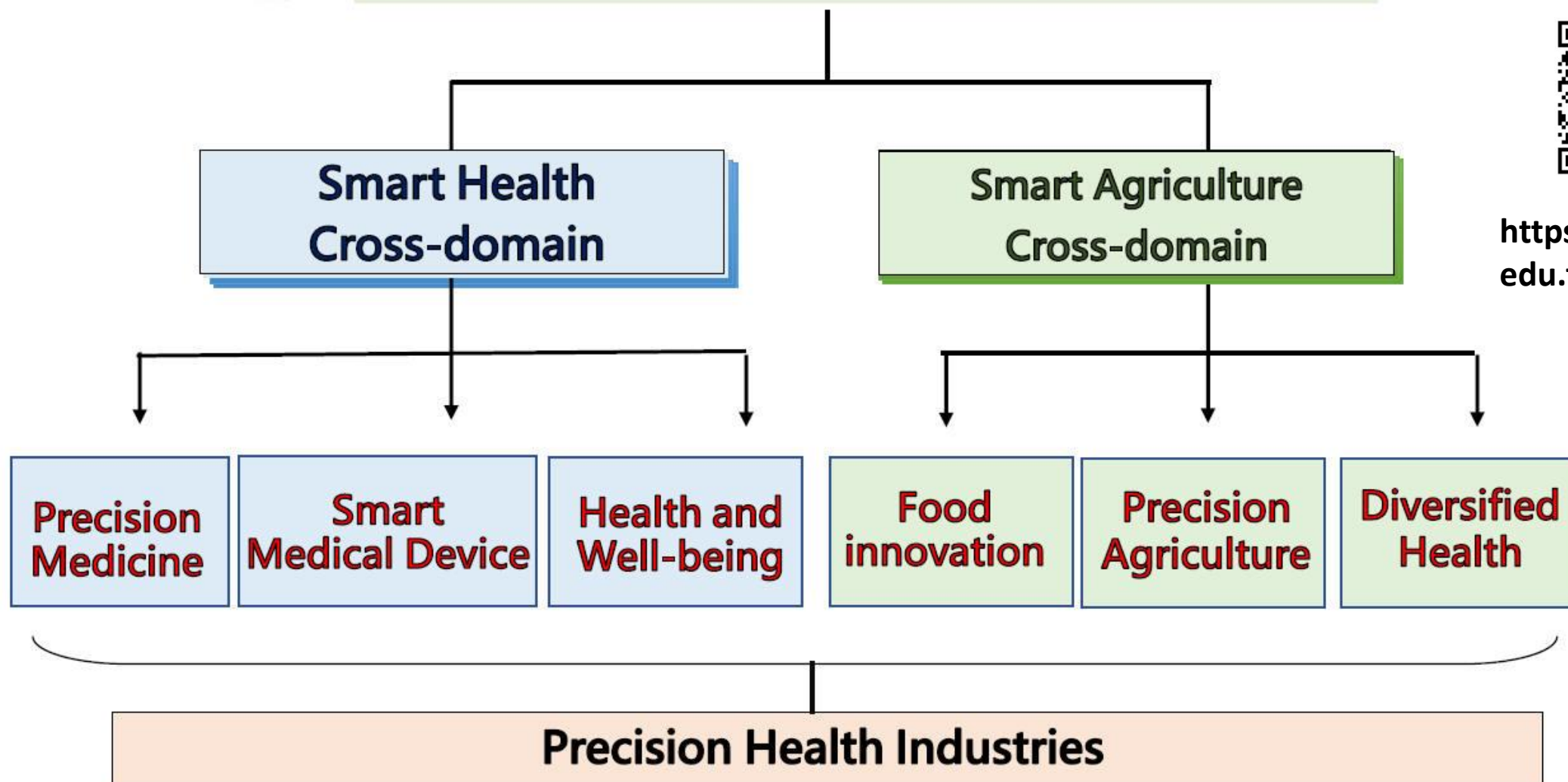
精準健康產業跨領域人才培育計畫

Training Program for Interdisciplinary Talents of Precision Health

2022-2025



<https://homepage.ntu.edu.tw/~tpitph/>



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2-5 December 2021, Taipei

台灣醫療AI科技特展

Inno Zone



28% 醫療健康相關服務
16% 貿易及投資
15% 數位科技/資通訊
15% 醫用設備及儀器
14% 學術及研究
12% 生命科學及其他

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The 2022 Taiwan Healthcare Expo brings together more than 20 medical centers and 300 biotechnology companies to jointly exhibit, fully presenting new medical technologies, new applications, and new trends at home and abroad. It has become an important platform for driving medical technology innovation, and provided one of the best Healthcare training courses in Asia.



Welcome to Taiwan



Thank you for your attention