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FIRST PLENARY: Transforming Healthcare and Leveraging Digital Health for Better Health in Asia Pacific

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MONASH University RACMA MonashHealth

Medicine, Nursing and Health Sciences

Digital Health in Asia Pacific
Revolution or Evolution

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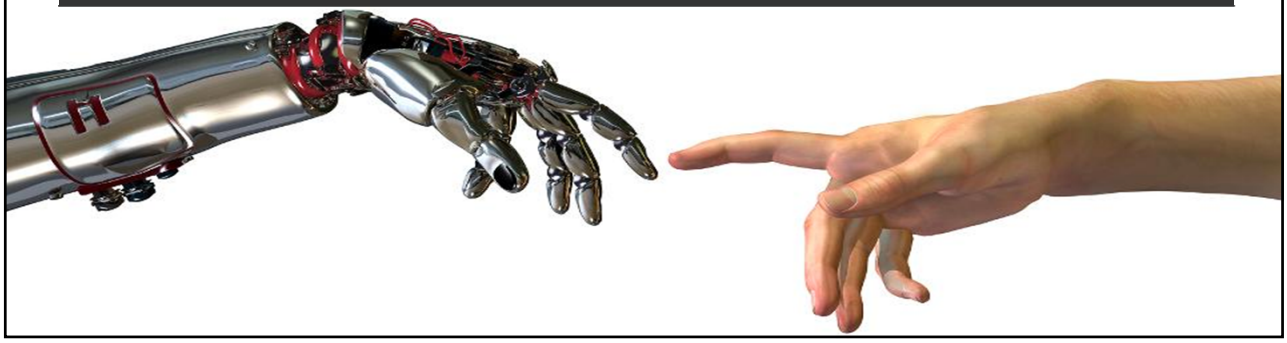
9 September 2018



World's most liveable city: Melbourne takes top spot for seventh year running

By Stephanie Chalkley-Rhoden

Updated 16 Aug 2017, 4:07pm

Melbourne has once again been named the world's most liveable city by The Economist, receiving a perfect score for healthcare, education and infrastructure.

Top five most liveable cities:

1. Melbourne
2. Vienna
3. Vancouver
4. Toronto
5. Adelaide, Calgary

30%

1.31m

8 hospitals

17,000

45 sites

$1.8b

2200 beds

HOSPITALS

MONASH HEALTH COMMUNITY

MELBOURNE CBD

Monash Medical Centre Moorabbin

Monash Medical Centre Clayton

Kingston Centre

Springvale

Dandenong Hospital

Dandenong

Doveton

Cockatoo

Berwick

Casey Hospital

Pakenham

Cranbourne

Cranbourne Centre

Our sites

We provide quality public health care in our community from over 40 care locations across south eastern Melbourne, including major tertiary and secondary hospitals, aged residential care centres and an extensive network of rehabilitation, community health and mental health facilities.

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7 November 2016

Medical futurology – the changing role of doctors

Authored by
ERWIN LOH

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The Quarterly
The Royal Australasian College of Medical Administrators

"Medical Administrat... medical and clinical kno... registered medical prac... the health and safet...

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The Future of Medicine

"Declare the past. Diagnose the present. Foretell the future." - Hipp...

Declare the Past:

The role of the doctor is a constantly evolving one. To know where i... come from. Much has been written about the history of medicine, which goes back thousands of years, as part of ancient Babylon, China, India, Egypt and Greece. For example, the Hippocratic Oath, which is still relevant today in its modernised version, was developed in 5th century BCE Greece.

Doctors were only systematically trained as a profession in 12th century AD in Europe at the beginning of the Renaissance, with the discovery of anatomy and microscopes. The Age of Enlightenment and the Industrial Revolution in the early 19th century led to the germ theory of disease being confirmed and the birth of public health medicine.

Consider that antibiotics were only discovered in the mid-20th century, and modern medical technologies we take for granted such as diagnostic imaging platforms, laboratory equipment, and computers were only invented in our own lifetimes, medicine has come a long way. The role of the doctor has evolved together with the tools of the trade. However, technology in medicine is developing at an exponential rate, and the speed at which this is happening is accelerating - medicine will advance more in the next 10 years than it did in the last 100 (1).

Review

OPEN ACCESS

Medicine and the rise of the robots: a qualitative review of recent advances of artificial intelligence in health

Erwin Loh

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1 June 2018

ABSTRACT
Artificial intelligence (AI) has the potential to significantly transform the role of the doctor and revolutionise the practice of medicine. This qualitative review paper summarises the past 12 months of health research in AI, across different medical specialties, and discusses the current strengths as well as challenges, relating to this emerging technology. Doctors, especially those in leadership roles, need to be aware of how quickly AI is advancing in health, so that they are ready to lead the change required for its adoption by the health system. Key points: 'AI has now been shown to be as effective as humans in the diagnosis of various medical conditions, and in some cases, more effective.' When it comes to predicting suicide attempts, recent research suggest AI is better than human beings. 'AI's current strength is in its ability to learn from a large dataset and recognise patterns that can be used to diagnose conditions, putting it in direct competition with medical specialties that are involved in diagnostic tests that involve pattern recognition, such as pathology and radiology'. The current challenges in AI include legal liability and attribution of negligence when errors occur, and the ethical issues relating to patient choices. 'AI systems can also be developed with, or learn, biases, that will need to be identified and mitigated'. As doctors and health leaders, we need to start preparing the profession to be supported by, partnered with, and, in future, potentially be replaced by, AI and advanced robotics systems.

Prof Erwin Loh

in a local labour market coincides with an employment drop of 5.6 workers.[2] Last year alone, there have been news reports of apple-picking robots,[3] burger-flipping robots[4] and a barista robot that makes you coffee.[5] *Nature* even ran an editorial on sex robots.[6]

There is a false sense of security in assuming that automation will only impact blue-collar type work that requires more manual, repetitive actions and less intellectual input. PwC released a report based on a survey of 2500 US consumers and business leaders, which predicts that AI will continue to make in-roads into white collar industries.[7] A large stockbroking firm ran a trial in Europe of its new AI program this year that showed it was much more efficient than traditional methods of buying and selling shares.[8] A Japanese insurance firm replaced 34 employees with an AI system, which it believes will increase productivity by 30% and see a return on its investment in less than 2 years.[9] The *Washington Post* used an AI reporter to publish 850 articles in the past year.[10]

Not even the jobs of computer programmers, the creators of the code for AI, are safe. Microsoft and Cambridge built an AI capable of writing code that would solve simple math problems.[11] Lawyers are not exempt either. Late last year, an AI was able to predict the judicial decisions of the European Court of Human Rights with 79% accuracy.[12]

Compared with other industries like hospitality

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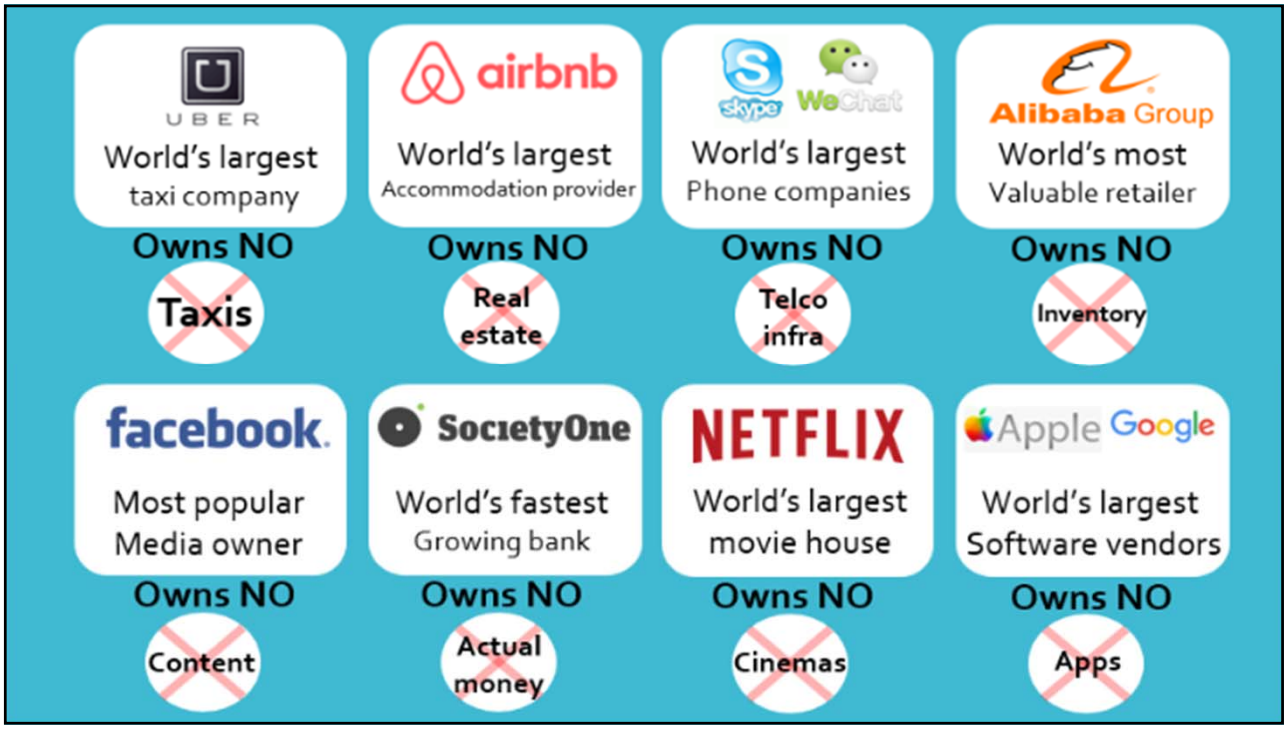
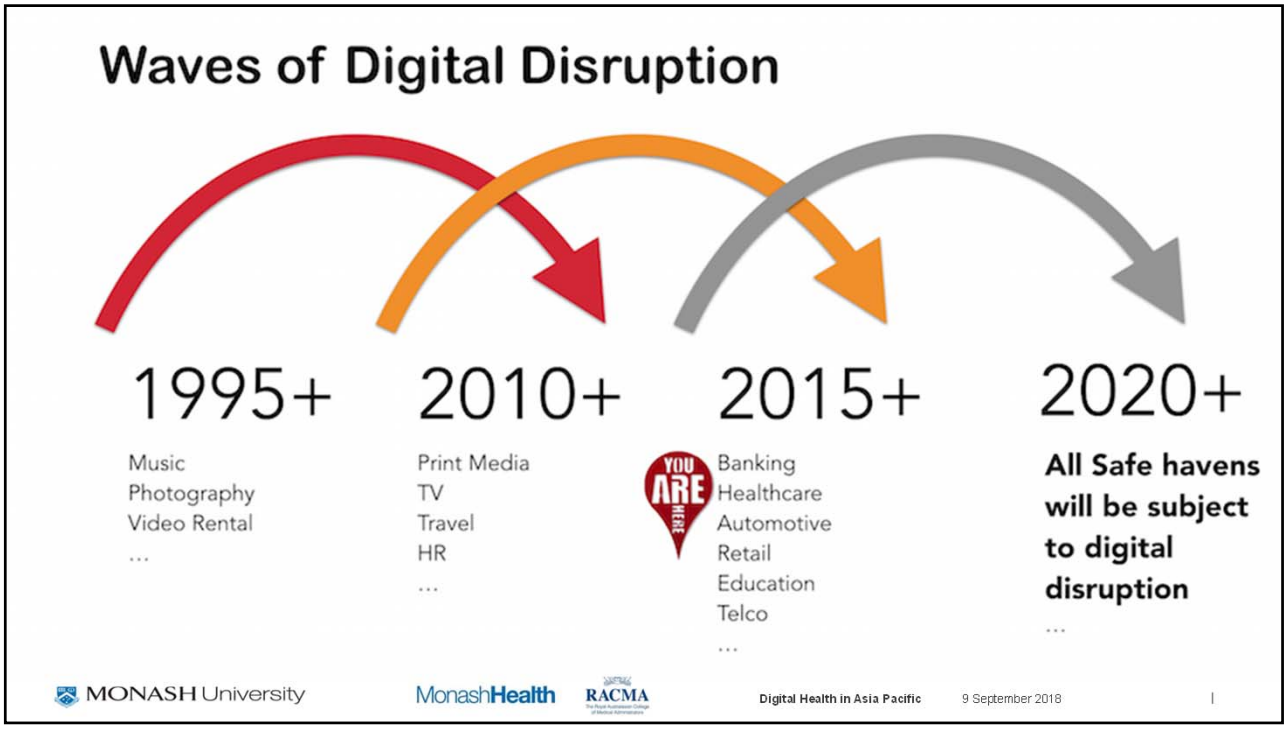

UBER
World's largest taxi company
Owns NO
Taxis
airbnb
World's largest Accommodation provider
Owns NO
Real estate
skype
WeChat
World's largest Phone companies
Owns NO
Telco infra
Alibaba Group
World's most Valuable retailer
Owns NO
Inventory
facebook
Most popular Media owner
Owns NO
Content
SocietyOne
World's fastest Growing bank
Owns NO
Actual money
NETFLIX
World's largest movie house
Owns NO
Cinemas
Apple Google
World's largest Software vendors
Owns NO
Apps


Waves of Digital Disruption
1995+
Music
Photography
Video Rental
…
2010+
Print Media
TV
Travel
HR
…
2015+
YOU ARE HERE
Banking
Healthcare
Automotive
Retail
Education
Telco
…
2020+
All Safe havens will be subject to digital disruption
…
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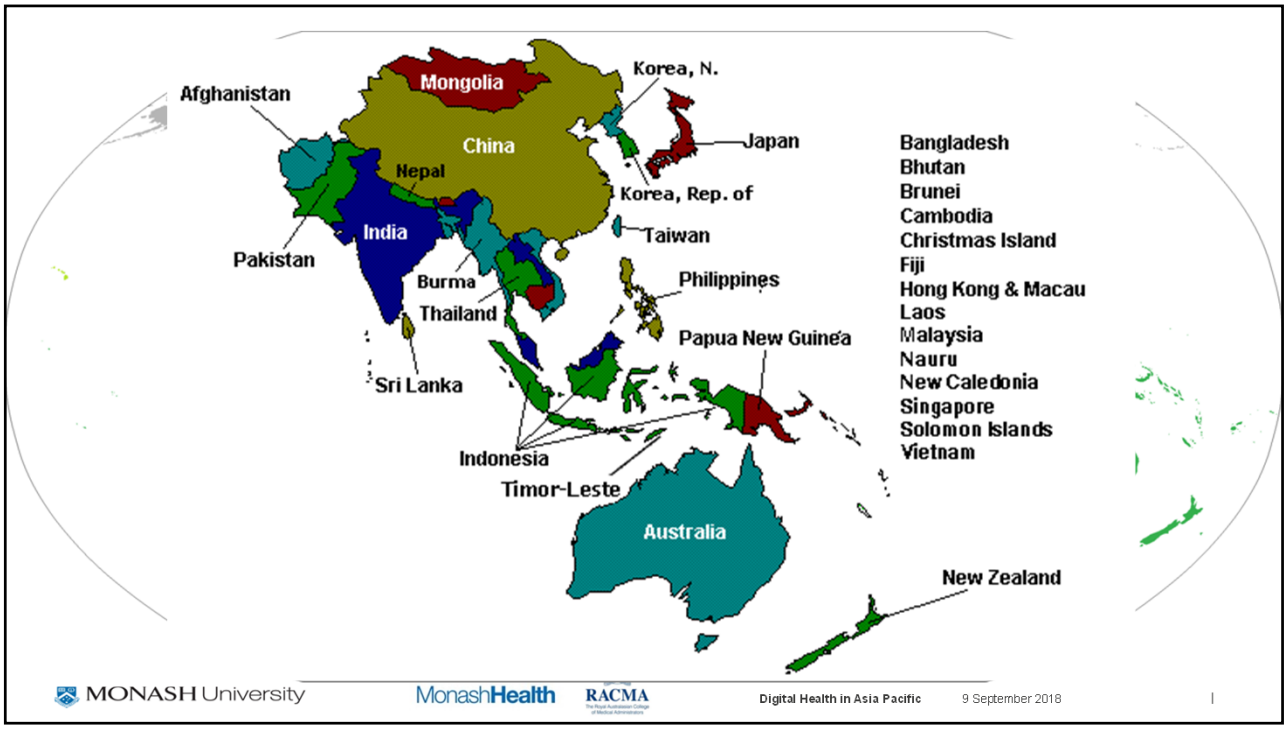
Mongolia
Korea, N.
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China
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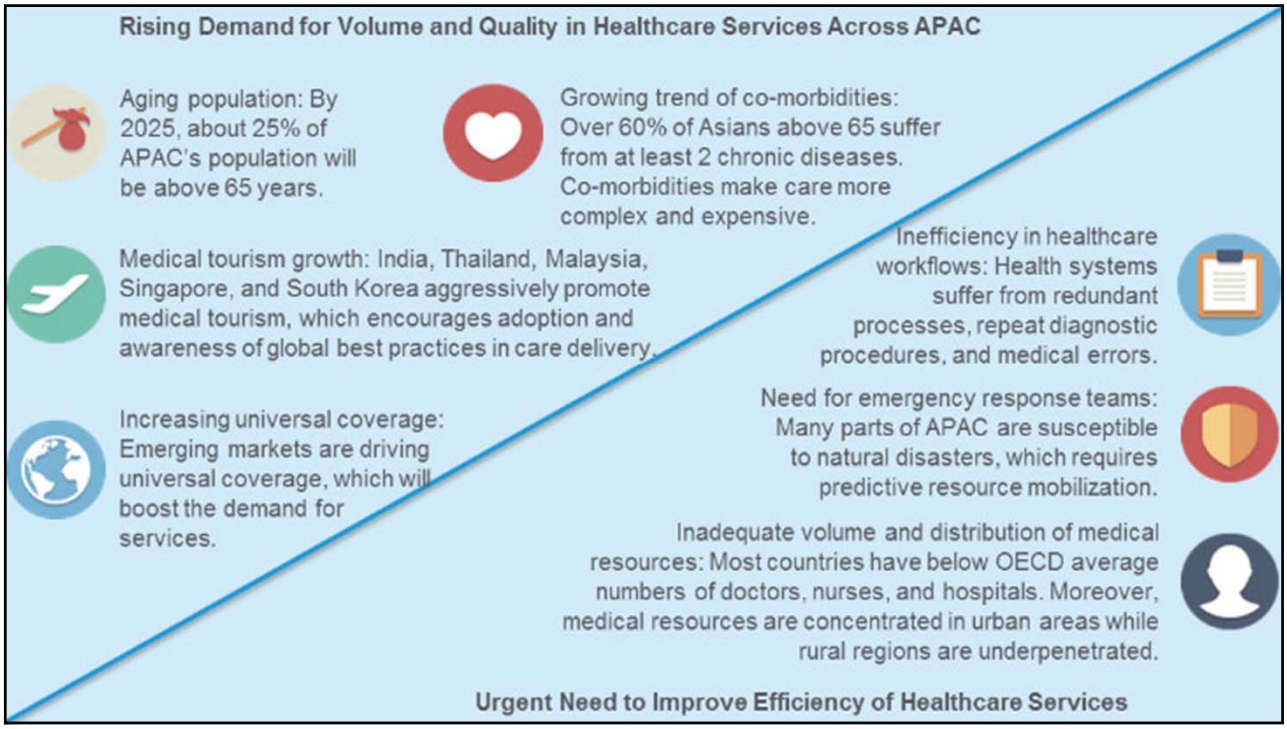
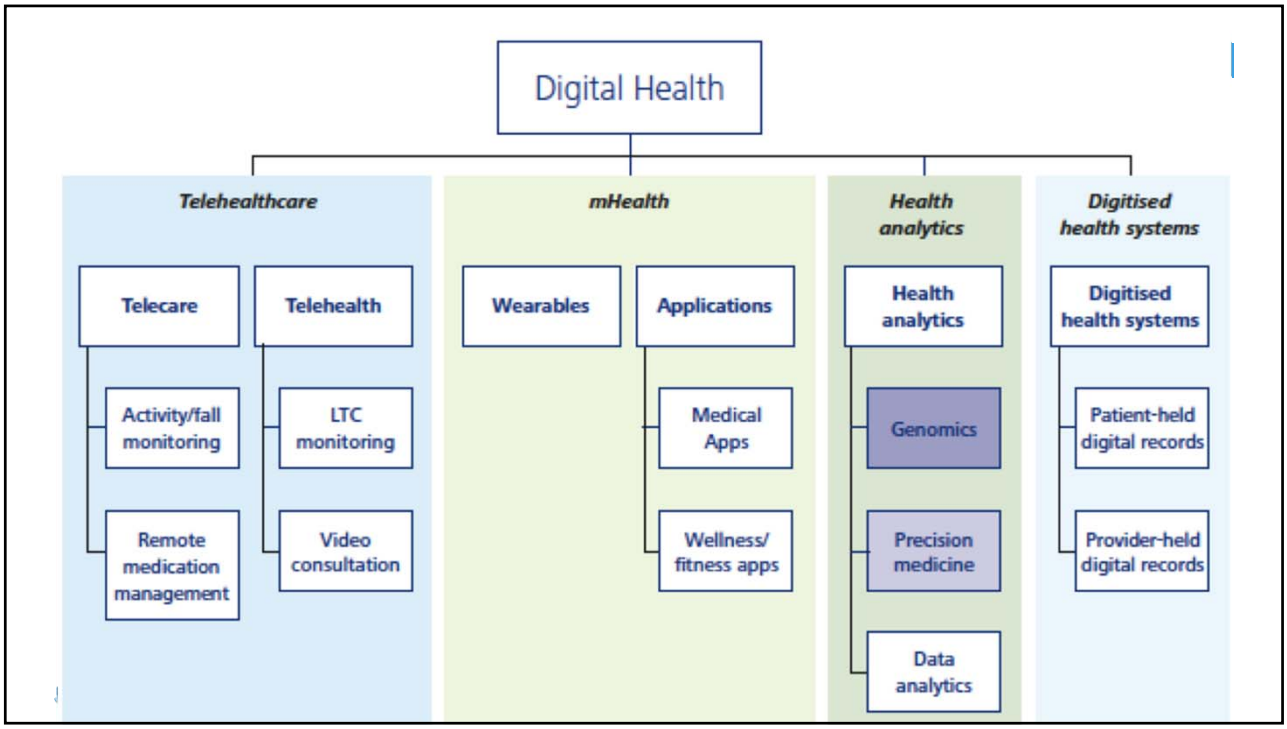
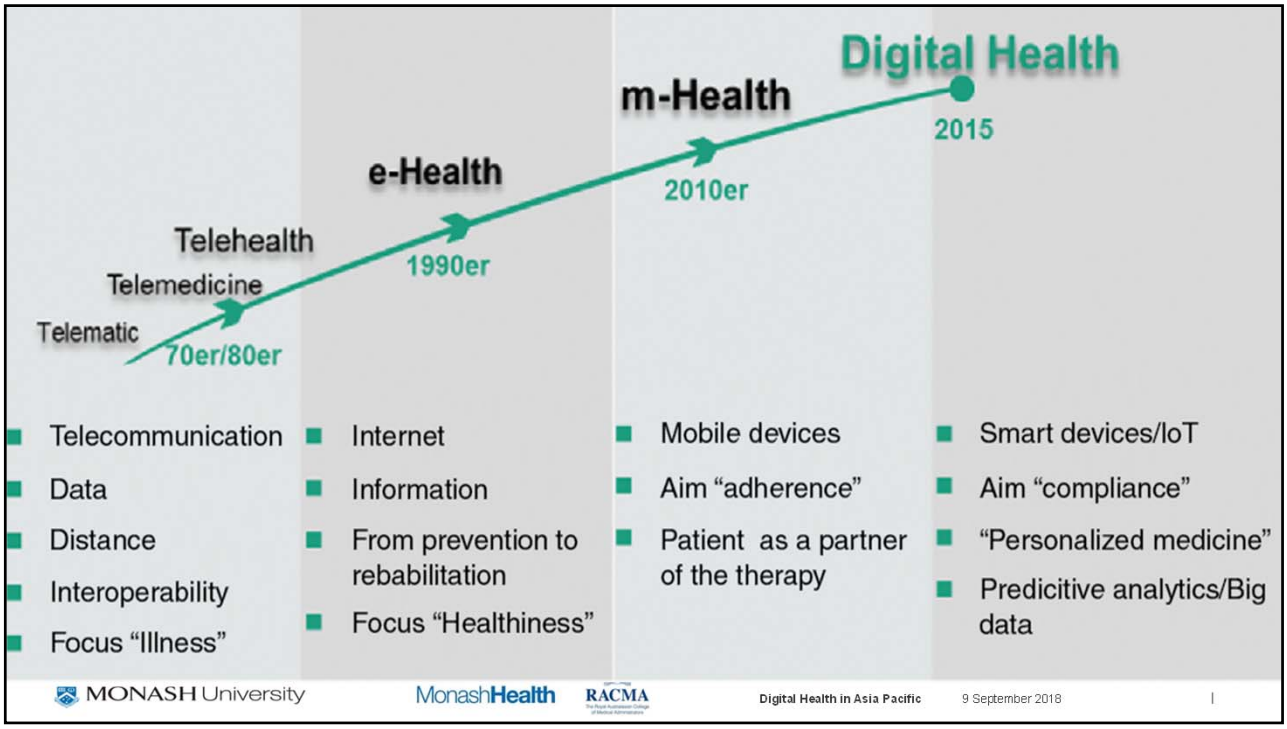

Rising Demand for Volume and Quality in Healthcare Services Across APAC
Aging population: By 2025, about 25% of APAC's population will be above 65 years.
Growing trend of co-morbidities: Over 60% of Asians above 65 suffer from at least 2 chronic diseases. Co-morbidities make care more complex and expensive.
Medical tourism growth: India, Thailand, Malaysia, Singapore, and South Korea aggressively promote medical tourism, which encourages adoption and awareness of global best practices in care delivery.
Inefficiency in healthcare workflows: Health systems suffer from redundant processes, repeat diagnostic procedures, and medical errors.
Increasing universal coverage: Emerging markets are driving universal coverage, which will boost the demand for services.
Need for emergency response teams: Many parts of APAC are susceptible to natural disasters, which requires predictive resource mobilization.
Inadequate volume and distribution of medical resources: Most countries have below OECD average numbers of doctors, nurses, and hospitals. Moreover, medical resources are concentrated in urban areas while rural regions are underpenetrated.
Urgent Need to Improve Efficiency of Healthcare Services


Digital Health
Telehealthcare
mHealth
Health analytics
Digitised health systems
Telecare
Telehealth
Wearables
Applications
Health analytics
Digitised health systems
Activity/fall monitoring
LTC monitoring
Medical Apps
Genomics
Patient-held digital records
Remote medication management
Video consultation
Wellness/ fitness apps
Precision medicine
Provider-held digital records
Data analytics


Digital Health
2015
m-Health
2010er
e-Health
1990er
Telehealth
Telemedicine
Telematic
70er/80er
Telecommunication
Data
Distance
Interoperability
Focus "Illness"
Internet
Information
From prevention to rebabilitation
Focus "Healthiness"
Mobile devices
Aim "adherence"
Patient as a partner of the therapy
Smart devices/IoT
Aim "compliance"
"Personalized medicine"
Predicitive analytics/Big data
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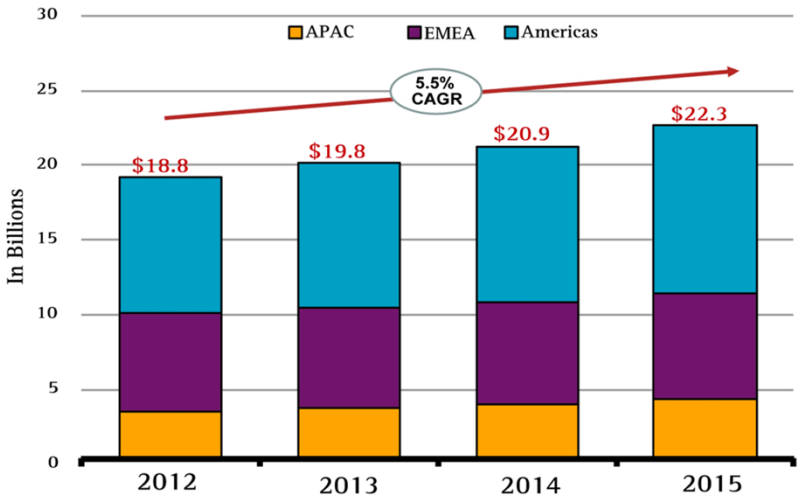
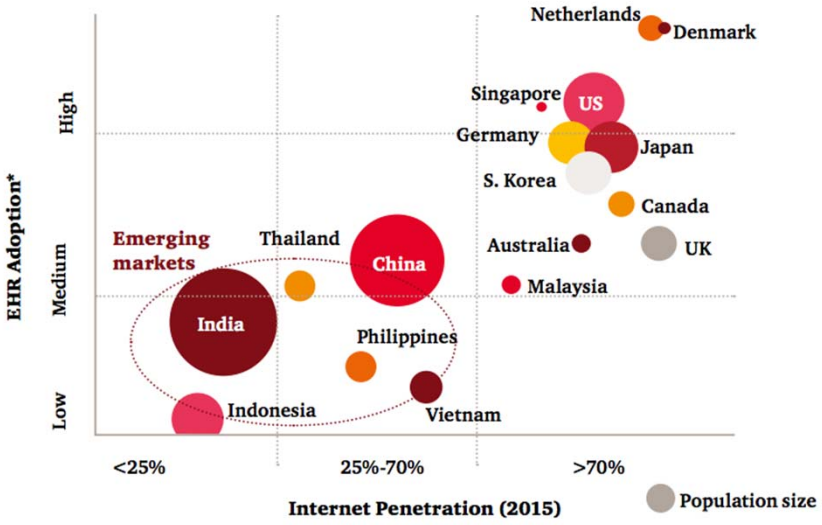
Global Forecast for Electronic Health Records (EHR)

Accenture Study Estimates EHR Market to Reach $22.3 billion by end of 2015

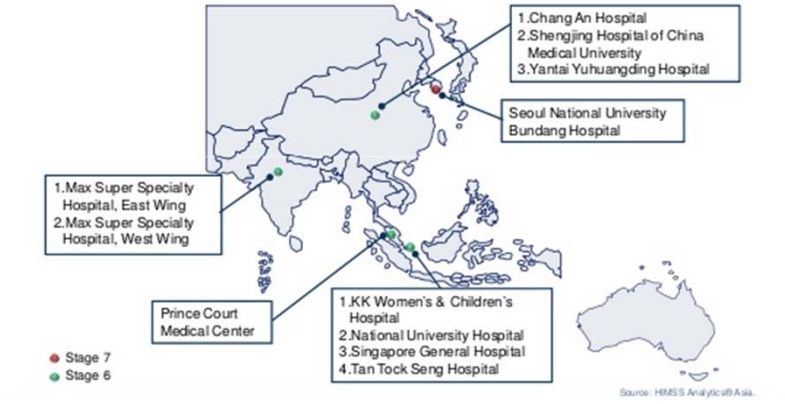




Source: Statista, HIMMS Analytics Electronic Medical Record Adoption Model, PwC Analysis

HIMSS Analytics EMRAM^{SM} Stage 6 and 7 Hospitals in APAC

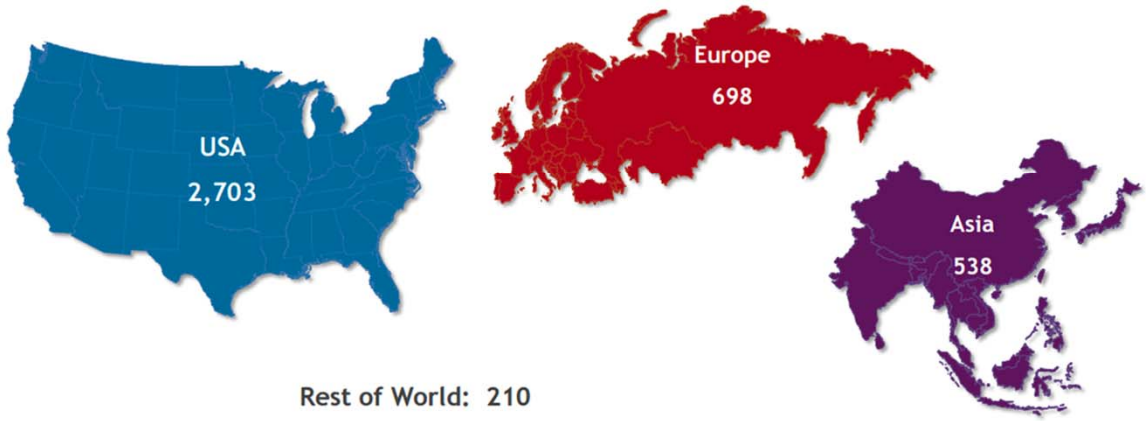
Total EMR and EHR Market: EMRAM^{SM} Stage 6 and 7 Hospitals, APAC, 2012



da Vinci System Installed Base

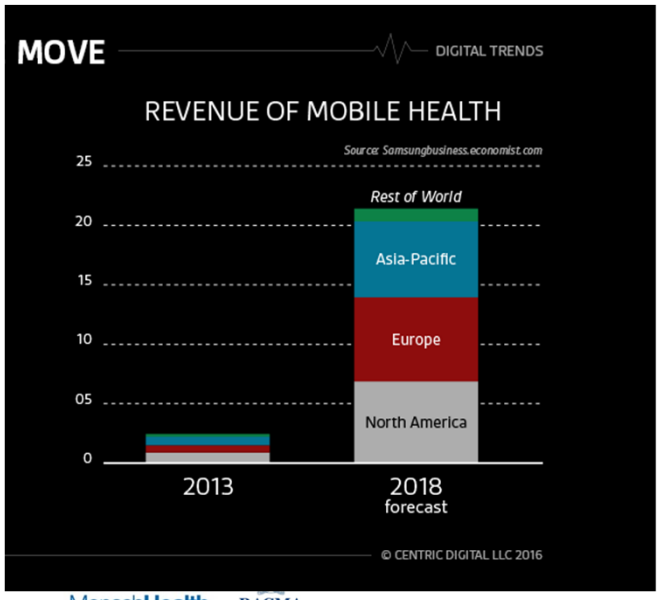
INTUITIVE SURGICAL®

4,149 Worldwide as of June 30, 2017



Rest of World: 210

Source: Company reports


MOVE
DIGITAL TRENDS
REVENUE OF MOBILE HEALTH
Source: Samsungbusiness.economist.com
25
20
15
10
05
0
Rest of World
Asia-Pacific
Europe
North America
2013
2018
forecast
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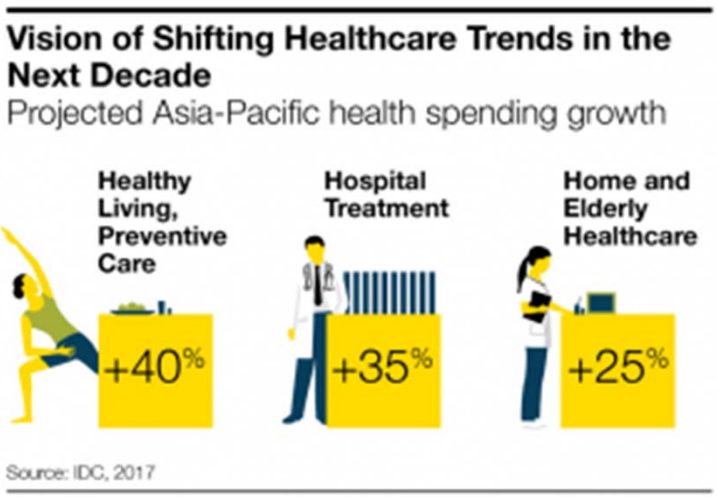
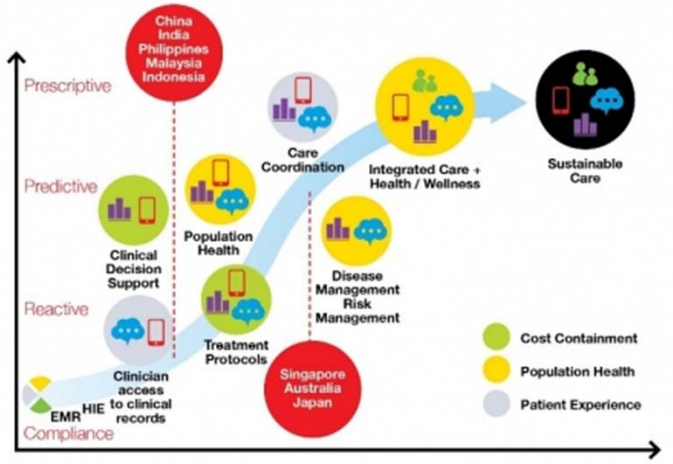

Vision of Shifting Healthcare Trends in the Next Decade
Projected Asia-Pacific health spending growth
Healthy Living, Preventive Care
+40%
Hospital Treatment
+35%
Home and Elderly Healthcare
+25%
Source: IDC, 2017

Evolution of Healthcare in Asia



Source: IDC, 2017