

**The future of Life Sciences and  
Health Care in Asia Pacific**  
Embrace, Build and Grow

Introduction	03
Trends in Asia Pacific	04
Embrace	06
Build	13
Grow	19
The way forward	26
Contact us	27

# Introduction

Given that quality, outcomes, and value are the new buzzwords for the Life Sciences and Health Care industry, stakeholders around the globe are looking for innovative, cost-effective ways to deliver patient-centric, technology-enabled solutions to patients both inside and outside hospital walls.

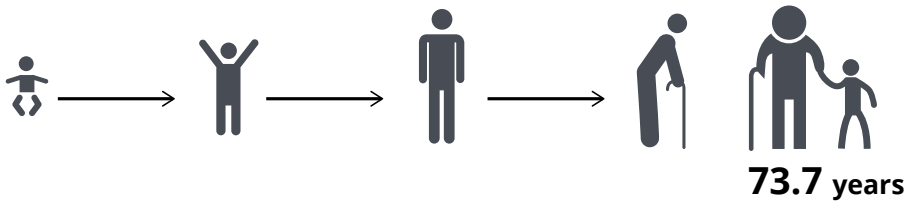
In particular, emerging technologies – such as 3D printing, artificial intelligence, and Blockchain – are creating transformative opportunities for the industry, as scientific achievements continue at their record pace. In a myriad of ways, these technologies are helping to drive change by making health care delivery less expensive, more efficient, and more accessible, while lowering costs, increasing speed, and enabling greater flexibility in the life sciences sector.

On a macro level, we see many global trends play out similarly in the Asia Pacific region. However, we must ultimately keep in mind that the region is a collection of markets with very diverse sets of demographics, regulatory environments, and disease profiles – and such disparities are often indicators that a varied array of unmet patient needs exist within the region.

In this report, we detail several imperatives that we believe forward-looking Life Sciences and Health Care companies should consider. Specifically, they should Embrace exponential changes in technology and the shift from volume to value; Build a patient-centric focus and the new currency of data; and Grow new partnerships, operating models, and the workforce of the future.

# Trends in Asia Pacific

## Demographic

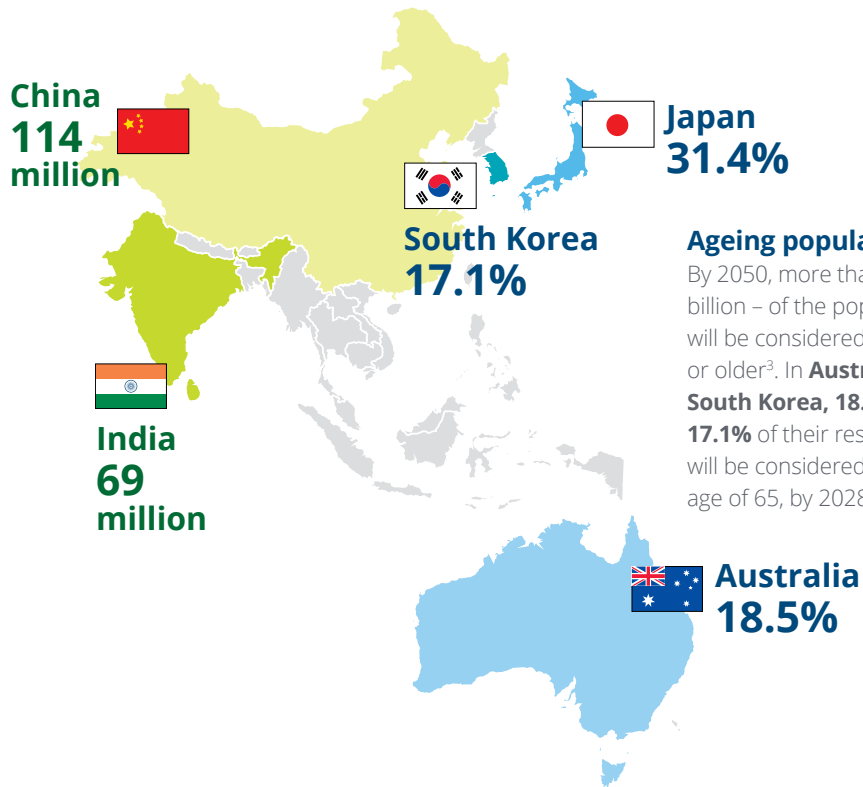


### Life expectancy

In 2015, life expectancy at birth for the region was **73.7 years** on average, a gain of about **4.6 years** since 2000<sup>1</sup>.

### Chronic diseases

As a result of rapid urbanisation, sedentary lifestyles, and rising obesity levels, chronic diseases – once the hallmark of developed markets – are no longer confined to these markets. **China** and **India** now have the largest number of diabetes sufferers in the world, at around **114 million** and **69 million**, respectively<sup>2</sup>.



### Ageing populations

By 2050, more than a quarter – or 1.3 billion – of the population in Asia Pacific will be considered elderly, or 60 years or older<sup>3</sup>. In **Australia, Japan, and South Korea, 18.5%, 31.4%, and 17.1%** of their respective populations will be considered elderly, or above the age of 65, by 2028<sup>4</sup>.

1 "Health at a Glance Asia/Pacific 2016". OECD. 2016. [https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-asia-pacific-2016/life-expectancy-at-birth\\_health\\_glance\\_ap-2016-5-en](https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-asia-pacific-2016/life-expectancy-at-birth_health_glance_ap-2016-5-en)

2 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

3 "Ageing in Asia and the Pacific". Economic and Social Commission for Asia and the Pacific. <https://mipaa.unescapsdd.org/files/documents/SDD%20Ageing%20Fact%20Sheet%20Overview.pdf>

4 Economist Intelligence Unit Data Tool.

**Economic**

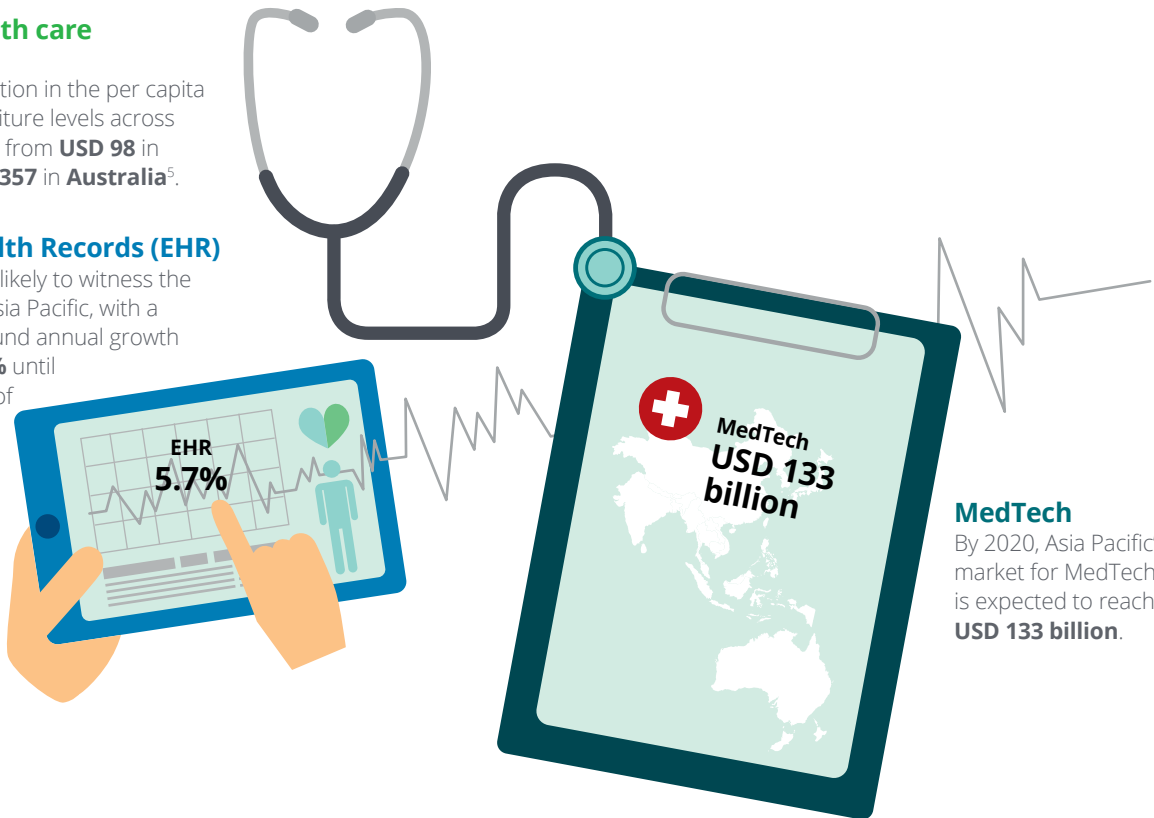
Lao PDR  **USD 98**       **Australia USD 4,357**

**Per capita health care expenditure**

There is much variation in the per capita health care expenditure levels across Asia Pacific, ranging from **USD 98** in Lao PDR to **USD 4,357** in Australia<sup>5</sup>.

**Electronic Health Records (EHR)**

The **EHR** market is likely to witness the fastest growth in Asia Pacific, with a forecasted compound annual growth rate (CAGR) of **5.7%** until 2023, on the back of aggressive investments by governments, non-profit organisations and the private sector<sup>6</sup>.



**MedTech**  
By 2020, Asia Pacific's market for MedTech is expected to reach **USD 133 billion**.

5 "Health at a Glance Asia/Pacific 2016". OECD. 2016. [https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-asia-pacific-2016/life-expectancy-at-birth\\_health\\_glance\\_ap-2016-5-en](https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-asia-pacific-2016/life-expectancy-at-birth_health_glance_ap-2016-5-en)

6 "Global electronic health record market is projected to attain a size of \$30.4 billion by 2023". PR Newswire. 11 October 2018. <https://www.prnewswire.com/news-releases/global-electronic-health-record-market-is-projected-to-attain-a-size-of-30-4-billion-by-2023--300729892.html>

# Embrace



## Exponential changes in technology

We are currently in an era of exponential change – a fourth industrial revolution. One of the implications of this trend on health care is its increasing digitisation, which would enable better management of population health data, and improve patient engagement, product development and other commercial activities.

Across Asia Pacific, local governments are prioritising information and communications technology development as one of their key national reforms. Earlier in 2017, for instance, the Chinese government issued its 13th Five-year Plan on Science, Technology and Innovation detailing plans to develop technologies for precision medicine, establish a multilevel knowledge database, and create a national platform to capture and store biomedical big data<sup>7</sup>.

Overall, we witness life sciences and pharmaceutical companies in the region leveraging the following exponential technologies in a bid to cope with pressures from patent cliffs and escalating costs:

- **3D printing:** With 3D printing comes the promise of a greater opportunity to customise patient treatment. In biologics, 3D printing is being explored as a new way of manufacturing cell and tissue products. Drugs and disease models, for instance, can be tested on 3D-printed tissue instead of on animals or humans. When used in combination with nanotechnology, it can also be applied at a molecular level: for instance, customised white blood cells can be designed to hunt down and attack cancer cells. While the potential of emerging technologies, such as 3D printing, is well-recognised, regulations on these technologies remain nascent at this point in time, even in more developed markets within the region, such as Australia (see Case Study 1 and 2).
- **Artificial intelligence (AI):** AI algorithms can analyse large data sets from clinical trials, health records, genetic profiles, and pre-clinical studies. Patterns and trends within this data can help develop hypotheses at a much faster rate than researchers alone, and deliver new insights quickly. In Asia Pacific, a growing number of biopharma companies are using AI to streamline the drug discovery process, but its applications can also be found in other areas such as diagnostics (see Case Study 3 and 4).

<sup>7</sup> "Precision medicine and cancer immunology in China". Science/AAAS Custom Publishing Office. 2 February 2018. [http://www.sciencemag.org/sites/default/files/GiantCRO\\_supplement.pdf](http://www.sciencemag.org/sites/default/files/GiantCRO_supplement.pdf)

- **Blockchain:** Blockchain, a shared, immutable record of peer-to-peer transactions built from linked transaction blocks stored on a digital transaction, enables each patient data source to act as a “block” of a complete, unalterable patient data profile that can then be shared securely with health care providers or other research organisations. Pharma companies can also use Blockchain to record irrefutable evidence on the performance of a medicine and demonstrate adherence to a prescribed regimen. Other use cases of Blockchain include smart contracts and evidence sharing between regulators and collaborators during the research and development (R&D) process. Indeed, the evidence in Asia Pacific shows that Blockchain’s true potential likely lies in its ability to facilitate collaborations between different companies or even industries by enabling them to share digital assets with one another (Case Study 5 and 6).
- **Gene therapy:** Gene therapy offers the potential for customised, targeted patient treatment, such as new CAR-T therapies (see Case Study 7). While the adoption of these therapies remain low, insights from human genetics and precision medicine are already transforming health care through innovative biotechnology. Given that approximately 80% of rare diseases have a genetic origin<sup>8</sup>, gene therapy is expected to continue to play a significant role in the treatment of rare diseases. Several approaches are also being explored in Asia Pacific for the treatment of orphan diseases (see Case Study 8), such as the replacement of defective genes with healthy ones, or the inactivation of a mutant gene (see Case Study 9).



### Case Study 1

#### Australia puts in place reforms regulation for emerging technologies

In addition to its pharmacovigilance initiative, Australia’s Therapeutic Goods Administration (TGA) is planning to put forward regulatory amendments for emerging technologies, covering technological innovations such as health applications, diagnostic AI systems and the 3D printing of body parts<sup>9</sup>.

According to the TGA, while such scientific developments continue to bring opportunities for Australians, they also require a regulatory framework that is “contemporary, adaptable, and supports innovation”. The TGA has also said that it will continue to implement regulatory reforms, including those recommended by the Expert Panel Review of Medicines and Medical Devices Regulation, and propose amendments for the medical application of 3D printing while being cognisant of international harmonisation<sup>10</sup>.



### Case Study 2

#### Singapore rises as key player in medical manufacturing

In Singapore, the government has launched several key technology initiatives with direct impacts on the medical manufacturing sector. These include programmes on 3D printing, robotics, and industrial applications of the Internet of Things (IoT), to name a few. Under the Research, Innovation and Enterprise plan, for instance, SGD 3.2 billion has been allocated to advanced manufacturing and engineering research through 2020<sup>11</sup>. Earlier in July 2017, the National University of Singapore Centre for Additive Manufacturing was also launched to help develop additive manufacturing, or 3D printing, technologies for the biomedical and health care fields.

8 “Rare Diseases and Orphan Products: Accelerating Research and Development”. The National Academies Press. 2010. <https://www.ncbi.nlm.nih.gov/books/NBK56184>

9 “TGA to reform regulation for software as medical devices as apps, AI and 3D printing in healthcare boom”. Healthcare IT News Australia. 11 October 2018. <https://www.healthcareit.com.au/article/tga-reform-regulation-software-medical-devices-apps-ai-and-3d-printing-healthcare-boom>

10 “TGA to reform regulation for software as medical devices as apps, AI and 3D printing in healthcare boom”. Healthcare IT News Australia. 11 October 2018. <https://www.healthcareit.com.au/article/tga-reform-regulation-software-medical-devices-apps-ai-and-3d-printing-healthcare-boom>

11 “Singapore dazzles as a world leader in medical manufacturing”. EDB Singapore. 13 April 2018. <https://www.edb.gov.sg/en/news-and-resources/insights/manufacturing/singapore-dazzles-as-a-world-leader-in-medical-manufacturing.html>



### Case Study 3

#### AI decision support technology in Australia

The RippleDown technology, managed by Pacific Knowledge Systems in Australia, is a system integrated with wearable devices such as smartwatches, point-of-care devices, and fitness trackers, to encourage and motivate user engagement.

According to current research, a third of wearable device users stop using their devices within half a year<sup>12</sup>. The integration of RippleDown with wearable devices, however, enables the knowledge, expertise, and experience of world-class coaches, trainers, athletes, clinicians, physiotherapists, nutritionists, and other experts to be accumulated and made available to users on a one-stop platform.

The information is then applied contextually in real-time in response to the user's health, fitness, and wellness data sources to provide personalised guidance and motivation and support the user in achieving their goals. This, in turns, helps to encourage long-term engagement, with positive impacts on the health, fitness, and wellness of the user.



### Case Study 4

#### AI diagnostics in China

One recent application of AI technology has been in the area of diagnostics. In 2017, China's Tencent launched an AI-powered diagnostic medical imaging service, known as its AI Medical Innovation System (AIMIS)<sup>13</sup>. Currently, the technology has demonstrated accuracy rates of over 90% for preliminary diagnoses of oesophageal cancer, 95% for lung sarcoidosis and 97% for diabetic retinopathy<sup>14</sup>.

To date, AIMIS labs have been established in more than 10 hospitals, with agreements for further deployment at close to 100 hospitals in China<sup>15</sup>. Tencent's Youtu Lab, its AI research lab, is also collaborating with the Sun Yat-sen University Cancer Centre's Oesophageal Cancer Research Institute in Guangzhou to leverage thousands of anonymised patient data to train the diagnostic component of its AI technology.

Such a development could hold significant implications for the drug development process. For example, AIMIS images captured by Tencent's AI technology can be combined with XtalPI – a technology that leverages cloud computing platforms such as Amazon Web Services, Tencent Cloud, Google Cloud, and Ali Yun, to run its algorithms through the deployment of a million cores of computing power – to discover new products in silico, potentially drastically reducing the amount of time and hefty investments required for pharmaceutical companies to discover new products.



### Case Study 5

#### Asia Pacific developments in Blockchain

Governments in the Asia Pacific region are increasingly showing greater interest in Blockchain technologies, and throwing their support behind its development through a number of policy changes and initiatives.

The Monetary Authority of Singapore, for instance, embarked on a multi-phase collaborative project, known as Project Ubin, with players in the financial services industry to explore the use of Distributed Ledger Technology for the clearing and settlement of payments and securities<sup>16</sup>.

Meanwhile, in China, the government is exploring the use of Blockchain for the tracking of charity donations, with further plans to use the platform for a complete overhaul of the charity tracking system<sup>17</sup>.

12 "Artificial Intelligence Decision Support Technology". RippleDown. <https://rippledown.com.au>

13 "How Tencent's medical ecosystem is shaping the future of China's healthcare". TechNode. 11 February 2018. <https://technode.com/2018/02/11/tencent-medical-ecosystem>

14 "How Tencent's medical ecosystem is shaping the future of China's healthcare". TechNode. 11 February 2018. <https://technode.com/2018/02/11/tencent-medical-ecosystem>

15 "How Tencent's medical ecosystem is shaping the future of China's healthcare". TechNode. 11 February 2018. <https://technode.com/2018/02/11/tencent-medical-ecosystem>

16 "Project Ubin: Central Bank Digital Money using Distributed Ledger Technology". Monetary Authority of Singapore. <http://www.mas.gov.sg/Singapore-Financial-Centre/Smart-Financial-Centre/Project-Ubin.aspx>

17 "Why is Asia Pacific Blockchain industry growing so fast?". NewsBTC. 25 September 2018. <https://www.newsbtc.com/2018/09/25/why-is-asia-pacific-blockchain-industry-growing-so-fast/>





### Case Study 6

#### Singapore invests in Blockchain

As part of its strategy to develop research-based, deep tech start-ups, SGInnovate, Singapore's government-owned innovation platform, has invested in MediLOT Technologies, a Singapore-based Blockchain and health care analytics start-up, for an undisclosed amount<sup>18</sup>.

Offering a health data protocol built on the principles of "patient centricity, privacy, and equitable data sharing"<sup>19</sup>, MediLOT's solution is a dual Blockchain with a layered architecture incorporating AI and data analytics, on top of its control and data layers, that allows machine learning APIs and complex applications to be built on top of its platform<sup>20</sup>.



### Case Study 7

#### CAR-T clinical trials

The advancement of clinical trials for the CAR-T immuno-oncology treatment is one illustrative case of the potential that a convergence between the pharmaceuticals and biotechnology sectors can bring. Broadly, in the CAR-T process, a patient's own immune cells, known as T-cells, are extracted, preserved, transported, and modified in the treatment of cancer.

During the annual meeting of the American Society of Clinical Oncology held in June 2017, the Chinese firm Nanjing Legend Biotech demonstrated that its CAR-T candidate could be a safe and effective way treatment for relapsed or refractory multiple myeloma<sup>21</sup>. Furthermore, 94% of patients whose multiple myeloma had relapsed after previous treatments had clinical remission within two months of receiving the experimental product<sup>22</sup>. In the US, the Food and Drug Administration (FDA) has also approved the use of Tisagenlecleucel, which is marketed by Novartis as Kymriah, for the treatment of leukaemia<sup>23</sup>.



### Case Study 8

#### China's great leap into biotechnology

In China, the medical industry is hard at work developing cheaper and more effective alternatives to Novartis's Kymriah and Kite Pharma's Yescarta, which are CAR-T therapies used for the treatment of acute lymphoblastic leukaemia and B-cell lymphoma respectively, that come with hefty price tags: Kymriah is marketed at USD 475,000 per treatment, while Yescarta goes for USD 373,000.

As of January 2018, there are 153 CAR-T studies in China – just 33 short of the number in the US. In Hainan, a Chinese resort island and free-trade zone for medical tourism in the region, a similar form of therapy developed by Innovative Cellular Therapeutics Co. has already been made commercially available for a price of RMB 490,000 (USD 76,000) per treatment. Over the next three years, prices for CAR-T treatments in China are expected to continue to fall to less than RMB 100,000 (USD 15,510)<sup>24</sup>.

18 "How Singapore is using blockchain outside of cryptocurrencies". CIO Asia. 6 September 2018. <https://www.cio-asia.com/article/3291758/blockchain/how-singapore-is-using-blockchain-outside-of-crypto-currencies.html>

19 "Our solution". MediLOT. October 2018. <https://medilot.com/our-solution>

20 "How Singapore is using blockchain outside of cryptocurrencies". CIO Asia. 6 September 2018. <https://www.cio-asia.com/article/3291758/blockchain/how-singapore-is-using-blockchain-outside-of-crypto-currencies.html>

21 "After impressing at ASCO, Legend gains Johnson & Johnson as new CAR-T partner". FierceBiotech. 22 December 2017. <https://www.fiercebiotech.com/biotech/after-impressing-at-asco-legend-gains-jj-as-new-car-t-partner>

22 "CAR T Cells: Expanding into Multiple Myeloma". National Cancer Institute. 12 June 2017. <https://www.cancer.gov/news-events/cancer-currents-blog/2017/car-t-cell-multiple-myeloma>

23 "FDA approval brings first gene therapy to the United States". U.S. Food and Drug Administration. 30 August 2017. <https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm574058.htm>

24 "China's great leap into biotech". Bloomberg. 18 January 2018. <https://www.bloomberg.com/opinion/articles/2018-01-17/china-s-push-into-gene-therapy-targets-biotech-s-1>



### Case Study 9

#### Japan's first gene therapy?

Earlier in January 2018, AnGes, Inc., submitted its application for marketing approval to Japan's Pharmaceuticals and Medical Devices Agency for its HGF plasmid, an investigational gene therapy for the treatment of critical limb ischemia, the most severe condition of peripheral arterial disease<sup>25</sup>.

This marks the second time that AnGes is submitting beperminogene for approval from Japan's health ministry, after having withdrawn its first application due to a lack of data<sup>26</sup>. It is, however, more optimistic this time as a result of the introduction of a conditional early approval system for regenerative medicine and gene therapies introduced by the Japanese government in its bid to make Japan a leader in advanced medicine. Under this fast-track scheme, a company can release a product conditionally, collecting additional data while the treatment is in use to be later submitted for formal approval<sup>27</sup>.

If approved, the product – which could become the first commercial gene therapy product in Japan – can help to alleviate the symptoms of critical limb ischemia, a condition marked by reduced blood flow to the extremities, leading to pain and even gangrene. The product is designed to be injected directly into the feet, where it promotes the regeneration of blood vessels.

According to estimates by Anges, its gene therapy would be suitable for approximately 10% of the 100,000 to 200,000 people in Japan suffering from this condition, whose alternative would be to undergo surgery<sup>28</sup>.

### The shift from volume to value

With escalating health care costs, governments, health care providers, and other stakeholders across Asia Pacific are recognising the benefits of keeping individuals and populations healthy. As a result, the needle is increasingly moving from treatment to prevention, and from volume-based payment models to value-based ones.

With an ageing population and the rise of chronic diseases within the Asia Pacific region, the need for such interventions has only grown more acute in recent years. A number of markets have begun this transition from volume to value in earnest, through reform policies and programmes promoting operational efficiency, technology use, and population health. In other words, a successful transition to value-based care requires stakeholders, including consumers, to move from health care to health; from treatment to prevention; and from individual to population health.

In Japan, for instance, the government has introduced a series of reforms, including the establishment of an Integrated Community Care System that combines health care, long-term care, housing, and livelihood support services in a unified manner so that Japan's elderly can receive continuous quality care in their local communities instead of the hospital<sup>29</sup>. Indeed, many sector stakeholders, particularly in those with advanced health systems in the region, are now advocating the shift from a "break-fix" model of health care to one focused on prevention and the overall holistic health of populations rather than episodic and transaction-based treatments (see Case Study 10).

25 "AnGes Submits Application for Marketing Approval to PMDA for HGF gene therapy for Critical Limb Ischemia". GlobeNewswire. 22 January 2018. <https://globenewswire.com/news-release/2018/01/23/1298857/0/en/AnGes-Submits-Application-for-Marketing-Approval-to-PMDA-for-HGF-gene-therapy-for-Critical-Limb-Ischemia.html>

26 "Bioventure AnGes MG tries again to market Japan's first gene therapy". Nikkei Asian Review. 10 June 2017. <https://asia.nikkei.com/Business/Bioventure-AnGes-MG-tries-again-to-market-Japan-s-first-gene-therapy>

27 "Bioventure AnGes MG tries again to market Japan's first gene therapy". Nikkei Asian Review. 10 June 2017. <https://asia.nikkei.com/Business/Bioventure-AnGes-MG-tries-again-to-market-Japan-s-first-gene-therapy>

28 "Bioventure AnGes MG tries again to market Japan's first gene therapy". Nikkei Asian Review. 10 June 2017. <https://asia.nikkei.com/Business/Bioventure-AnGes-MG-tries-again-to-market-Japan-s-first-gene-therapy>

29 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

One emerging area of policy is that of population health, that enables providers to manage care – from preventive and maintenance care to acute and long-term care – for a defined population. With the objective of using health care resources effectively and efficiently to improve the lifetime health and well-being of a specific population, the most successful population health policies often deploy innovative delivery models, employ the use of data and analytics to identify at-risk patients and target services that reduce their use of expensive and low-quality care, and are underpinned by value-based payment contracts for the successful execution of these processes.

Ultimately, the goals of population health management are critical: improving clinical effectiveness, lowering costs, sharing accountability, enhancing safety and, most importantly, keeping an entire population healthier. But striving to achieve these goals is both challenging and complex. In Asia Pacific, population health efforts range from minimal to robust and are as diverse as the markets that they exist in (see Case Study 11).



### Case Study 10

#### Singapore's '3 beyonds'

In its bid to ensure the quality and affordability of its health care services into the future, Singapore's Ministry of Health recently introduced its '3 beyonds' strategy<sup>30</sup>:

- **Beyond health care to health:** Initiatives are designed to create a healthier nation that would require less of the health care system, and include efforts to get people to opt for healthier meals, a “war” against diabetes, and highly subsidised health screening for people aged 40 years and above.
- **Beyond hospital to community:** Initiatives are designed to enable people to receive the appropriate care at home or within their communities, thus avoiding frequent hospital admissions, and include post-discharge visits to patients' homes by nurses and care workers.
- **Beyond quality to value:** Initiatives are designed to ensure value for money while retaining or increasing quality of care, and include the introduction of fee benchmarks, and the creation of the Agency for Care Effectiveness that was set up in 2015 to research treatments that provide the best value for money.

At the same time, the Ministry of Health is also investing in automation initiatives to improve productivity as labour growth slows. Examples of these include a new robotic bottle medication dispensing system that automatically loads, picks and packs, as well as fastens water-proof and tear-proof labels onto medication bottles<sup>31</sup>.

30 "The '3 Beyonds': Singapore's strategy to sustain quality healthcare as demand rises". The Straits Times. 30 November 2017. <https://www.straitstimes.com/singapore/health/the-3-beyonds-singapores-strategy-to-sustain-quality-healthcare-as-demand-rises>

31 "Improving productivity key to delivering good healthcare service: MOH". Channel NewsAsia. 17 January 2017. <https://www.channelnewsasia.com/news/singapore/improving-productivity-key-to-delivering-good-healthcare-service-7562960>



### Case Study 11

#### Population health management in Asia Pacific

##### China

In October 2016, China launched its Healthy China 2030 blueprint, declaring public health a precondition for future economic and social development. It details five specific goals, including the need to improve the nation's health, control major risk factors, and increase the capacity of the health system<sup>32</sup>.

In addition, the blueprint is based on four core principles: health priority; reform and innovation; scientific development; and justice and equality<sup>33</sup>. As China's first long-term strategic population health plan, it also aims to grow investments in its "Big Health" sector to RMB 16 trillion by 2030<sup>34</sup>.

##### Japan

In July 2016, Japan's government released the Asia Health and Human Well-Being Initiative, which aims to apply aspects of the Japanese health care and nursing care system in other ageing Asian countries, and to enable Japanese providers to expand their overseas footprint, especially in Asian countries that are facing rapidly ageing societies<sup>35</sup>.

As part of this initiative, Japan's health ministry will also be supporting Asian students, chiefly from Southeast Asia and India, studying at Japanese medical schools<sup>36</sup>. The Economic Research Institute for ASEAN and East Asia, which the Japanese government is funding, will also be developing a framework to enable Japanese doctors to conduct joint research and practice in other Asian countries<sup>37</sup>.

32 "Healthy China 2030: A Vision for Health Care". Value in Health Regional Issues. May 2017. [https://www.valuehealthregionalissues.com/article/S2212-1099\(17\)30026-2/abstract](https://www.valuehealthregionalissues.com/article/S2212-1099(17)30026-2/abstract)

33 "Healthy China 2030: A Vision for Health Care". Value in Health Regional Issues. May 2017. [https://www.valuehealthregionalissues.com/article/S2212-1099\(17\)30026-2/abstract](https://www.valuehealthregionalissues.com/article/S2212-1099(17)30026-2/abstract)

34 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

35 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

36 "Japan offering financial aid to Asian medical students". Nikkei Asian Review. 5 January 2018. <https://asia.nikkei.com/Editor-s-Picks/Japan-Update/Japan-offering-financial-aid-to-Asian-medical-students>

37 "Japan offering financial aid to Asian medical students". Nikkei Asian Review. 5 January 2018. <https://asia.nikkei.com/Editor-s-Picks/Japan-Update/Japan-offering-financial-aid-to-Asian-medical-students>

# Build



## A patient-centric focus

Globally, Life Sciences and Health Care companies are investing in their capabilities to advance patient centricity. In an evolution of the “quantified self”, consumer engagement in and expectations of their health care experience are growing, as they become more aware of the effectiveness of health interventions and sophisticated about their disease profiles and health risks.

In Asia Pacific, we have witnessed the increasing adoption of regulated and validated health applications, and wearables that combine the power of analytics and other non-traditional sources of data collection – including social media, telehealth channels, and virtual reality (VR)/augmented reality (AR) platforms – to identify new care pathways and high-risk individuals. Telehealth, in particular, could be useful in increasing the accessibility of health care for underserved populations in certain parts of Asia Pacific (see Case Study 12).

However, the lack of interoperability among devices limits the promise of these devices and hampers care coordination. If these challenges can be addressed, a more integrated omnichannel patient experience that enables health care providers to provide more personalised care and better engage with consumers – across a variety of channels including customer apps, patient portals, personalised digital information kits, and self-check-in kiosks – will become possible.

Life sciences companies, too, are adopting a more patient-centric focus. Companion diagnostics or supporting digital technologies are helping patients and providers determine the best treatment and correct dosing as well as improve adherence. For example, one pharma company held a workshop on gamification that led to the development of web-based services to collect patient data. The data was then translated into personalised regimens, reminding patients to take an active role in managing their treatment<sup>38</sup>. In Asia Pacific, we are also beginning to witness the use of AR to deliver personal health solutions (see Case Study 13).

Furthermore, pharmaceutical players are developing new, more personalised drugs for smaller groups of patients and monitoring and managing patient adherence and health outcomes. They are looking at engaging patients earlier in the process to better understand unmet needs, inform trial design, patient recruitment and resilience. Current data also suggests that products and services that better meet patient needs and improve treatment regimens will receive higher acceptance by payers, providers, and regulators<sup>39</sup>.

38 “2018 Global life sciences outlook”. Deloitte. 2018. <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-ls-outlook-2018.pdf>

39 “2018 Global life sciences outlook”. Deloitte. 2018. <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-ls-outlook-2018.pdf>



## Case Study 12

### Dial-a-doc in Southeast Asia

Driven by the increasing health care demand, app-based consultations have begun to take off in Southeast Asia. Although these app-based consultations currently perform only limited functionalities, that is, primarily basic consultations, they have the potential to improve access to underserved areas in the region.

One example of such an app is Indonesia's Halodoc. Founded in 2016, Halodoc now possesses about 2 million users and 20,000 doctors in its database. It charges a consultation fee of about IDR 25,000-75,000, a rate that is lower than in-person consultations at traditional clinics. Currently, Halodoc facilitates several thousand consultations a day, taking 5-25% of the consultation fee, depending on its contract with the doctor<sup>40</sup>. It also has partnerships with insurance companies to enable users to pay with their health insurance, and collaborations with pharmacies from which medicines are delivered to its users. In Indonesia, apps like Halodoc solve two types of pain points: long commute times to visit doctors due to congestion in urban areas, and lack of doctors in rural areas.

Indeed, the inability of health care systems in the region to cater to the growing demand is a key driver of growth for teleconsultation apps. Estimates suggest that medical expenditure in six major Southeast Asia countries – Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam – are expected to reach USD 740 billion by 2025, from USD 420 billion in 2017<sup>41</sup>. A number of Southeast Asian countries also have to deal with a lack of doctors: the number of physicians per 1,000 population is about 0.20 in Indonesia, 0.47 in Thailand and 0.56 in Myanmar, in contrast to developed markets like Germany (4.19) or US (2.56)<sup>42</sup>.

In Singapore, the telehealth start-up Doctor Anywhere that was launched earlier in 2017 now has some 50,000 users serviced by 50 doctors, covering the areas of general practitioner consultation, lactation, and medical aesthetics. It offers video consultations, priced at SGD 20, and delivers medicines to patients' addresses<sup>43</sup>. In 2018, it successfully raised an additional funding of SGD 5.6 million, which it will use to improve accessibility to quality health care, while providing a platform for health care providers to meet the needs of health care seekers<sup>44</sup>.

China's largest online health care app, Ping An Good Doctor, is also expected to enter the Southeast Asia market in 2019 through a joint venture with Singapore-based ride-hailing app Grab. It plans to leverage the use of AI, with an AI-assisted chatbot routing patients to an appropriate doctor. As of June 2018, Ping An Good Doctor has some 228 million registered users in China<sup>45</sup>.

40 "Telehealth apps rise in Southeast Asia due to doctor scarcity". Nikkei Asian Review. 11 September 2018. <https://asia.nikkei.com/Business/Business-Trends/Telehealth-apps-rise-in-Southeast-Asia-due-to-doctor-scarcity>

41 "Telehealth apps rise in Southeast Asia due to doctor scarcity". Nikkei Asian Review. 11 September 2018. <https://asia.nikkei.com/Business/Business-Trends/Telehealth-apps-rise-in-Southeast-Asia-due-to-doctor-scarcity>

42 "Telehealth apps rise in Southeast Asia due to doctor scarcity". Nikkei Asian Review. 11 September 2018. <https://asia.nikkei.com/Business/Business-Trends/Telehealth-apps-rise-in-Southeast-Asia-due-to-doctor-scarcity>

43 "Telehealth apps rise in Southeast Asia due to doctor scarcity". Nikkei Asian Review. 11 September 2018. <https://asia.nikkei.com/Business/Business-Trends/Telehealth-apps-rise-in-Southeast-Asia-due-to-doctor-scarcity>

44 "Doctor Anywhere raises \$5.6m in Series A funding". The Straits Times. 4 July 2018. <https://www.straitstimes.com/business/companies-markets/doctor-anywhere-raises-56m-in-series-a-funding>

45 "Telehealth apps rise in Southeast Asia due to doctor scarcity". Nikkei Asian Review. 11 September 2018. <https://asia.nikkei.com/Business/Business-Trends/Telehealth-apps-rise-in-Southeast-Asia-due-to-doctor-scarcity>



### Case Study 13

#### Helping asthma sufferers “Breatherite”

Earlier in 2017, Mundipharma announced the launch of Breatherite, a mobile app that uses AR to address errors in inhaler use amongst asthma sufferers. This app, developed in its Regional Head Office in Singapore, is the first digital health platform to utilise AR together with a range of smartphone sensors, and will deliver a personal asthma management solution to correct errors in the patient’s inhaler techniques.

Specifically, the app will engage the front-facing camera for facial mapping, the accelerometer and gyrometer to track inhaler preparation, the microphone to analyse inhalation and exhalation, and utilise AR to visualise the correct inhaler orientation and head alignment. It will also enable patients to set medication reminders, as well as receive lifestyle tips, real-time weather and air quality information<sup>46</sup>.

### The new currency of data

Health data is the new health care currency, as organisations increasingly use advanced digital and cognitive technologies to mine vast amounts of data to produce clinical and operational insights. Facing a continuous, ever-growing influx of data from internal and external sources, hospitals will come to depend on cognitive analytics to sort through and find the most important data points and trends, analyse the data, and present actionable insights to clinicians, patients, and caregivers in an easy-to-understand format that seamlessly fits into their daily activities.

Of course, no single organisation has all the data required to look at a patient or targeted population in a holistic manner. This can limit the abilities of the health system that is providing the care and the payer that is financing the care and, in turn, directly impact the patient journey. However, three developments are helping organisations in the Asia Pacific region mine insights across various data sources:

- **IoT:** The advancement of IoT has been particularly valuable for remote clinical monitoring, chronic disease management, preventive care, assisted living for the elderly, and fitness monitoring. In Asia Pacific, IoT’s application is also helping to lower costs, improve efficiency, and bring the focus back to quality patient care (see Case Study 14).
- **Cognitive computing:** Cognitive computing, including machine learning, neural networks, and deep learning techniques, could help organisations cope with large volumes of rapidly changing data. With its ability to handle a variety of statistical algorithms and quickly generate new models for new data, it is particularly useful for turning the vast amount of health care data – aggregated from sources such as medical devices, smartphones, activity trackers, and EHRs – into insights that enable personalised medicine (see Case Study 15). But more than that, players in Asia Pacific are also using it to predict health trends (for example, disease onset), detect patterns in data (for example, a drug’s effects on individuals or populations), or combine data across various sources (for example, to create a 360-degree patient view).
- **Cloud-based interoperable EHRs:** When combined with AI, interoperable EHRs could help health systems in Asia Pacific better integrate of data into daily care, and enable patients to play a more active role in curating their own data, which could include genetic, social, and behavioural patient information, as well as financial, clinical, and administrative records (see Case Study 16 and 17). When stored in the cloud, these data can be accessed on an as-needed basis, and perhaps on a Blockchain, which is a distributed, immutable record ledger of digital transactions.

<sup>46</sup> "Mundipharma announces its digital vision and launches first augmented reality app to help asthma sufferers 'Breatherite'". Mundipharma. 21 April 2017. <http://www.mundipharma.com.sg/2017/04/21/mundipharma-announces-digital-vision-launches-first-augmented-reality-app-help-asthma-sufferers-breatherite>

Life sciences companies are also implementing the use of end-to-end evidence management as a way of unifying their data at an enterprise level, from research and clinical development, through to commercialisation. The lack of data, however, remains the largest challenge for such real-world evidence (RWE) programmes<sup>47</sup>. This underscores the importance of defining an enterprise RWE and data strategy to address data gaps and access challenges through novel business models and partnerships, and to provide the necessary expertise to generate insights from the data. As the volume of real-world data grows and data access improves, companies will have the opportunity to leverage RWE earlier in the product life cycle to streamline development and drive down costs.

However, with the increased use of data – and high-profile ransomware attacks such as WannaCry – cyber security and data risk management issues have become a real concern for the Life Sciences and Health Care industry. Indeed, health care is second only to the finance sector in the number of cyber attacks annually<sup>48</sup>. Globally, governments are in the midst of designing new regulations to, amongst other objectives, give patients control over their data and simplify the regulatory environment.

In Japan, for instance, the Ministry of Health, Labour and Welfare released the latest edition of its Security Guidelines for Health Information Systems in May 2017, which aims to recommend a series of measures to address the risk of cyber attacks targeting medical institutions<sup>49</sup>. Until recently, medical institutions in Japan generally employed closed systems to reduce cyber threats. However, the implementation of the national health system's new medical ID and data-sharing scheme will require medical institutions to upload data to external servers, heightening the importance of cyber security.

47 "Getting real with real-world evidence". Deloitte. 2017. <https://www2.deloitte.com/content/dam/Deloitte/ch/Documents/life-sciences-health-care/ch-en-lshc-2017-real-world-evidence-survey.pdf>

48 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

49 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>





### Case Study 14

#### The next thing for Asia Pacific

According to estimates, Asia Pacific is set to be leading on several fronts for IoT. With government-driven investments, the number of things connected is expected to increase from 3.1 billion to 8.6 billion by 2020, creating a USD 583 billion market opportunity<sup>50</sup>. In the deployment of IoT solutions, we are witnessing an increasing number of cross-sector collaborations involving technology companies. One such example is the partnership between Alibaba Cloud and myDevices to create the “IoT in a Box” solution that offers customers the simple deployment of remote monitoring products<sup>51</sup>.

One key use of this solution is refrigeration, such as refrigeration units at hospitals that keep medication at cold temperatures to prevent them from going bad. Through the use of remote sensors, hospitals can also reduce the number of employees needed to monitor temperatures on-site, while benefitting from a more reliable log for compliance and reporting purposes<sup>52</sup>.

Several other Southeast Asian markets are also investing heavily in this area, as part of a wider adoption of what is now known as Industry 4.0 technologies. Across the region, IoT-related expenditure is expected to experience a 35% growth from USD 1.68 billion in 2015 to approximately USD 7.53 billion in 2020<sup>53</sup>.

#### Philippines

A-Square Digital Core is a digital provider for IoT and IT solutions for corporations, government, education institutions, and health care clients<sup>54</sup>. It provides solutions to drive revenue and innovation using Android or iOS native applications, and middleware such as Arduino or Raspberry Pi, in addition to the customisation of applications.

#### Thailand

The BAESlab IoT platform was developed to assist family members and carers with elderly care, especially those who are unable to constantly be physically present<sup>55</sup>. As a solution, two devices – known as Watchfully, and Oura – were created. Watchfully can be worn as a wristband or necklace, and alerts family members and relevant units in the event of an emergency. An inbuilt location-tracking signal also enables help to be dispatched if the wearer of the device falls, or requires immediate medical assistance. Oura, on the other hand, is a ring-sized wellness computer that aims to help its users sleep and generally perform better.

50 “Driving IoT growth in Asia”. SME Portal. 22 December 2016. <https://www.smeportal.sg/content/smeportal/en/industries/Industry-Highlights/2016/driving-iot-growth-in-asia.html>

51 “Alibaba Cloud and myDevices have partnered to launch “IoT in a Box””. Business Insider. 13 September 2018. <https://www.businessinsider.com/alibaba-cloud-mydevices-china-iot-in-a-box-2018-9/?IR=T>

52 “Alibaba Cloud and myDevices have partnered to launch “IoT in a Box””. Business Insider. 13 September 2018. <https://www.businessinsider.com/alibaba-cloud-mydevices-china-iot-in-a-box-2018-9/?IR=T>

53 “Which companies are using IoT in Southeast Asia?” CIO Asia. 12 October 2018. <https://www.cio-asia.com/article/3313098/internet-of-things/which-companies-are-using-iot-in-southeast-asia.html>

54 “Which companies are using IoT in Southeast Asia?” CIO Asia. 12 October 2018. <https://www.cio-asia.com/article/3313098/internet-of-things/which-companies-are-using-iot-in-southeast-asia.html>

55 “Which companies are using IoT in Southeast Asia?” CIO Asia. 12 October 2018. <https://www.cio-asia.com/article/3313098/internet-of-things/which-companies-are-using-iot-in-southeast-asia.html>



### Case Study 15

#### A consultation with Dr Watson

Hospitals in Asia Pacific are adopting the use of cognitive technologies to improve and speed up symptom analysis, and determine the best treatment. Within the region, IBM has been working with hospitals and health care organisations, such as Thailand's Bumrungrad International Hospital, and regional Southeast Asian medical provider Parkway Pantai.

By working with hospitals to integrate their decision support tools, clinicians and nurses are able to obtain timely health care data that is more personalised to the patient's needs, through the use of cognitive computing to read, monitor, and quickly make sense of vast amounts of data.

Earlier in June 2016, IBM also opened The Watson Centre, an incubator designed to bring together health care organisations to help create solutions to leverage the technology's capabilities, in Singapore<sup>56</sup>.



### Case Study 16

#### India's digital health initiative

In India, the government has introduced standards and guidelines for the implementation of interoperable EHRs to pave the way for the digitisation of health care data in the country. These standards aim to set the norms for the capture, storage, retrieval, exchange and analytics of health care data and information, including images and clinical codes, and put in place guidelines for maintaining the privacy and confidentiality of such information. As part of this initiative, a cloud-based hospital application will be built to enable real-time health data to be fed from all hospitals, better enabling the government to streamline data and analyse health indicators<sup>57</sup>.



### Case Study 17

#### Mobile health care makes its foray into India

One major impediment to the treatment of hypertension is that patients either do not record their blood pressure readings, or record them inaccurately. To overcome these challenges, Omron Healthcare introduced to the India market a mobile application, the Bluetooth-enabled Smart Elite HEM-7600T<sup>58</sup>, for use with its digital blood pressure monitors.

The mobile application enables the viewing and management of recorded blood pressure readings, and stores the data to enable the patient, carers, and medical professionals to monitor heart health progress with graphical interpretations of the health data which can be easily analysed.

56 "Dr Watson vs Dr Google: Asia battles healthcare data asymmetry". Health Care Asia Magazine. 23 September 2016. <https://healthcareasiamagazine.com/healthcare/exclusive/dr-watson-vs-dr-google-asia-battles-healthcare-data-asymmetry>

57 "Centre issues guidelines for e-health records". The Times of India. 2 January 2017. <https://timesofindia.indiatimes.com/india/centre-issues-guidelines-for-e-health-records/articleshow/56284092.cms>

58 "Digital healthcare in India – The emerging trend". The Times of India. 20 June 2018. <https://timesofindia.indiatimes.com/digital-healthcare-in-india-the-emerging-trend/articleshow/64633473.cms>

# Grow



## New partnerships and operating models

As health care costs increase, affordability remains a problematic issue for the Asia Pacific region. Yet, efforts by sector stakeholders to manage costs are further complicated by price controls and funding models. For example, hospitals in India are increasingly seeing the need to build more financially sound operating models to deal with their diminishing margins brought about by price controls on drugs, consumables, and medical devices, and insurance companies' use of their growing patient share and buying power to squeeze hospital pricing<sup>59</sup>. India's medical workforce shortage also means available doctors command a high price structure, further eating into hospital margins<sup>60</sup>. In China, the policy of zero mark-ups for drugs sold at hospital is also a major contributor of eroding profits (see Case Study 18 and 19).



### Case Study 18

#### China's Zero Mark-up Drug Policy

Since the 1970s, China's health care providers have relied heavily on drug revenue. As these providers both prescribe and sell drugs, there was a financial incentive to recommend drugs to patients even when they were not clinically appropriate, resulting in many unwarranted prescriptions and the overuse of drugs that were sold at high mark-ups<sup>61</sup>. Typically, hospitals were able to add a 15% surcharge to the cost of these drugs, with hospitals deriving as much as 40% of their revenue – which could account for their entire profit – from drug sales<sup>62</sup>.

To combat this issue, and to ensure the availability and appropriate use of essential drugs, especially for low-income groups, the Chinese government introduced the Zero Mark-up Drug Policy to decouple provider compensation from drug prescription and sales in 2009<sup>63</sup>. In 2015, this policy was implemented nationwide and hospital margins have been falling as a result<sup>64</sup>.

59 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

60 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

61 Yi, H. et al. "Intended and unintended consequences of China's zero markup drug policy". Health Affairs. Volume 34, No. 8: Variety Issue. August 2015. <https://www.healthaffairs.org/doi/10.1377/hlthaff.2014.1114>

62 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

63 Yi, H. et al. "Intended and unintended consequences of China's zero markup drug policy". Health Affairs. Volume 34, No. 8: Variety Issue. August 2015. <https://www.healthaffairs.org/doi/10.1377/hlthaff.2014.1114>

64 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>



### Case Study 19

#### Vietnam's new pharmaceutical decree

Earlier in 2017, Vietnam's government issued a new decree to regulate and control drug pricing through the enforcement of stricter requirements on manufacturers, importers and/or distributors, which apply to domestic and foreign pharmaceutical activities<sup>65</sup>.

Under this decree, should players intend to raise the price of the drug, they are required to produce justifications on drug efficacy, cost versus effectiveness comparisons, technology evidence, and cost breakdown of drug pricing. In addition, pharmacy business entities are not permitted to sell drugs whose respective prices have not been declared or re-declared by manufacturers or relevant entities<sup>66</sup>.

To deal with the challenges of shrinking margins and rising costs, a number of different new partnerships and operating models have emerged for stakeholders to work collaboratively on innovative access, delivery, and financing models. One example is the formation of closed loop supply chains: the acquisition of hospitals by large medical groups in China is a case in point. CR Healthcare, for instance, currently manages 109 hospitals with more than 11,000 beds, while its sister company CR Pharmaceuticals supplies the hospitals' drugs<sup>67</sup>. Chinese insurance companies are also employing similar business models to promote commercial medical insurance.

Earlier in April 2017, Japan's government also launched a scheme where medical corporations can create non-profit holding companies without corporate acquisitions<sup>68</sup>. Under this scheme, a single holding company can manage several medical institutions, such as nursing care facilities – an arrangement that may be especially beneficial for medical institutions serving rural areas that face the challenge of increasing their operational efficiency in spite of the lack of scale due to declining patient populations.

Across the Asia Pacific region, different players have begun lateral expansion across the Life Sciences and Health Care sectors through the use of mergers and acquisitions, as well as joint ventures. From Indonesia to India, local manufacturers face strong imperatives to explore higher drug manufacturing and venture beyond their local markets (see Case Study 20). To bolster their positions globally, local manufacturers are also recognising the need to partner multinationals and pharmaceutical giants to leverage their marketing capabilities (see Case Study 21).

Other collaborative arrangements include the use of joint ventures and public-private partnerships (PPPs), both within the Life Sciences and Health Care industry, as well as across industries and sectors (see Case Study 22). Increasingly, governments, providers, and life sciences companies are working together to develop wellness programmes, particularly in the public health arena, as well as personalised therapies, such as for cancer.

65 "New decree on the promulgation of the law on pharmacy in Vietnam". Mondaq. 29 January 2018. <http://www.mondaq.com/x/657592/food+drugs+law/New+Decree+On+The+Promulgation+Of+The+Law+On+Pharmacy+In+Vietnam>

66 "New decree on the promulgation of the law on pharmacy in Vietnam". Mondaq. 29 January 2018. <http://www.mondaq.com/x/657592/food+drugs+law/New+Decree+On+The+Promulgation+Of+The+Law+On+Pharmacy+In+Vietnam>

67 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>

68 "2018 Global health care outlook". Deloitte. 2018. <https://www2.deloitte.com/uk/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>



## Case Study 20

### Finding room for growth

#### China

Despite its success in propelling China's economic growth thus far, the low-cost manufacturing sector is currently witnessing rapid wage inflation. As a result, several neighbouring economies, including those in Southeast Asia, are beginning to appear more cost competitive to low-cost manufacturers, some of whom have already begun to relocate parts of their value chains to these markets.

In a bid to strengthen its existing foothold in the manufacturing sector, such as in the biopharmaceutical segment, China is re-examining its presence in the region. Specifically, it expects to become more involved in complex supply and value chains where manufactured components are produced in other markets, while China retains its position as a central hub within the regional chain, a concept known as Factory Asia. To achieve this, China is leveraging cross-border relationships within value chains. For example, through the Information Technology Agreement, a voluntary plurilateral agreement under which signatories agree to remove restrictions on trade in technology products, including scientific instruments<sup>69</sup>, companies are able to reduce the costs of doing business across borders.

#### India

India has one of the largest pharmaceutical industries in Asia Pacific. In 2017, India's pharmaceutical exports amounted to USD 16.8 billion, and this figure is expected to reach USD 40 billion by 2020<sup>70</sup>. Currently, it is the world's largest provider of generic medicines: in terms of volume, India's generic drugs exports account for 20% of total global generic drugs exports<sup>71</sup>. The Indian pharmaceutical industry also supplies more than half of the global demand for vaccines, 40% of the demand for generics in the US, and 25% of demand for all medicines in the UK<sup>72</sup>.

Recently, however, the Drug Price Control Order and attempts by the National Pharmaceutical Pricing Authority to introduce more stringent price control regulations<sup>73</sup> to deal with the issue of drug affordability and availability – which to some observers implied a more permissive attitude towards generics, with potentially stifling effects on innovation – has resulted in escalating backlash from the industry.

As a result, many local companies are looking at ways to modify their businesses to enable more profitable scaling, while exploring investment opportunities in biosimilars, biologics and vaccines production. For example, Cipla, one of the leading generics manufacturer in India, announced plans to set up a new biotech facility to focus on the production of biosimilars in South Africa. Biocon, too, is setting up overseas manufacturing bases to cater to local and export markets in Asia, Europe and US<sup>74</sup>.

69 "Information Technology Agreement – an explanation". World Trade Organisation. [https://www.wto.org/english/tratop\\_e/inftec\\_e/itaintro\\_e.htm](https://www.wto.org/english/tratop_e/inftec_e/itaintro_e.htm)

70 "Indian Pharmaceutical Industry". India Brand Equity Foundation. September 2018. <https://www.ibef.org/industry/pharmaceutical-india.aspx>

71 "Indian Pharmaceutical Industry". India Brand Equity Foundation. September 2018. <https://www.ibef.org/industry/pharmaceutical-india.aspx>

72 "Indian Pharmaceutical Industry". India Brand Equity Foundation. September 2018. <https://www.ibef.org/industry/pharmaceutical-india.aspx>

73 "NPPA's drug price fixing power to be curbed". The Times of India. 7 June 2018. <https://timesofindia.indiatimes.com/india/nppas-drug-price-fixing-power-to-be-curbed/articleshow/64486527.cms>

74 "Indian companies gearing up to solve the biosimilars puzzle". Business Standard. 13 July 2016. [https://www.business-standard.com/content/b2b-pharma/indian-companies-gearing-up-to-solve-the-biosimilars-puzzle-116071200648\\_1.html](https://www.business-standard.com/content/b2b-pharma/indian-companies-gearing-up-to-solve-the-biosimilars-puzzle-116071200648_1.html)

## Indonesia

With the Jaminan Kesehatan Nasional, a compulsory national health insurance scheme implemented by Badan Penyelenggara Jaminan Sosial Kesehatan, that prioritises the use of low cost generics<sup>75</sup>, competition in the generics market has become increasingly intense, and companies have to contend with diminishing profit margins.

As a result, local manufacturers face strong imperatives to explore higher value drug manufacturing. For instance, Kimia Farma, state-owned manufacturer with injectables capabilities recently announced plans to expand its market presence beyond Indonesia with acquisitions in Saudi Arabia's Dwa Medical Company<sup>76</sup>, in addition to previous co-investments with Singapore-based CellSafe to venture into biosimilars and stem cell research<sup>77</sup>.

## Japan

As Japanese companies' appetite for growth continues to drive their outbound investments, the Southeast Asia region has emerged as one of their major investment destinations: from 2011-2016, Japanese investment in major Southeast Asian markets averaged about USD 20 billion each year, more than double the average of the previous five-year period<sup>78</sup>.

In terms of pharmaceuticals, the Japanese government is implementing new measures to help Japanese companies with the construction of factories for the production of generic drugs in several Southeast Asian countries where labour costs are lower than Japan<sup>79</sup>, such as Thailand and Vietnam. Ultimately, it aims to reduce overall drug costs, which are currently at about JPY 10 trillion (USD 91 billion) a year, by lowering production costs and strengthening the sales competitiveness of Japanese pharmaceutical companies in these locations.



### Case Study 21

#### South Korea's ambitions for biosimilars

Biosimilars, a new category of copycat drugs, are designed to provide competition for branded, expensive biological drugs. Unlike traditional chemical-based drugs, which can be easily copied once they lose their patent protection, biologics are impossible to replicate precisely as they are made from living cells and consist of large molecules. This has left a gap in the market for biosimilars, or drugs that can sufficiently match the original<sup>80</sup>.

However, the uptake of biosimilars has been slow, because doctors and patients have been cautious about substituting cheaper copies for proven, branded biologics. South Korea's Celltrion faced similar scepticism when it embarked on the development of biosimilars in 2007, having previously functioned as a contract manufacturer for other drug manufacturers. Later, it was also dealt another blow as its chairman was fined for share price manipulation<sup>81</sup>.

To bolster its position, Celltrion partnered with Hospira of the US to market its Remsima drug in Europe. But it is not the only South Korean player embarking on this strategy: Samsung's Bioepis, for example, also has marketing agreements with Merck and Biogen<sup>82</sup>.

75 "Indonesia launches universal healthcare". Economist Intelligence Unit. 13 January 2014. <http://www.eiu.com/industry/article/1071418091/indonesia-launches-universal-healthcare/2014-01-13>

76 "Kimia Farma Expansion to Saudi Arabia". Association of Investor Relations Indonesia. 28 July 2017. <https://www.irindo.co.id/single-post/2017/07/28/Kimia-Farma-Expansion-to-Saudi-Arabia>

77 "CellSafe unit and PT Kimia Farma in biotech tie-up". The Star. 24 April 2010. <https://www.thestar.com.my/business/business-news/2010/04/24/cellsafe-unit-and-pt-kimia-farma-in-biotech-tieup/#AiWWEsxiXLaHeDhh.99>

78 "JETRO Global Trade and Investment Report 2016". Japan External Trade Organization (JETRO) Overseas Research Department. 2016. [https://www.jetro.go.jp/ext\\_images/en/news/releases/2016/25775525206556e1/overview.pdf](https://www.jetro.go.jp/ext_images/en/news/releases/2016/25775525206556e1/overview.pdf)

79 "Japanese firms eye Asia factories for generic drugs". The Straits Times. 19 January 2018. <https://www.straitstimes.com/asia/east-asia/japanese-firms-eye-asia-factories-for-generic-drugs>

80 "South Korea pushes to be new force in pharmaceuticals". Financial Times. 10 June 2015. <https://www.ft.com/content/0d1367ac-09a9-11e5-8534-00144feabdc0>

81 "South Korea pushes to be new force in pharmaceuticals". Financial Times. 10 June 2015. <https://www.ft.com/content/0d1367ac-09a9-11e5-8534-00144feabdc0>

82 "South Korea pushes to be new force in pharmaceuticals". Financial Times. 10 June 2015. <https://www.ft.com/content/0d1367ac-09a9-11e5-8534-00144feabdc0>

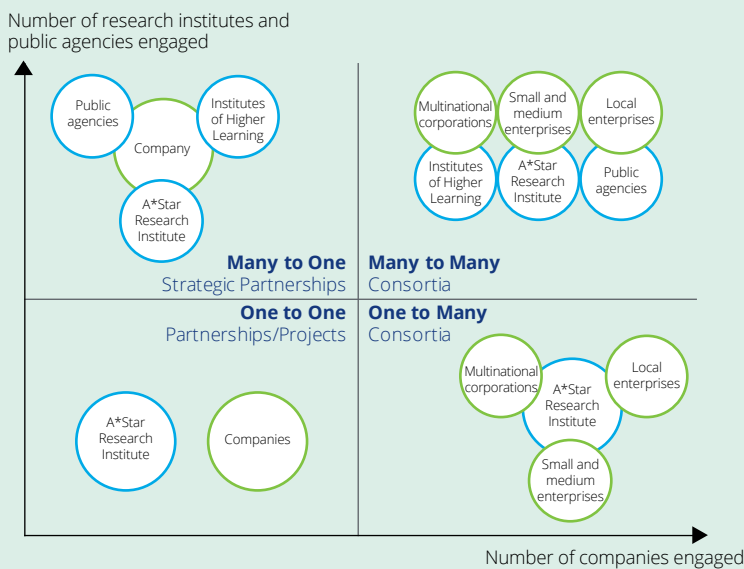


**Case Study 22**  
**PPP models in Singapore**

Over the past few decades, Singapore has explored a number of different PPP models, with varying levels of distribution of risks and responsibilities – including management oversight, resources, and financial contribution – between the public and private players involved. Earlier in 1998, as part of its plans to transform from an entrepôt economy to one that is driven by knowledge and innovation<sup>83</sup>, Singapore established a Science Hub in the Buona Vista area comprising the Biopolis, Fusionpolis and Mediapolis developments to enable public and private researchers to work side-by-side, and to incubate and grow ideas when meeting along hallways<sup>84</sup>.

In 2015, Singapore also launched the Research Innovation Enterprise 2020 (RIE2020) Plan, a PPP initiative under which public research agencies and medical institutions plan to collaborate on the development of an ecosystem to better enable the translation of research to improve health outcomes, with a focus on enhancing the efficiency of health services delivery<sup>85</sup>. Under RIE2020, five therapeutic areas of focus have been identified: cancers, cardiovascular diseases, diabetes mellitus and other metabolic or endocrine conditions, infectious diseases, and neurological and sense disorders. Grants and funding mechanisms, such as the Industry Alignment Fund Pre-Positioning scheme have also been put in place to support this initiative<sup>86</sup>.

**Figure 1: A\*STAR’s multi-faceted approach towards industry engagement**



83 "Interview with Chairman Philip Yeo". SMA News. 11 November 2009. <http://news.sma.org.sg/4111/Feature.pdf>

84 "20 years of Science and Technology in Singapore". A\*STAR. 2012. [https://www.a-star.edu.sg/Portals/0/aboutastar/2012\\_Commemorative\\_Pub\\_Webv6.pdf](https://www.a-star.edu.sg/Portals/0/aboutastar/2012_Commemorative_Pub_Webv6.pdf)

85 "RIE2020 Plan: Health and Biomedical Sciences". National Research Foundation. September 2018. <https://www.nrf.gov.sg/rie2020/health-and-biomedical-sciences>

86 "RIE2020 Plan: Health and Biomedical Sciences". National Research Foundation. September 2018. <https://www.nrf.gov.sg/rie2020/health-and-biomedical-sciences>

## The workforce of the future

Workforce challenges are evident within the Asia Pacific region, as staffing shortages become increasingly acute in health and social care, as well as hospital specialities. But the talent issue goes beyond that: the region faces a scarcity of leaders with strategic next-generation skills to guide and support the transformation to becoming patient-centric, insight-driven, and value-focused organisations.

Although digital technology, robotics, and other automated tools have the enormous potential to resolve current and future workforce pain points, the future of work is likely to be powered by an augmented workforce – one that combines people with machines to do things in a way that is not only more productive, but also more rewarding. In Asia Pacific, we have witnessed how the ability to automate repetitive, rule-based tasks could leave humans to handle higher-level functions, focusing on work that is more meaningful and directly tied to the organisation's mission (see Case Study 23).

The technology-enabled enterprise management model of the future would also require a digitally-savvy workforce that is able to understand how best to leverage technology to manage operations, implement clinical pathways, and optimise processes. For instance, a lot of time and effort is currently required to collate patient data, review it, and then use it for decision-making. With the use of AI, however, this process can be automated, making it easier for doctors to make decisions for their patients, and leaving more time for direct patient care. In Asia Pacific, one such example of this application can be seen in the Command Centre that is being implemented in Singapore (see Case Study 24).



### Case Study 23

#### Pill-packing robots in pharmacies

An employee that works seven days a week, with no breaks, no pay, and no mistakes sounds too good to be true. But “he” actually exists at Life Pharmacy in Rotorua, New Zealand, where “he” fills out blister packs of prescription medicine. Known as Alpaca, “he” is a robot that is helping to free up pharmacy staff from time-consuming tasks and enabling them to serve customers more quickly: while they previously had to tell customers to return the next day for their medication, prescriptions can now be turned around in half an hour. At the same time, the checks and balances of the robotic system help the pharmacy to reduce the potential for human errors in filling out its prescription orders<sup>87</sup>.

But this pharmacy is no exception: the Alpaca robot is dispensing and packing drugs in 100 pharmacies across New Zealand. One of the first to install the robot a few years ago was Fiona Grove's West Auckland Unichem pharmacy. Packing pills for hospitalised and elderly customers, the robot enabled Fiona to cut her staff by about 30%, which was achieved through natural attrition. Although the robot initially costed more than NZD 65,000, it paid for itself within two years. With the robot, the pharmacy is now also able to offer extra in-house services, such as immunisations, blood pressure checks, and emergency contraceptive consultations, which it did not have enough time to do before<sup>88</sup>.

In the long run, such technologies may help to alleviate some of New Zealand's brain drain problems in the Life Sciences and Health Care industry, which is facing a severe shortage of doctors.

87 “Rotorua's robot pharmacist”. Stuff.co.nz. 27 January 2017. <https://www.stuff.co.nz/waikato-times/news/rotorua-review/88781225/Rotoruas-robot-pharmacist?rm=m>

88 “Pill packing robot cheaper than staff for pharmacies”. Stuff.co.nz. 17 November 2017. <https://www.stuff.co.nz/business/98876563/pill-packing-robot-cheaper-than-staff-for-pharmacies>





#### Case Study 24

##### Deploying a Command Centre for better decision-making

As part of the Discovery AI initiative that has been test-bedded at the National University Hospital, a Command Centre – an intricate map of patient data that gives doctors an overview of every single patient in a hospital – has been put in place.

On the map, each patient is represented by a concentric circle containing details such as the patient's age, medical condition, medication, length of stay, ward class, and breakdown of hospital fees. The Command Centre can even predict the probability that a patient will be re-admitted, so that doctors can take preventive actions to avoid these situations<sup>89</sup>.

But Dr Ngiam Kee Yuan, National University Health System's group chief technology officer, stressed that there is still one crucial element that AI cannot replace: the human touch. "It makes us better, more efficient, more precise. I must emphasise that none of the tools that we build are to replace doctors, they are all to help us become better at what we do to improve the accuracy of doctors making diagnoses," commented Dr Ngiam<sup>90</sup>.

89 "Artificial Intelligence platform launched to help doctors crunch patient data, make better diagnoses". Channel NewsAsia. 6 July 2018. <https://www.channelnewsasia.com/news/singapore/artificial-intelligence-platform-launched-to-help-doctors-crunch-10505634>

90 "Artificial Intelligence platform launched to help doctors crunch patient data, make better diagnoses". Channel NewsAsia. 6 July 2018. <https://www.channelnewsasia.com/news/singapore/artificial-intelligence-platform-launched-to-help-doctors-crunch-10505634>

# The way forward



With value-based competition the new reality, companies must change the way they evaluate treatments and adopt them into practice. Life Sciences and Health Care companies in Asia Pacific could benefit from addressing the evolving needs of their stakeholders by understanding the different care delivery models across the region; identifying the appropriate metrics to measure outcomes; capturing real-world evidence; and extracting meaningful insights with the right data tools.

When it comes to emerging technologies, real-world engagement is the best way to understand the nature of the opportunities and challenges that they present. Pilots, for instance, can be used to support collaborations and knowledge-sharing across the organisations and between different partners. For Life Sciences and Health Care companies, forming strategic alliances with technology companies could be one way to tap into their expertise in the consumer experience.

But collaborations should not stop there. With patient groups growing in influence, personalised medicine is driving clinical innovation and research. Early engagement with regulators, too, can help to accelerate the development of innovative treatments. All these require that companies adopt an ecosystem view of their stakeholders – from academia, to non-profits, governments, and the patient.

# Contact us

For more information, please contact

**Mohit Grover**

Executive Director, Risk Advisory  
mogrover@deloitte.com  
+65 6531 5207

**Loke Wai Chiong**

Executive Director, Risk Advisory  
wcloke@deloitte.com  
+65 6800 2885

**Southeast Asia Life Sciences and Health Care practice**

**Southeast Asia Industry  
Leader**

**Mohit Grover**

mogrover@deloitte.com  
+65 6531 5207

**Audit & Assurance**

**Sanjay Panjabi**

spanjabi@deloitte.com  
+65 6216 3142

**Brunei**

**Daniel Ng Hui Hua**

hung@deloitte.com  
+673 222 5880

**Lao PDR**

**Choopong Surachutikarn**

csurachutikarn@deloitte.com  
+66 2676 5700

**Consulting**

**Kavita Rekhraj**

krekhraj@deloitte.com  
+60 3 7610 9006

**Cambodia**

**Kimheng Khoy**

kkhoy@deloitte.com  
+855 2396 3788

**Philippines**

**Marites Landicho**

mblandicho@deloitte.com  
+63 2 581 9063

**Financial Advisory**

**Keoy Soo Earn**

skeoy@deloitte.com  
+65 6216 3238

**Guam**

**Lee Vensel**

lvensel@deloitte.com  
+1 671 646 3884

**Singapore**

**Mohit Grover**

mogrover@deloitte.com  
+65 6531 5207

**Risk Advisory**

**Mohit Grover**

mogrover@deloitte.com  
+65 6531 5207

**Indonesia**

**Steve Aditya**

staditya@deloitte.com  
+62 21 5081 9707

**Thailand**

**Mark Kuratana**

mkuratana@deloitte.com  
+66 2034 0125 ext. 40125

**Tax & Legal**

**Richard Mackender**

rimackender@deloitte.com  
+65 6216 3270

**Malaysia**

**Cheryl Khor**

ckhor@deloitte.com  
+60 3 7610 8871

**Vietnam**

**Phong Le Viet Anh**

phongle@deloitte.com  
+84 28 3910 0751 ext. 7125

**Myanmar**

**Aye Cho**

aycho@deloitte.com  
+65 6800 2255



Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited (“DTTL”), its global network of member firms, and their related entities. DTTL (also referred to as “Deloitte Global”) and each of its member firms are legally separate and independent entities. DTTL does not provide services to clients. Please see [www.deloitte.com/about](http://www.deloitte.com/about) to learn more.

Deloitte is a leading global provider of audit and assurance, consulting, financial advisory, risk advisory, tax and related services. Our network of member firms in more than 150 countries and territories serves four out of five Fortune Global 500<sup>®</sup> companies. Learn how Deloitte’s approximately 286,000 people make an impact that matters at [www.deloitte.com](http://www.deloitte.com).

#### **About Deloitte Southeast Asia**

Deloitte Southeast Asia Ltd – a member of Deloitte Touche Tohmatsu Limited comprising Deloitte practices operating in Brunei, Cambodia, Guam, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam – was established to deliver measurable value to the particular demands of increasingly intra-regional and fast growing companies and enterprises.

Comprising approximately 340 partners and 8,800 professionals in 25 office locations, the subsidiaries and affiliates of Deloitte Southeast Asia Ltd combine their technical expertise and deep industry knowledge to deliver consistent high quality services to companies in the region.

All services are provided through the individual country practices, their subsidiaries and affiliates which are separate and independent legal entities.

#### **Disclaimer**

This communication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively, the “Deloitte Network”) is, by means of this communication, rendering professional advice or services. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser. No entity in the Deloitte Network shall be responsible for any loss whatsoever sustained by any person who relies on this communication.