HEALTHCARE & LIFE SCIENCES REVIEW

PHARMA BOARDROOM

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THE HEART OF ASIA PACIFIC PAGE 21

SINGAPORE

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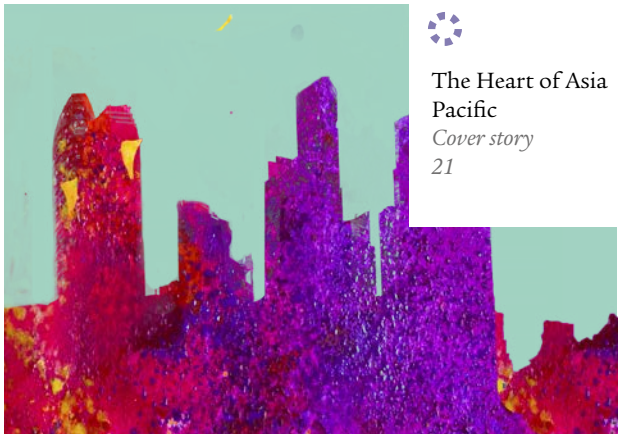
Jack of all Trades - An Exclusive Interview with Takeda's President of Emerging Markets
Interview 40



The Heart of Asia Pacific
Cover story 21

Emerging Asia - leading the digital charge
Featured 50

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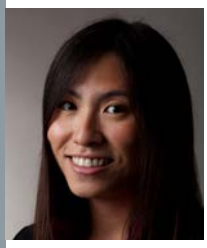
CONTENTS

— February 2017



In fast growing regions such as Asia, many countries are confronted with unmet healthcare needs and increasing accesibility to healthcare. Singapore has invested strongly in building up our biomedical sciences industry to date, and has built up a strong foundation.

Today, Singapore is home to more than 50 biomedical sciences manufacturing plants, producing a wide range of products ranging from drugs to medical devices and equipment, with a combined manufacturing output of more than $26 billion in 2014. With over 30 leading biomedical sciences companies basing their regional headquarters here, Singapore is also a key base for companies to access the fast-growing Asia-Pacific markets.

On the research front, business expenditure in R&D (BERD) in Biomedical & Related Sciences and Biomedical Engineering has increased more than four times from around S$140 million in 2002 to more than S$630 million in 2014. The employment of researchers has also grown more than three times from around 500 to 1500 in the same period. As a whole, the industry employs an estimate of over 25,000 people across manufacturing, R&D and commercial activities today.

Looking ahead, heathcare models are shifting, particularly with aging populations and increasingly pervasive chronic diseases, ASEAN today is a US$2.5 trillion economy, with an expected GDP growth averaging 5% in the coming years. Collectively, it has a population of more than 650 million people and it is already the seventh largest economy in the world.

These trends present key opportunities for governments, companies and institutions alike. Navigating the region's complex markets and meeting the growing demand for healthcare solutions is critical for the development of the sector. With its pro-business environment, coneectivity to the region and strong talent pool, Singapore has been future-ready in responding to changing healthcare needs over the years.

The Singapore Government is commmitted to developing the biomedical sicences sector in the years to come. I am confident that the industry in Singapore will continue to grow and play a critical role in addessing healthcare needs in the region and beyond. We will strive to ensure that our continued efforts will accelerate Singapore's shift from beign a value adding economy to being a value creating one, to bring about sustainable development in the long run.

Weng Si Ho
Director (Biomedical Sciences)
Singapore Economic Development Board (EDB)

Preface

As a tiny city-state with limited land and natural resources, Singapore has had to carve out its own niche as a global trade hub and gateway to the Asia-Pacific region to compete globally since declaring independence in 1965. In terms of healthcare and life sciences, the island now serves as a regional hub for myriad multinationals, stands at the forefront of cutting-edge scientific research and development, and is globally renowned in several important levels of the pharmaceutical supply chain, such as logistics.

However, with a number of countries from emerging Asia now catching up to Singapore, this report tackles how the Lion City is repositioning itself to fend off new challengers and maintain its status as the beating heart of Asia-Pacific.

Through in-depth interviews with industry leaders in both the public and private sectors, as well as exclusive articles and detailed facts and figures, this report helps paint a picture of how actors within Singapore are pivoting their operations to combat the problems of aging populations and increasingly pervasive chronic diseases; the new realities of global healthcare. A country that has based much of its extraordinary growth over the last 50 years on international capital inflows is now focusing on building truly innovative homegrown companies and looks set to stay ahead of the curve for years to come.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Singapore

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AMPLIFIED CONTENT

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PETER ULVSKJOLD –
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FREDERIK BEELAERTS VAN BLOKLAND –
SVP & Regional Head of Marketing & Sales Asia Pacific, Panalpina, Singapore

BRENT SCOTT –
President of Asia, Stryker, Singapore

IN BRIEF

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Ng Tian Wee of @PierreFabre Asia Pacific on the importance of SIngapore as a regional hub #pharma

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Christopher Snook, Country President #Singapore & Head of Group Country Mgmt at @Novartis on adhering to regulation

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Massimiliano Colella of @SmithNephewPLC talks diversity in Southeast Asian #medtech markets #Singapore

Read the interview

@GSK_Asia

Richard Saynor chats with @pharmaboardroom about what's keeping him busy and benefits of operating in #Singapore.

Read the interview

SINGAPORE FACTS

Population:
5,781,728

Area:
697 sq km (192nd globally)

Ethic groups: (2013 est.)
Chinese 74.2%
Malay 13.3%
Indian 9.2%
Other 3.3%

GDP (PPP):
$486.9 billion
(2016 est.)

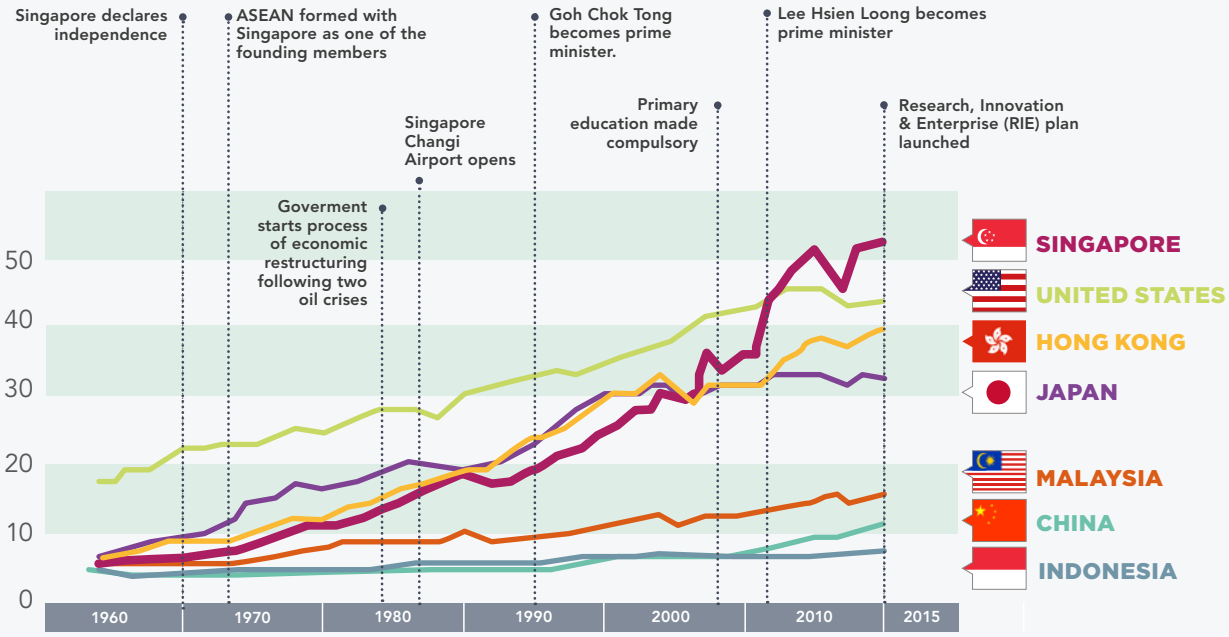
Source: CIA World Factbook

HOME TO OVER 40 PERCENT OF GLOBAL MNCS' REGIONAL HEADQUARTERS

Source: EDB, 2016

STAR PERFORMANCE

REAL GDP PER PERSON, AT PPP* $'000



*Purchasing-power parity

Source: Penn World Table, University of Groningen; UN; The Economist

LEADING THE PACK FOR INVESTOR FRIENDLINESS

EASE OF DOING BUSINESS	LABOUR FORCE	INNOVATION INPUT
1 SINGAPORE	1 SINGAPORE	1 SINGAPORE
2 NEW ZEALAND	2 US	2 SWITZERLAND
3 HONG KONG	3 TAIWAN	3 FINLAND
4 DENMARK	4 SWITZERLAND	4 HONG KONG
5 REPUBLIC OF KOREA	5 BELGIUM	5 US

Singapore was the top-ranked Asian country in the Global Innovation Index 2015.

Source: EDB, 2016

THE EVOLVING HEALTHCARE LANDSCAPE IN SINGAPORE

DEMAND FOR HEALTHCARE WORKERS

Source: MOH, 2015

Average population Increase: 6 (2015) → 45 (2030)

\+ Citizens aged 65 and above: 340K (2015) → 900K (2030)

\+ Citizens aged 80 and above: 70K (2015) → 210K (2030)

= Increase in demand for healthcare workers: 82%

CAPACITY OF AGE CARED SERVICES

- Nursing home care beds increase by **7,200**
- **1,000** more home pallitative care places
- **Twice** The number of centre based care places
- **3,500** more home care places

SINGAPORE AS A MEDICAL TOURISM HUB

- **50%** Cheaper than USA in terms of medical cost
- **4th** Best healthcare infrastructure (2010)
- **2** Consecutive years for 'Best medical/Wellness Tourism Destination' award (2007,2008)

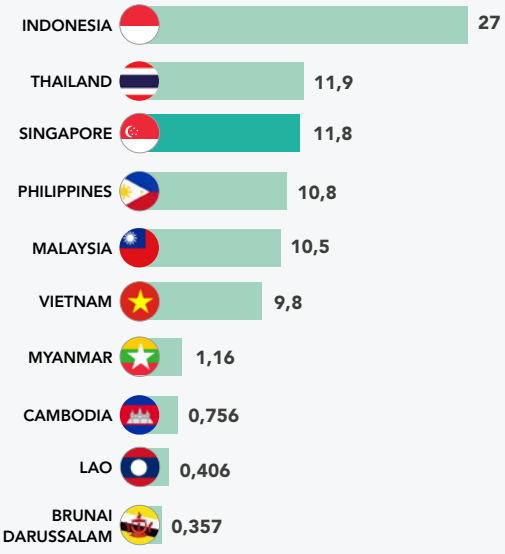
TOP 10 CAUSES OF DEATH PER YEAR (2014)

Deaths

Source: WHO 2014; Worldlifeexpectancy.com

CORONARY HEART DISEASE	4,228	19.71%
INFLUENZA AND PNEUMONIA	4,036	18.82%
STROKE	2,079	9.69%
LUNG CANCERS	1,524	7.11%
COLON-RECTUM CANCERS	1,090	5.08%
KIDNEY DISEASE	1,013	4.72%
LIVER CANCER	643	3.00%
BREAST CANCER	622	2.90%
LUNG DISEASE	603	2.81%
STOMACH CANCER	510	2.38%

HEALTHCARE EXPENDITURE - SINGAPORE COMPARED TO REST OF SE ASIA



Of the 10 ASEAN members, Singapore is by far the most developed and efficient healthcare provider and annually spends the most per capita on health.

Source: ASEAN, TforG 2015

SINGAPORE HEALTH RISK FACTORS

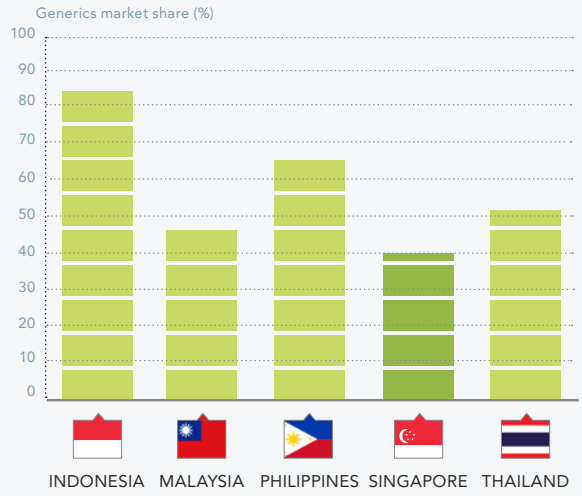
PER 100,000 POPULATION

Source: WHO 2014; Worldlifeexpectancy.com

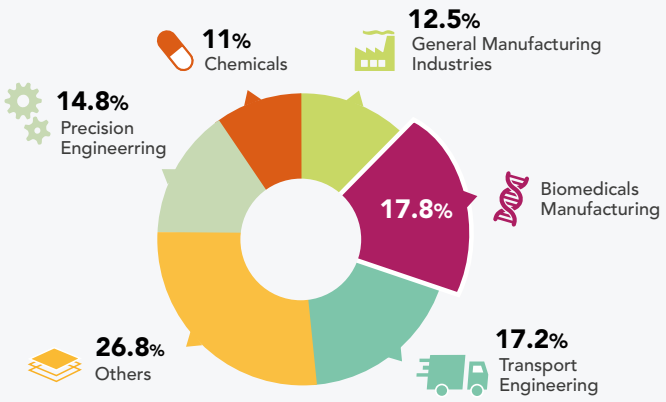
	Rank			
SMOKING PERCENT	81/82	MALE 28.0	FEMALE 5.0
ALCOHOL LITERS	139	TOTAL 2.9	
OBESITY PERCENT	141/176	MALE 5.7	FEMALE 6.8

GENERICS PENETRATION IN SOUTHEAST ASIA

Source: Gabi, 2014



SINGAPORE MANUFACTURING SECTOR BREAKDOWN



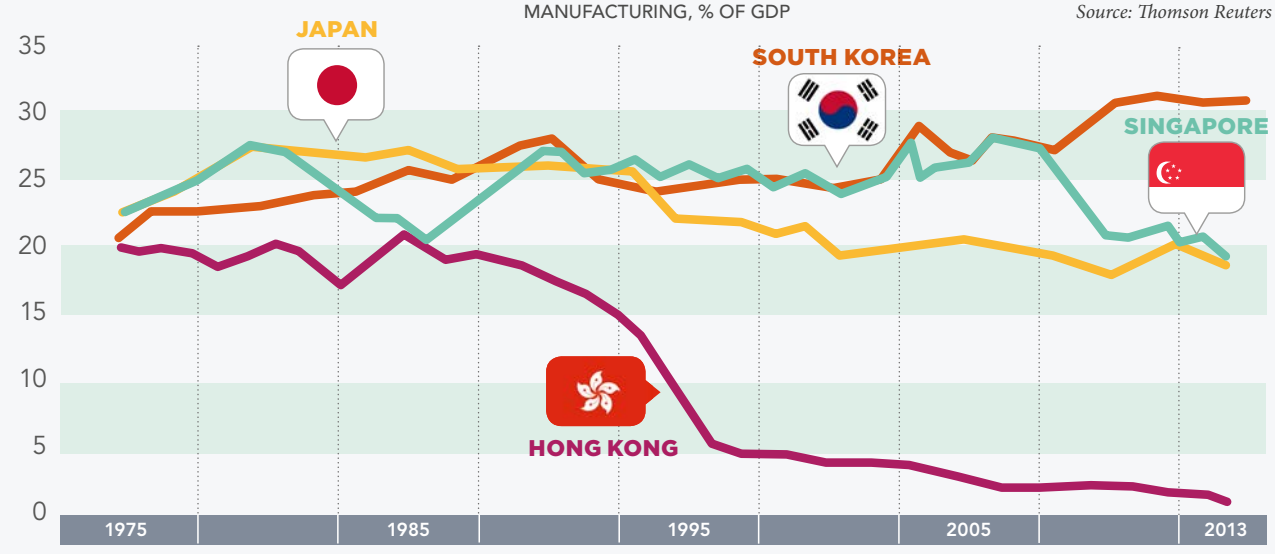
Singapore's medical technology sector contributes about SG $4.3 billion and around 9000 jobs to the country's economy. To put this into perspective, 10 percent of the world's contact lenses, over 70 percent of microarrays, and roughly half of the world's thermal cyclers and mass spectrometers are currently produced in Singapore.

Source: EDB, Emerging Strategy 2016

STILL MAKING STUFF

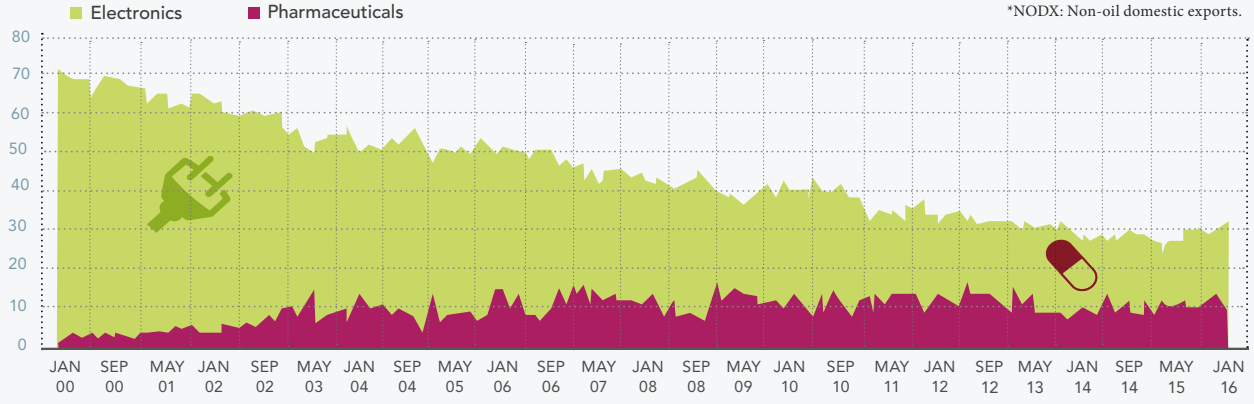
MANUFACTURING, % OF GDP

Source: Thomson Reuters



ARE PHARMACEUTICALS HELPING REVIVE SINGAPORE'S FLAGGING EXPORT SECTOR?

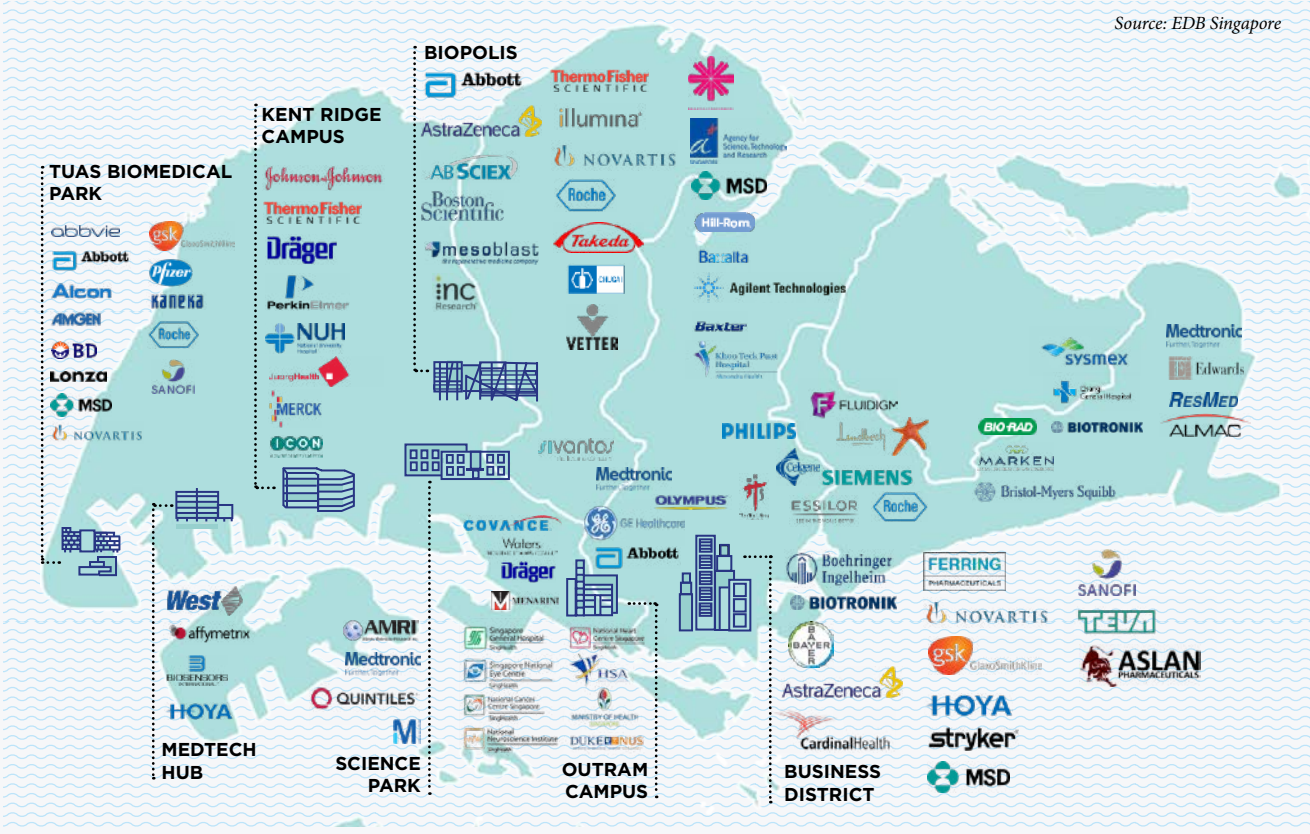
SINGAPORE - ELECTRONICS & PHARMACEUTICAL NODX*, & OF TOTAL



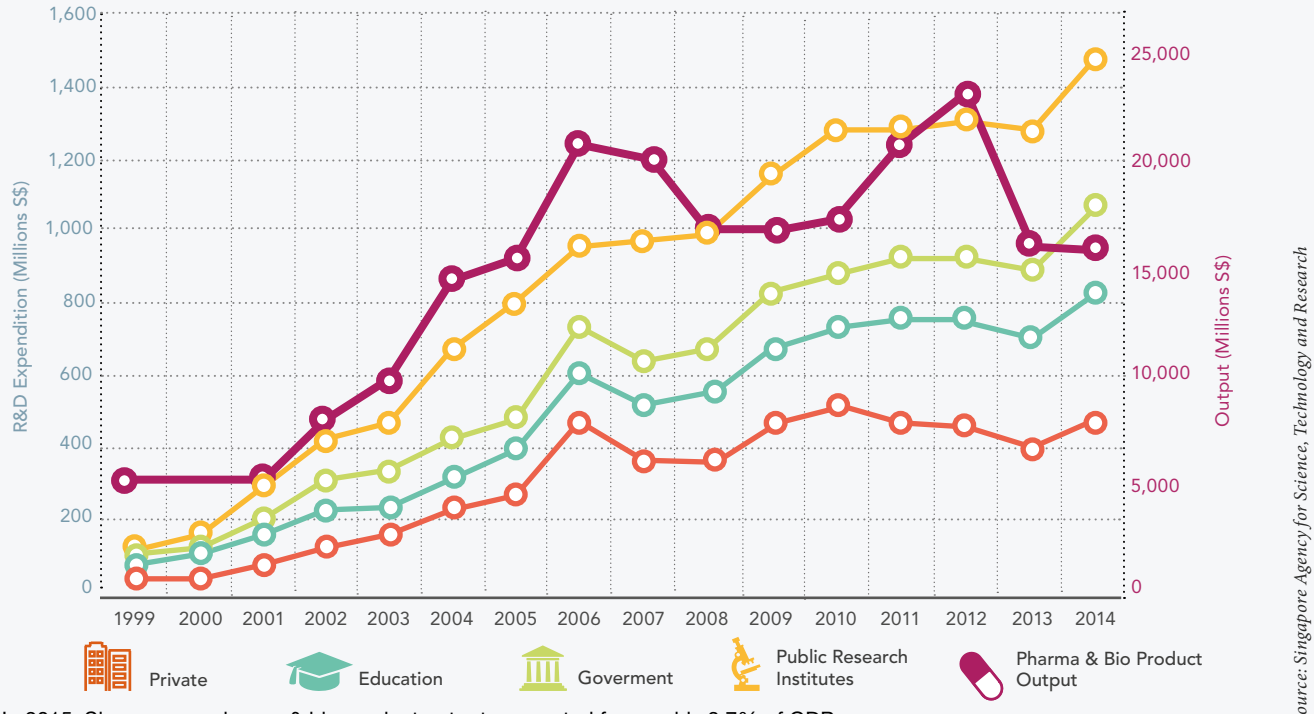
Source: BMI, Bloomberg

BIOMEDICAL SCIENCES INDUSTRY

Source: EDB Singapore



BIOSCIENCES R&D EXPENDITURE & OUTPUT



Source: Singapore Agency for Science, Technology and Research

In 2015, Singaporean pharma & bio product output accounted for roughly 3.7% of GDP

FROM EXCEPTION TO EXCEPTIONAL

Preface: Since gaining independence in 1965, Singapore has invested heavily in moving beyond being a mere supplier of low cost labor like many of its Asian neighbors and pivoting into a more knowledge-based and innovation-intensive economy.

Chemicals, engineering, and electronics have always served as key manufacturing segments, but only starting from 2000, with the implementation of the Biomedical Sciences (BMS) Initiative, have the pharmaceutical and biotech realms become a strategic focus. With an injection of more than USD five billion, segmented into three phases over the past 15 years, Singapore has strived to construct a self-sustaining terrarium comprising comprehensive, end-to-end capabilities for biomedical research, development, and manufacturing. In many respects, the country has succeeded in becoming a simply irresistible platform for companies looking to tap into lucrative Asian markets and enhance their R&D productivity, with over 30 of the world's top pharmaceutical biotechnology and medical technology companies now using Singapore as a regional center of excellence to host a variety of their core business activities.

And the vitality of Singapore's investment pipeline remains fruitful so far. On the biologics front AbbVie recently committed USD 320 million to construct its first manufacturing plant in Asia and Amgen inaugurated its USD 145 million bio manufacturing plant two years ago. Chugai has pledged USD 355 million through to 2021 to ramp up its R&D efforts, while GSK is investing a further USD 57 million to enhance its antibiotic manufacturing facility. Ferring recently opened up its regional HQ for APAC and plans on investing USD 7.5 million in R&D over the next five years.

With respect to Horizon 2020, under the sixth science and technology plan for Singapore, Prime Minister Lee Hsien Loong has recently unveiled the RIE2020 Plan, which entails a government commitment of S$19 (USD 14) billion over 2016 to 2020 to research, innovation and enterprise to take Singapore to through its next stage of development. This is 18 percent more than the previous plan, with spending close to one percent of the nation's GDP.

Under this plan, Singapore seeks to support and translate research, build up the innovative capacity of its companies to drive economic growth, and leverage science and technology to address national challenges. Resources will be prioritized in four key areas: advanced manufacturing and engineering (17%), health and biomedical sciences (21%), services and digital economy, and urban solutions and sustainability.

Essentially, RIE2020 aims to smash research silos by getting interdisciplinary groups to work together under broad groupings, increase competition for funding to get the best research, train people in the right areas and get the best out of them. These efforts strive to fortify the country against a backdrop of brethren ASEAN countries looking to replicate Singapore's development curve and allure, while buffering the country's assets to shine through a post-modern era.

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ATTRACT, TRANSFORM, CREATE

WENG SI HO

Director of Biomedical Sciences, EDB

Preface: The Singapore Economic Development Board (EDB) director of biomedical sciences, Weng Si Ho highlights three values: 'attract,' transform,' and 'create' as the primary strategic focuses of the organization and explains how, ultimately, they serve to help sustain Singapore's future value proposition to healthcare and life science companies

HCLS: What items have been occupying the bulk of your agenda since assuming this role in January 2016?

WENG SI HO (WSH): Singapore has done well to date, but now the question is how do we remain competitive and evolve alongside the industry's own development? Healthcare models are shifting, particularly with aging populations and increasingly pervasive chronic diseases. In Singapore, it is about creating the right environment so that companies can benefit from the capabilities that we have built. Companies then adopt and pivot to new healthcare models, in order to continue growing their businesses.

Our overall strategic framework is Attract, Transform, and Create (ATC). "Attract" has us very much focused on growth, but by selectively attracting the type of activities that align with Singapore's priorities to ultimately ensure sustainable growth.

"Transform" focuses on working with the already established base of companies in Singapore to adopt the latest trends and technologies to stay competitive and remain sustainable in Singapore in the long-term.

"Create" is our latest agenda, and is specifically targeted at cultivating new businesses from Singapore. Startups are certainly one aspect of that objective, but of course it's also about helping MNCs and large local enterprises create new lines of business out of Singapore. Given the country's capabilities in not only biomedical sciences, but all the other complementary sectors as well, we hope the close integration and co-location of industries can make some magic happen.

This is especially relevant in the greater context of how healthcare is evolving. In the future, healthcare solutions might not only be delivered by just incumbent healthcare players—certain partnerships may need to be taken into consideration. With the advent of digital technologies effectively disrupting care models, we may start seeing the surge of more companies from, for example, IT or insurance entering the mix, alongside traditional pharma, medtech, and nutrition companies to meet modern day healthcare challenges.

HCLS: Spanning all the sectors under EDB's scope, how do biomedical sciences align with the organization's primary interests?

WSH: We are one of the key sectors in Singapore, as we're now the second largest contributor to manufacturing output. This is alongside the country's other industry pillars including chemicals, electronics, and engineering.

Currently, about 3.5 to 4 percent of our GDP is currently attributed to the biomedical sciences manufacturing sector, amounting to roughly SGD 27 billion, of which SGD 16 billion is coming from the pharma industry and SGD 11 billion from medtech. In terms of manufacturing workforce, the biomedical sciences employs more than 18,000 workers, with the medtech

> IN SINGAPORE, IT IS ABOUT CREATING THE RIGHT ENVIRONMENT SO THAT COMPANIES CAN BENEFIT FROM THE CAPABILITIES THAT WE HAVE BUILT. COMPANIES THEN ADOPT AND PIVOT TO NEW HEALTHCARE MODELS, IN ORDER TO CONTINUE GROWING THEIR BUSINESSES.

sector typically requiring more people—>12,000 to pharma's >6,000.

HCLS: Particularly invoking this concept of a "Future Ready Singapore," what direction will Singapore's biomedical sciences landscape now take in relation to national priorities?

WSH: Singapore is not a large country, so to remain competitive we need to always plan in a forward-thinking manner. In addition, we do have the luxury of a stable government, leaving ample opportunities to consistently pursue longer term objectives. This is start in the latest Research, Innovation, and Enterprise Plan (RIE 2020)—the national budget for R&D, which is determined in five-year tranches.

For biomedical sciences specifically, the first phase was launched in 2000 and focused on building the foundation—putting in the core scientific capabilities, establishing the Biopolis, and establishing fundamental pillars to build the landscape.

Phase two then was about moving into translational and clinical research—effectively taking the science from bench to bedside.

Phase three, which just culminated in 2015, focused on integrating all these capabilities and forging industry partnerships.

The current phase will now focus on driving health outcomes for Singapore, not just economic ones. Together with the Ministry of Health (MoH), we have defined the top five therapeutic areas of national priority: diabetes, infectious diseases, cancer, sensory and neurological disorders, and cardiovascular diseases.

HCLS: And where does EDB then come into play?

WSH: Of course as a development agency, we focus on the economic outcomes. We work closely with the MoH to bridge public sector resources with industry capabilities to drive the healthcare outcomes. It's only by establishing that collective drive can we begin achieving our goals on both fronts.

As a case in point, the health minister recently declared war on diabetes, a pervasive problem in not only Singapore but across the entire region—60 percent of the world's diabetics actually reside in Asia. In Singapore, it is predicted that one in three people will be afflicted with this disease at some point in their lifetime.

In response, we have organized different roundtables to bring together the unconventional industry partners together with government stakeholders and healthcare providers, to obtain a variety of perspectives on the same challenge. It's about bringing together all encompassing stakeholders to collectively look at the patient journey, understand the points where intervention can and should take place, and ultimately develop the business model to drive these solutions. Essentially, it's about bringing together all relevant parties together to brainstorm and discuss opportunities for collaboration towards tangible outcomes that meet the needs of both patients and Singapore.

UNITING HEALTHCARE LEADERS

Preface: CEO of the Asia Pacific Medical Technology Association (APACMed), Fredrik Nyberg explains the rationale behind the creation of the first regional medical technology association; the industry challenges ahead, and the critical importance of bringing together all industry stakeholders to effectively advance the development of medical technology across Asia Pacific.

Fredrik Nyberg
APACMED

HCLS: Could you please introduce to our international readers the rationale behind APACMed's establishment, as well as the main responsibilities of the association?

FREDRIK NYBERG (FN): APACMed was established in late 2014 as a non-profit trade association with the aim of unifying the medical technology industry across Asia Pacific to raise standards of care for patients in the region. Our founding members are some of the world's largest medical devices, equipment and in vitro diagnostics manufacturers.

The diversity across Asia Pacific, in terms of demographics, disease profiles, healthcare systems, and regulatory regimes presents big challenges. Our aim is to support our member companies in addressing these challenges.

National, country-based industry associations have existed in many part of the region for some time. But until now, there had been no overarching medical technology association covering all of Asia Pacific, specifically addressing regional issues and challenges. As an association, we have two equally important responsibilities: firstly, to add value, stay relevant and serve our member organizations. Secondly, to serve our patients and ensure that they have timely access to the most appropriate medical technologies and innovations.

HCLS: What is the main strategy that the association is following in Asia Pacific in terms of the medical technology business?

FN: Our mission is simple: we strive to improve the standards of care for patients through innovative collaborations, to jointly shape the future of healthcare in Asia Pacific. It is a patient-centric mission that focuses on collaborating in new, innovative ways with a diverse range of stakeholders within a complex healthcare ecosystem.

We have defined three strategic pillars, which underpin everything we do: access, innovation and collaboration. Firstly, "access" is centred on working closely with regulators and policy makers to develop policies that improve patient access to high quality healthcare.

Secondly, "innovation" aims to promote cost-effective, value-based approaches to healthcare, to ensure product portfolios meet regional needs.

Finally, "collaboration" aims to provide an industry platform for knowledge exchange, to raise awareness, and to meet the demands of the markets in Asia Pacific. We have also recently identified the need for much greater collaboration among industry stakeholders to build regulatory capacity, to enhance the pace and quality of medical education and to accelerate the adoption of new innovative healthcare delivery models.

HCLS: Why was APACMed established in Singapore and what is the strategic importance of the region to your members?

FN: It is not a coincidence that we are headquartered in Singapore, as most medical technology MNCs have their Asia Pacific headquarters here. To date, over 30 medical technology companies have set up operations in Singapore to produce medical devices for both regional and global markets. But I should add that we also have members with regional offices in Hong Kong, Shanghai and Tokyo.

Asia Pacific is of major strategic significance to our member companies. Ten or fifteen years ago, the focus was almost exclusively on Japan and China. Today, the region as a whole contributes to 15-20% of global sales for many of our members, and markets such as India, Indonesia and Vietnam are getting much greater attention.

This is also the region of the world that continues to drive overall growth in our sector. Many of our member companies have multiple manufacturing plants and R&D centres in the region.

A recent McKinsey study indicates that the Asia Pacific medical technology market will exceed the EU in size by 2020 to become the world's second largest market after the U.S.

> "IT IS NOT A COINCIDENCE THAT WE ARE HEADQUARTERED IN SINGAPORE, AS MOST MEDICAL TECHNOLOGY MNCS HAVE THEIR ASIA PACIFIC HEADQUARTERS HERE. TO DATE, OVER 30 MEDICAL TECHNOLOGY COMPANIES HAVE SET UP OPERATIONS IN SINGAPORE TO PRODUCE MEDICAL DEVICES FOR BOTH REGIONAL AND GLOBAL MARKETS.

HCLS: How have regulators across the region perceived the creation of such association?

FN: Regulators have been very welcoming. To ensure that patients have timely access to new, safe medical technology innovations, industry and regulators must work together. For example, in emerging markets where device regulations are new and evolving, the industry can play a key role in supporting regulatory capacity building and provide training on new technologies.

For compliance reasons, regulators nowadays often prefer to deal with an industry body rather than working on a one-on-one basis with individual companies.

The regulatory environment in the region is complex, and there are several initiatives aimed at regulatory harmonization or convergence. An independent association such as APACMed is well placed to be the voice of the industry and lead a constructive dialogue with regulators on these topics. We are already working actively with organizations such as AHWP (Asian Harmonization Working Party), APEC-RHSC (APEC Regulatory Harmonization Steering Committee) and CIMDR (China International Medical Device Regulatory Forum).

HCLS: What trends in Asia Pacific must industry executives start taking into consideration now to ensure long-term, sustainable success in the future?

FN: The megatrends of a rapidly ageing population, a growing middle class, and a rising chronic disease burden are all driving demand for quality healthcare. Addressing this growing demand will require a different kind of innovative thinking on the part of all stakeholders. We will need to collaborate differently to solve our common health care challenges.

In addition, there are other trends that will drive growth and cannot be ignored: expanding universal healthcare coverage; an increase in private healthcare infrastructure; and the adoption of digital health technologies to enable alternative delivery models.

A RECIPE FOR SUCCESS

Preface: Singapore, though conscious of its limitations, has been able to leverage its key assets of location, infrastructure and local talent to become the business hub for the entire region, with pharma and biotech as key components in its success.

It is not a coincidence that more than 30 of the top 100 biomedical companies globally have their regional headquarters in Singapore. It is well known that the nation offers a unique situation that, despite the comparatively small size of the market, makes it a great place to establish a flagship office in Asia.The executive director of the French Chamber of Commerce and Industry (FCCI) in Singapore, Carine Lespayandel, says that "Singapore is indeed an attractive investment destination, especially for the biomedical sector, because it has sophisticated infrastructure, a relevantly skilled workforce and great logistical connectivity to regional markets. Most notably, it has a robust intellectual property framework, ranked fourth in the World Economic Forum's Global Competitiveness Report 2015/2016, which bolsters the confidence of medical technology firms and investors."

The Singapore Economic Development Board (EDB) is working hard to create the conditions necessary to attract foreign companies. Leading enterprises that have already set up their regional headquarters, manufacturing sites, and R&D centers in Singapore include Sanofi, International SOS, BioMérieux, and Servier. Singapore also has several business friendly organizations such as BioSingapore, SAPI and the different country chambers that are tailored to facilitating business processes, innovation acceleration and developing relations between the Singaporean and international business communities.

In comparison to other regions such as Europe and North America, it is quite normal to see public-private partnerships used in both Singapore and Asia to build up biomedical industry expertise. Business interests and the government's health objectives therefore converge in order to meet upcoming needs for services, support, and solutions in integrated ecosystems. The president of SAPI

(the Association of Pharmaceutical Industries), Ti Hwei How, explains that "Singapore is the example of how efficiency can be improved when the government and the industry work together collaboratively."

In order to maintain its leading regional position, the Singaporean government remains receptive to foreign investment, with a number of initiatives rolled out to make Singapore a more competitive and attractive place to do business. The executive director of the American Chamber of Commerce in Singapore, Judith Fergin, elucidates the inherent need to look for external resources, "Singapore is a small market with few natural resources, so it was with purpose that the government originally focused on attracting foreign direct investment to develop the economy." In order to attract foreign interest, it was imperative for Singapore to establish the proper setting, environment, and incentives.

> "SINGAPORE IS THE EXAMPLE OF HOW EFFICIENCY CAN BE IMPROVED WHEN THE GOVERNMENT AND THE INDUSTRY WORK TOGETHER COLLABORATIVELY.
>
> **TI HWEI HOW** SAPI

One of the government's priorities is attempting to understand how science, technology and innovation can help Singapore to be more competitive in the future economy. Pharma and biotech remain a fundamental part of the country's biomedical strategy, now and moving forward, including disruptive technologies such as genomics, imaging, and digital monitoring, in which A*Star plan to invest heavily. Indeed, the government plans to invest USD 14 billion into R&D over the next five years with USD three billion being directed to biomedical research.

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THE HEART OF ASIA PACIFIC

The narrative of Singapore's economic miracle will be all too familiar to many readers: a country that was never meant to be, transforming itself from a sleepy fisherman's hollow into a thriving metropolis that is now among the richest nations in the world in terms of GDP per capita. With limited land and natural resources, this island city-state has managed to carve out its own unique value proposition over the last 50 years as a leading global hub of trade, and a facilitator of access for companies looking to unlock Asia's untapped potential; "Singapore remains an extraordinarily logical place to lead operations for either Southeast Asia or Asia Pacific: it's quite frankly an easy sell to corporate boards, risk management teams, and families seeking to relocate," quips A.T. Kearney's head of health practice for Asia Pacific Keith Lostaglio.

Time and time again, Singapore has exceeded expectations and managed to stay relevant despite its relatively minuscule size. Currently serving as a regional hub for a horde of leading international healthcare and life sciences companies, while simultaneously straddling the frontier of scientific advancement and innovation, Singapore's position as the "Biopolis of Asia" is seemingly uncontested.

Yet, the most pressing question remains, how many times can one country reinvent itself before plateauing?

THE BEST IS YET TO COME

DR. BENJAMIN SEET
Executive Director, A*STAR BMRC

HO WENG SI
Director of Biomedical Sciences, EDB

DR. TEOH YEE LEONG
CEO, Singapore Clinical Research Institute

"The harsh reality is that a lot of countries within the region are now catching up and developing their economies," conveys Dr. Teoh Yee Leong, CEO of the Singapore Clinical Research Institute (SCRI). "In order for us to truly maintain our lead positioning, we have to be highly conscious of our limitations and continuously invest in our human, intellectual, and industrial capital, while forging networks with highly populated countries in Asia and mounting the forefront of scientific and clinical research within the region," stresses Teoh. Under the sixth iteration of the science and technology plan, Prime Minister Lee Hsien Loong recently unveiled the RIE2020 Plan, which entails a government commitment of SGD 19 (USD 14) billion over the period 2016 to 2020 to research, innovation and enterprise, with at least 21 percent of that funding dedicated to taking Singapore's biomedical sciences sector through its next stage of development. As it currently stands, according to Singapore's Economic Development Board (EDB)—the lead government agency in charge of attracting multinational interests and responsible for much of the country's success to date—the biomedical sciences sector now employs over 15,000 people and contributes 3.5 to 4 percent of the nation's GDP, amounting to roughly USD 19 billion and firmly cementing it as Singapore's 4th economic pillar, alongside chemicals, engineering, and electronics.

"Singapore has done well to date, but now the question is how do we remain competitive and evolve alongside the industry's own development? Healthcare models are shifting, particularly with aging populations and increasingly pervasive chronic diseases. For us in Singapore then, it's about creating the right environment so that companies can adopt and pivot to a new healthcare model," indicates EDB's director of biomedical sciences Ho Weng Si.

In line with the agency's latest strategic framework — Attract, Transform, and Create (ATC) — pivoting to a new healthcare model is not only about attracting and applying the latest technologies to improve standards

THE NEXT LAP: BIOSCIENCES IN SINGAPORE 2025

	SINGAPORE	TAIWAN	SOUTH KOREA
R&D intensity: GERD/GDP 2011	2.23%	2.30%	4.36%
Researchers in R&D / mil people 2011	6494	7480	5928
Bioscience patent applications (2012)	104	N/A	1,168
Scientific American 2015 Worldview biotech rank	#5	#25	#23

*Source: A*STAR, Israel Advanced Technology Industries, Scientific American, World Intellectual Property Organization.*

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of care, but also strives to incorporate the participation of non-conventional players. "In the future, healthcare solutions might not only be delivered by just incumbent healthcare players... we may start seeing the surge of more companies from IT or insurance for example, entering the mix, alongside traditional pharma, medtech, and nutrition companies to meet modern day healthcare challenges," predicts Ho.

This notion of convergence and integration of industries has been one of the primary themes driving the nation's R&D efforts. "In the past, approximately 75 percent of our engagements were attributed to pharma and biotech," recounts Dr. Benjamin Seet, executive director of A*STAR's Biomedical Research Council. A*STAR, the chief government body tasked with coordinating the nation's research and development initiatives, has experienced a material change in its research portfolio over the last 5 years, with that 75 percent now becoming 25 percent. Seet explains this structural

AGING IN ASIA & ECONOMIC DISPARITY

MARKET	POPULATION CHANGE 2015-2050[1]	PERCENT OF POPULATION 65+ 2015-2050[1]	GDP PER CAPITA (Current US$)[2] 2014
Global	2015 - 7.35B 2050 - 9.73B	2015 - 8.3% 2050 - 16.0%	US$ 10,595
Asia	2015 - 4.39B 2050 - 5.27B	2015 - 7.5% 2050 - 18.2%	US$ 9,002
China	2015 - 1.38B 2050 - 1.35B	2015 - 9.6% 2050 - 27.6%	US$ 7,594
Japan	2015 - 126.6M 2050 - 107.4M	2015 - 26.3% 2050 - 36.3%	US$ 36,194
ASEAN (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam)	2015 - 633.5M 2050 - 792.1M	2015 - 5.9% 2050 - 15.6%	US$ 3,911

[1]*United Nations, Department of Economic and Social Affairs, World Population Prospects, the 2015 revision*

[2]*The World Bank, World Bank Open Data*

CARL FIRTH
CEO, ASLAN Pharmaceuticals

change had two purposes, one being to respond to emerging opportunities, and second to diversify into adjacent sectors such as medical technologies, food and nutrition, and personal care. "I believe we have to reinvent ourselves every five years. Looking at how to be relevant is a continuous process that requires looking for and anticipating signals of change that will drive how consumers behave," proclaims Seet.

Meanwhile, the founder and CEO of ASLAN Pharmaceuticals Dr. Carl Firth argues that Singapore must eventually grow out of its reliance on international capital. "Decision makers have long recognized that any subsequent value created from good science actually leaves Singapore when partnering with overseas companies," exclaims Firth, going on further to suggest that the ability to build truly innovative homegrown companies is the next critical step in driving Singapore's future value proposition. The chairwoman of BioSingapore Dr. Ong Siew Hwa, however, provides a word of caution: "It is worth mentioning that

ANAND THARMARATNAM
President Asia Pacific, QuintilesIMS

DR. ONG SIEW HWA
Chairwoman, BioSingapore

Singapore, especially given its relatively young age, does not possess the same level of experience, depth of knowledge, or critical mass in biotechnology that other territories such as the US or Europe might have. This may increase the

difficulties in dealing with MNCs or financial institutions in order to obtain investment."

Anand Tharmaratnam, QuintilesIMS's president for Asia Pacific, contends that for Singapore to successfully commercialize homegrown innovations, "there are some skills and competencies that will need to be developed to get there. Singapore's capabilities are quite robust in basic research, but the capacities needed to translate research into something of commercial value are still developing." He further details that, "Singapore will have to import talent for guiding products and companies from the clinic into the early commercial phase... Steps must also be taken to ensure that there is sufficient capital available as the startup ecosystem starts to mature."

Nevertheless, whether it's an inward or outward focus, A*STAR's Dr. Benjamin Seet remains resolute in the country's ambitions: "Going ahead, we will focus our efforts on identifying the disruptors and trend setters for each of these industry sectors, determine what we can do that's differentiated, and then invest deeply to build a level of expertise that's competitive on a global scale."

SPEARHEADING A NEW MODEL OF ASIAN HEALTHCARE

One area where Singapore can still assume a technological and thought leadership position is in its responsiveness to the myriad of issues afflicting the Southeast Asian and Asia Pacific healthcare and life sciences space. "With roughly half of the world's population here in Asia Pacific, we see an increase in unmet medical needs, which will continue to grow with aging populations and the surge of chronic diseases," says Gary Pruden, worldwide chairman of medical devices at Johnson & Johnson. Indeed, demand for healthcare in Asia is massive and rising quickly; Johnson & Johnson Medical Devices' company group chairman for Asia Pacific Vladimir Makatsaria – who also serves as chairman of APACMed – explains "we spend more than eight times as much on healthcare for people who are older than 65, and in Asia Pacific alone we have 320 million people that are aged 65 and over, a number that is set to double over the next few years." While many see the scale of these unserved or underserved patient populations as little more than a sizeable and sustained growth opportunity, the truth is that healthcare systems across the region are in no-way prepared to meet the incredible scale of new demand for healthcare. Makatsaria contends that, "supply as currently configured will not be able to keep up. It will take hundreds of years for doctor-patient ratios in Asia to draw level with those in countries with the most advanced healthcare systems. By 2020, the region will experience a shortage of approximately two million healthcare practitioners."

GARY PRUDEN
Worldwide Chairman Medical Devices, Johnson & Johnson

VLADIMIR MAKATSARIA
Company Group Chairman Asia Pacific, Johnson & Johnson Medical Devices

KRIS STERKENS
Company Group Chairman Asia Pacific, Janssen

For pharma and medical device companies, there are significant market access issues making it difficult to reach these large patient populations. As Kris Sterkens, company group chairman Asia Pacific for Janssen, points out, "Many of the governments in this region don't have the budgets to accommodate the substantial premiums associated with some of the newer treatments for cancer, for example. Similarly, within metabolic

> WITH ROUGHLY HALF OF THE WORLD'S POPULATION HERE IN ASIA PACIFIC, WE SEE AN INCREASE IN UNMET MEDICAL NEEDS, WHICH WILL CONTINUE TO GROW WITH AGING POPULATIONS AND THE SURGE OF CHRONIC DISEASES
>
> **GARY PRUDEN** JOHNSON & JOHNSON

diseases, the number of diabetic patients in India is 90 million, and that number increases to 150 million when we add China, which is more than the rest of the world combined by far. Governments are well aware of how difficult it is to enable widespread access to medicines for all of these patients, placing more of a moral obligation on the industry to explore different options that will help more patients."

Moreover, medical practices in many countries still lag significantly behind best practices, in many cases leading to inefficient use of limited resources. Pruden argues that, "Medtech across the region is underpenetrated in many categories," highlighting that "MIS (minimally invasive surgery) has a penetration rate of roughly 34 percent globally – which is significantly lower in emerging markets. Patients are often staying at a hospital for an extended period of time instead of going home in one day." As such, J&J sees "a lot of opportunity in partnering with governments in the region to increase training, education, and access to new technology to ultimately reach more patients and restore more lives in Asia Pacific as a whole."

KEITH LOSTAGLIO
Partner & Head of Health Practice Asia Pacific, A.T. Kearney

However, what is clear is that driving the adoption of innovation in terms of products and therapies can only do so much to help address the huge imbalance between supply and demand of healthcare in the biggest markets in Asia Pacific. Keith Lostaglio, partner and head of A.T. Kearney's health practice in Asia Pacific illustrates the issue, explaining that for countries "like Thailand or Indonesia with the logistical challenges of reaching all 16,000 islands, developing and implementing rational, relatively efficient systems and broadening coverage beyond major cities will require the use of new technologies, new ways of thinking and creative solutions. There is absolutely no way a multinational life science company can reach and communicate with physicians,

A Prescription for Performance

JAMES LIM
—
Executive Vice President & President Greater Asia, BD

"In order to truly succeed in healthcare markets across Asia Pacific, companies need to make a point of addressing localized unmet needs," counsels BD's president for Greater Asia James Lim. "This will invariably entail tailored solutions to meet these needs, beyond just provision of products and pill-pushing."

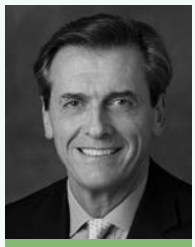
The needs for tailored or innovative solutions and products in many contexts across the Asia Pacific region are often of a very different quality than the 'unmet medical needs' discussed in Europe or the US. Not only are many countries in the region relatively resource constrained, but as Lim explains, many "don't possess the resources or political capital to allocate a significant portion of their GDP to healthcare… China, for example, only spends seven percent, perhaps moving to eight percent in the coming years, while Indonesia spends only two to three percent." As such, "what these countries are looking for then is increasingly innovative avenues to address healthcare challenges—achieving more outcomes with less spending— which has invariably impacted the way decision makers go about addressing patient needs."

For the life sciences industry, this means that it is essential that companies go the extra mile beyond just selling a product. Lim exhorts "we don't just look at products when approaching and conducting business. I always tell my team that we're not here just to deliver products into the market, but to advance the healthcare system for the people in the country, invoking the passion of our purpose to do so. This entails more than selling, but true partnerships such as facilitating worker safety sessions, assisting hospitals with accreditation, collaborating with governments to conduct phlebotomy training, or overall improving upon the competencies of the local workforce." He concludes, saying "this approach to business produces farreaching benefits across the value chain for everyone involved, including patients, healthcare practitioners, governments, and companies themselves—falling in line with our ambition of becoming the recognized partner of choice and our mission of Advancing the World of Health."

HIDEO ARASE
Director & Senior Executive Officer, Terumo Corporation & Managing Director, Terumo Asia Holdings

BOB WHITE
President Asia Pacific, Medtronic

STEPHEN OOI
Senior Executive Advisor Asia Pacific, Zimmer Biomet



JEAN-LUC BUTEL
President, K8 Global

pharmacists, and patients across more difficult to access portions of the region without an effective digital platform in place." Meanwhile, Makatsaria argues that, "the first priority must be innovation — not just product innovation, but process, procedure, and organizational innovation such that we can deliver better clinical value to patients at a lower overall economic cost."

The challenge is that the usual innovators from the multinational life science industry are not well suited towards this task, or rather their innovative goals are not necessarily well aligned with the challenges that patients and healthcare practitioners in Asia most need innovative solutions for. Hideo Arase, director and senior executive officer of Terumo Corporation and managing director of Terumo Asia Holdings, explains that "the Western mentality and fruitful demand for high-end value and features simply does not align in developing countries, particularly here in Asia, where many places are struggling to even meet basic medical needs, let alone elicit funds for premium products." Similarly, Medtronic's president for Asia Pacific Bob White admits that a common "misconception is taking a Western product and transplanting it in a market in Asia Pacific and expecting it to simply work... The way that technology plays itself out in each market is also very different, and it's crucial that people appreciate these regional complexities before diving into the nuances."

Zimmer Biomet's senior executive advisor for Asia Pacific Stephen Ooi is a big believer in what he calls 'frugal innovation.' "Emerging markets innovate because they have urgent needs for solutions. Some emerging market innovations need to be more focused on gaining value rather than creating high prices. This 'frugal innovation' can have an enormous impact." He also critiques his peers, saying that "Western companies sometimes use what I believe is an incorrect approach when they take existing innovations and just reduce the number of features. Instead they should be addressing the specific concerns of the populations that need the product and build the product around these needs. Innovation needs a ground-up approach." It is in this context that Zimmer Biomet is "doing a lot more in bringing designers and engineers from the Western world to see what is happening here in Asia Pacific and they are truly amazed by the developments in this region," enthuses Ooi.

With need necessitating innovation in healthcare models across Asia, it is clear that Singapore has

CLINICAL TRIALS IN SINGAPORE IN COMPARISON

COUNTRY	Number of Open Phase 1 Studies	Ratio of Population/ Phase 1 Study
South Korea	1102	48,000
Taiwan	630	37,000
Hong Kong	213	35,000
Singapore	235	24,000
China	1,833	764,000
USA	21,285	15,000

Source: clinicaltrials.gov

THE DIFFERENCE OF ONE PARTNER

MAKING AN IMPACT ON HEALTHCARE-ASSOCIATED INFECTIONS. Across the world, BD works closely with healthcare organisations to combat healthcare-associated infections (HAIs). HAIs, or infections acquired in healthcare settings, are the most frequent adverse events in healthcare delivery worldwide.[1] In healthcare facilities, the impact of HAIs is significant—ranging from needless patient suffering to strained resources and related costs. **Our broad portfolio of solutions and global insights combine products, education, screening, diagnosis and surveillance,** helping you minimise the risk of HAIs, deliver improved patient outcomes and control costs. Discover the difference one company can make. **Discover the new BD.**

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1 World Health Organisation. Patient Safety: *Healthcare-associated Infections Fact Sheet.* Accessed on August 5, 2016 at http://www.who.int/gpsc/country_work/gpsc_ccisc_fact_sheet_en.pdf

an important role to play supporting the development of healthcare systems in other countries, particularly the nearby members of ASEAN. A.T. Kearney's Lostaglio argues "Singapore and the life science ecosystem here should take the lead in developing broad health enablement across the region, which in part will mean strengthening Singapore's role as a hub for R&D and innovation." J&J's Makatsaria elaborates on Singapore's suitability for this role, explaining that when Singapore's innovative healthcare system and medical talent are "coupled with Singapore's medical education capabilities and connectivity with the rest of the region, this translates into Singapore being a very important hub for training of doctors and surgeons from across the Asia Pacific region."

Evidently the one takeaway for multinationals with global innovation platforms is that healthcare needs can only be met at a local level, and in turn, a personal level, according to Jean-Luc Butel, president of K8 Global and senior advisor to McKinsey. "Many companies certainly see Asia as a market, as with the US or Europe, but do they perceive Asia as a lever that will effectively define their future 10 years down the road?" he ponders. "Asia is a huge continent and, as a result of many factors such as the vast aging population and a huge emerging middle class entering and demanding healthcare, it is going to play an important role in determining the healthcare model of tomorrow. The sooner healthcare executives come to terms with that, the sooner their companies will perform better regionally and globally," concludes Butel.

TI HWEI HOW
President, SAPI

ALBERT LEE
Chairman, MTIG

CHRISTOPHER SNOOK
Country President Singapore & Head of Group Country management, Novartis

A BEACON OF LIGHT

Since 2000, the government's Biomedical Sciences (BMS) Initiative has set out to establish a self-sustaining biomedical ecosystem of end-to-end capabilities in research, development, and manufacturing—effectively enabling Singapore to transcend the technology curve into a truly knowledge and innovation-intensive economy. Following an orthodox export-oriented industrialization strategy, Singapore started on the road towards this ambitious goal by attracting FDI based manufacturing and R&D investments. This strategy has yielded much fruit, and today this 'little red dot' now serves a myriad of roles for healthcare and life science enterprises. The president of the Singaporean Association of Pharmaceutical Industries (SAPI) How Ti Hwei believes the country's refined network of infrastructure and the fact that 6 out of the top 10 selling drugs are now being

produced in Singapore only yields positive signs for the manufacturing sector. "This gives confidence to the industry that not only can we maintain sustainable operations, but also keep up our pace of growth," proclaims How. Furthermore, "from an R&D point of view, we have many highly trained scientists and clinicians that work with pharmaceutical companies to keep pushing the boundaries of science.

This open mindset is attracting some companies to even conduct their first-in-human clinical trials here." The chairman of the Medical Technology Industry Group (MTIG) Albert Lee holds Singapore's allure in a similarly supportive light: "The country has done a lot in trying to make it attractive for people, driving scientific collaboration among public and private parties, which has clearly not only appealed to SMEs, but also large MNCs. The joint physical spaces at One North, coupled with supportive policies and infrastructure has created a unique ecosystem where innovation can thrive," he summarizes. Novartis has long been one of Singapore's leading pharma investors, both in the manufacturing

Calibrating Collaboration

SUGANTHA NATARAJAN
—
Director, Healthcare, Asia Pacific, DB Schenker Healthcare

As Asia Pacific healthcare director, Sugantha Natarajan outlines, "DB Schenker has been in Asia Pacific—the fastest growing region for the company—for approximately 55 years, active in 20 countries from Pakistan all the way to New Zealand." Moreover, according to Natarajan, "in certain countries we're now by far the leading provider of Third-Party Logistics (3PL), and perhaps in the top three in others." The recipe for success? "We hold a strong positioning in any country we operate in... because we work around the limitations and go beyond traditional 3PL by collaborating with broader supply chain stakeholders." For DB Schenker, collaborating with a broader range of stakeholders often means bringing in supply chain expertise from other industries, which Natarajan explains are "definitely ahead of healthcare in terms of the way supply chains are handled." In the past such cross-industry sharing of best practices has been limited as "traditionally, healthcare has been very risk averse" and constrained by regulatory and quality concerns. However, today "companies are becoming more open to the ideas and best practices that can be brought from other industries." As such, DB Schenker is now working to find new ways to "best work with quality assurance teams more collaboratively, and see where we can improve efficiencies of the supply chain." Success in the Asia Pacific region has been driven by a wider range of partnership models, which recognize that "the needs and qualifications of every country [in the region] are completely different." Natarajan shares the example that, "in Indonesia, you can become a be-all, end-all partner to the customer, contributing to all aspects of the business including regulatory, quality assurance, and government affairs… that's what it takes to succeed in markets like Cambodia, Indonesia, and Vietnam." On the other hand, with highly developed markets in Asia such as Singapore, Natarajan excitedly declares that it "is a completely different ballgame. Here we're talking about how we can innovate, improve productivity, efficiency, where we can apply the Internet of Things, while also working with prominent government agencies such as the Economic Development Board (EDB) to bring more value to the overall system."

RAMAN SINGH
President of Emerging Markets, Mundipharma

MICHAEL TILLMANN
CEO, Vela Diagnostics

THOMAS PAGE
Vice President of Contract Logistics and Healthcare Asia Pacific, UPS

and R&D spaces. Country president of Singapore and head of group country management Christopher Snook explains that today Novartis has "three manufacturing facilities currently in production... last year, we celebrated the tenth anniversary of our contact lens manufacturing while next year, our tableting facility will reach its tenth anniversary." The group has also further strengthened their manufacturing presence in Singapore with a new "aseptic filling facility as part of the Alcon group... and at the moment, we are building an extraordinary biologics facility in Tuas, which is currently undergoing validation."

On the R&D side, Snook explains that back in 2004 "the Novartis Institute for Tropical Diseases (NITD) was established as a public-private partnership between Novartis and Singapore's Economic Development Board (EDB)." Although it was announced in October 2016 that Novartis would be moving the institute out of Singapore, Snook enthuses that "in R&D terms, the work of NITD has proven extraordinary. In 12 years, scientists discovered two new antimalarial compounds that are now in clinical development and have the potential to represent a real paradigm shift in the treatment of malaria. That in itself is impressive by any R&D assessment and we are delighted by the progress we have made there." As such, Snook strongly stresses that the facility's closure does not reflect any negative judgement on Singapore's R&D potential, and rather Novartis wanted to merge the NITD with their Biomedical Research Institute in Emeryville, California. With successful R&D investments in Singapore like the NITD to point to, Singapore's attractiveness as an R&D ecosystem has been clearer for more recent investors such as Mundipharma - who recently decided to establish its first-ever consumer health hub in the country.

> "SINGAPORE IS AN EXCELLENT ENGINEERING AND MICROELECTRONICS HUB SO THE TECHNOLOGY IS OF THE BEST CALIBER HERE
>
> **MICHAEL TILLMANN** VELA DIAGNOSTICS

However, the logic behind investments in manufacturing remain relatively ambiguous as many neighboring countries such as Vietnam, Malaysia, and China boast significantly lower-cost operating environments. Nevertheless, Mundipharma's president of emerging markets Raman Singh recognized the value of Singapore's pivot towards high-value manufacturing such as injectables, biologics, and vaccines. "This aligned perfectly with our ambitions to build one of the most advanced manufacturing plants in the world, forgoing laborintensive processes and employing cutting-edge technologies to give us the ability and flexibility to ship volumes in smaller quantities to anywhere in the world," illustrates Singh.

On a similar note, established locally in 2011, Vela Diagnostics, despite a primarily European and American-focused business, maintains Singapore as its global HQ, housing both R&D and manufacturing under one roof. "Singapore is an excellent engineering and microelectronics hub so the technology is of the best caliber here," firmly underscores the company's founder and CEO Michael Tillmann. "At the early stage of the company, it would have been very disruptive to have the manufacturing site away from the research site as it was necessary to transfer the know-how in scalable manufacturing sizes. Especially for a small company, facilitating this tech transfer on a consistent basis is difficult," he admits. "Therefore, we are happy to have our manufacturing hub in Singapore and we are willing to shoulder the slightly higher prices as it is ultimately to the benefit of the total output. The question is not rooted on the cost, but on the strength of the manufacturing talent to bring the level of quality to scale up the costs. Establishing a benchmark base here is essential in order to be able to build a secondary (or even tertiary) manufacturing sites in the years to come," projects Tillmann. BD's executive vice president and president of Greater Asia James Lim suggests that BD's investments in Singapore have been correlated with Singapore's investments in human and

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PHARMACEUTICALS... IN THE SKY!

With the Singaporean government putting immense effort into developing a true pharmaceutical cluster in the country replete with manufacturing and R&D, the city-state has simultaneously emerged as a major logistics hub for the life sciences sector in the region. As Leonora Lim, vice president life sciences and healthcare Asia Pacific for DHL customer solutions & innovation, explains "the Singaporean government has invested a lot to make healthcare and life sciences a strategic sector for the country. As such, Singapore has strong capabilities across the life sciences value chain from clinical research to manufacturing, commercialization, and distribution." It is with this narrative that Lim highlights that "DHL is strongly present in Singapore to support this strategic sector and globally recognized pharmaceutical cluster," and explains that the company has "special processes and facilities, such as our DHL Global Forwarding Life Sciences Competence Centers, in place to cater to the demanding needs of our clients from the life sciences industry. Our Advanced Regional Center (ARC) (a SGD 160 million contract logistics facility run by our sister business division, DHL Supply Chain, which opened in April 2016) is a huge investment in this regard and contains the infrastructure and certifications required by life sciences customers."

With the pharma industry's mentality towards cost and expenditures, which continue to evolve in light of persistent scrutiny of and downward pressure on prices around the world, many companies are doubling down

Connecting data in the logistics community

"From origin to destination an average product goes through roughly 26 touch points and sevenor eight different service providing entities," explains UPS's Thomas Page. From a perspective of a pharma company, every additional touch point bears additional risk when shipping high value sensitive products. As Changi Airport Group's Phau Hui Hoon observes, "with the rising sophistication, sensitivity, and value of many innovative pharma products, many pharmaceutical companies are now taking an active role in determining how their products are transported to ensure that the number of touchpoints is minimized and thus, that the risk in the overall transport chain is minimized."

Luckily, as the president of Singapore Airlines Cargo Chin Yau Seng explains "the world has become much more digital and data driven," such that information and technologies have created "opportunities to better manage complex global supply chains… the availability of data and the ability to process large amounts of it enable better visibility and control of the supply chain." Page concurs, saying that "we are a big believer in data at UPS and we track an enormous amount of metrics, mostly for operational efficiency purposes. We only see this increasing as it continues to be requested by regulatory authorities and the customer."

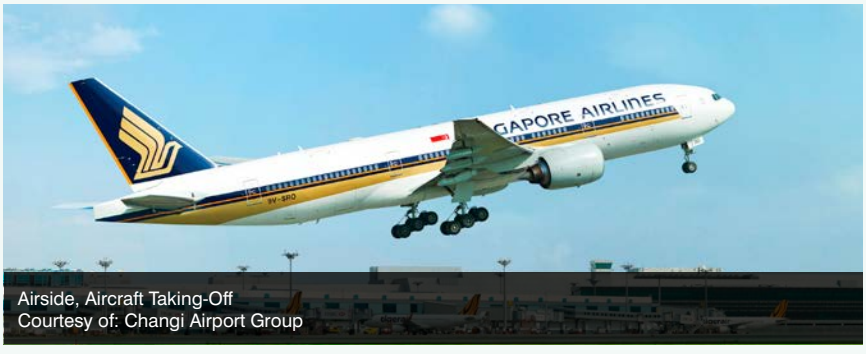
Despite the prevalence of discussions regarding digitization of business and the rise of big data, significant work remains to be done in actually setting up the needed systems and ensuring they are properly interconnected – and the logistics sector does nothing to buck this trend. As Chin admits, today "data is currently largely confined to the airport-to-airport segment of the supply chain… [and] in the air cargo industry data flows are still often disconnected between different segments of the supply chain." However, "we recognize this issue and are actively looking for ways to address the challenges," says Chin, explaining that Singapore Airlines Cargo has an "IT subsidiary in Singapore called Cargo Community Network (CCN) that provides data services for the air cargo industry, not just to SIA Cargo and freight forwarders but also to some other airlines. CCN is always on the lookout for ways to improve data sharing and integration." As such, Chin expects "to see a lot more data sharing and integration across the various segments of the supply chain" going forward.

on their regional distribution operations in Singapore to improve efficiency – and DHL is far from the only company working to capture the associated growth. Thomas Page, UPS's vice president of contract logistics and healthcare Asia Pacific explains that when "an additional location is added to the distribution hub, this reflects up to 29 percent more inventory, leading to obsolescence and an enormous investment on the balance sheet under inventory. Companies are looking to pull this inventory back to a regional hub with proximity to market and lower labeling costs for optimal inventory and flexibility. We are seeing this as a trend and one of the added benefits of Singapore as a hub." The logic is much the same for packaging and labelling operations, as "once the product is labeled there is no longer the ability to be geographically flexible with that inventory," and "when the product is labeled in-country, inventory is then sprinkled throughout the region tying up working capital." Running a physical or virtual distribution center in Singapore via a third party logistics provider can allow companies to cover significant sections of Asia Pacific markets with relatively low inventories on hand.

At the heart of the Singapore logistics hub lies Changi International Airport, which was voted the World's Best Airport for the fourth time in a row in 2016 by the passenger oriented Skytrax survey, and also holds a wide range of air cargo focused awards, including the Asia Pacific Airport of the Year from Payload Asia, which it won for the third consecutive year in 2016. Phau Hui Hoon, assistant vice president for cargo and logistics development at Changi Airport Group, explains that, "we have seen pharmaceuticals as a high potential niche for several reasons. Global spending on cold chain pharma shipments is growing at between eight and nine percent per year, and over the next few years Asia will account for one of the largest shares of that global growth. Given our geographic location, connectivity, infrastructure, and capabilities and a whole range of other factors, we feel [Changi Airport is] well located to capture a significant portion of this growth in pharmaceutical airfreight. As such we have made significant efforts to position Changi as an optimal hub for these shipment volumes," and efforts have proved successful as "pharma cargo volumes have grown at a CAGR of 13 percent from 2010 to 2015."

Since "Changi Airport Group itself is not a direct service provider," Phau clarifies that the airport's "role was very much to work with our stakeholders in the airport ecosystem to raise awareness about the potential the pharma industry represented, and some of the necessary investments that would be needed to capture that." The first visible success of this awareness initiative arrived in 2010 when one of the airport's ground handlers, SATS, opened their Coolport facility. "DNATA, our other airport ground handler, followed with their investment in their own cold chain facility in 2013," adds Phau. Beyond infrastructure, Changi Airport Group has also spearheaded the effort to get companies working in the airport ecosystem certified to handle pharma products. In this respect, the group has selected the relatively new IATA-CEIV Pharma certification, and SATS once again was the first mover getting certified in 2014; Phau excitedly shares that "we are expecting six different companies to get their IATACEIV Pharma certification in 2017." The next step for the airport has been joining the recently established Pharma. Aero community of IATA-CEIV Pharma certified airports around the world, with the eventual goal of being able to offer end-to-end services guaranteed under the same quality standards. Phau states "Changi Airport is proud to be a strategic member of the international Pharma.Aero

LEONORA LIM
Vice President, Life Sciences & Healthcare Asia Pacific, DHL Customer Solutions and Innovations



Airside, Aircraft Taking-Off
Courtesy of: Changi Airport Group

PHAU HUI HOON
Assistant Vice President for Cargo and Logistics development, Changi Airport Group

community alongside Miami International Airport, Brussels Airport, Sharjah Airport in the UAE, Singapore Airlines Cargo – other members include Brussels Airlines and Brinks Life Sciences."

Today Singapore's position as the premier logistics hub for pharmaceuticals in Asia is unassailable. As explained by President of Singapore Airlines Cargo Chin Yau Seng, "pharmaceutical companies need to be able to have easy access to even more locations to ensure that their products reach their ultimate customers without compromising product integrity. That's where direct air links are particularly important... Singapore together with SIA Cargo are in a good position to fulfil those needs as we have a substantial global flight network with extensive coverage of the Asia Pacific region." Altogether, the city-state enjoys direct flights to over 330 cities, including 32 in China, 15 in India, and at least 13 in Indonesia – a level of connectivity unparalleled by other airports in the region according to Phau.

CHIN YAU SENG
President, Singapore Airlines Cargo

MANAGING DIVERSITY

With stagnating growth rates in Western economies and their increasingly stringent pressures on controller healthcare costs, Asia Pacific has often been viewed as the next frontier for unlocking much sought-after growth. "APAC is estimated at 25 percent of the global economy and within 10 years it is expected to grow to 35 percent," postulates Martin Dewhurst, senior partner, co-convenor of the global pharmaceuticals and medical products practice

MARTIN DEWHURST
Senior Partner, Co-convenor of the Global Pharmaceuticals and Medical Products Practice, McKinsey & Company

at McKinsey & Company. He further outlines that "there are two billion people in just this region and the developing countries are projected to grow between 6 - 10 percent compared to 1 - 2 percent growth in the United States." "That being said," continues Dewhurst, "the region is entering a second époque that will throw up new challenges for the pharma and life sciences industries. If the first era was defined by great excitement and optimism, the second will be all about responding to unfolding scenarios and keeping alive the ambitions."

Indeed, while the tantalizing appeal of lucrative, untapped Asian markets still exerts a strong grip on investors, the degree of diversity in terms of demographics, disease profiles, healthcare systems, and regulatory regimes present big challenges according to Fredrik Nyberg, CEO of APACMed — a non-profit trade association established in 2014 to unify the voice of Asia's medical device industry. "10 or 15 years ago, the focus was almost exclusively on Japan and China. Today, the region as a whole contributes to 15-20 percent of global sales for many of our members, and markets such as India, Indonesia and Vietnam are getting much greater attention," details Nyberg.

Moreover, today the innovative potential of many countries in Asia is of increasing interest to foreign service providers – no longer can one view many of these economies as large, population driven consumer markets. Alan Ong, executive vice president Asia Pacific and global head of medical devices and diagnostics at INC Research enthuses "like most CROs, we see the enormous potential of Asia due to the population size and the growing developments within the region... A number of years ago the attraction to Asia Pacific was access to this large population at a lower pricing point, with Japan as an exception... Now we are starting to see an increasing number of biotech companies from Korea, China, and Taiwan, and they are developing their pipelines. We did not see this just five years ago..." The growth potential such opportunities present is substantial, and Ong attests "this region's contribution to the overall revenue of INC Research is only increasing and we expect this to continue and grow. We are experiencing double-digit growth, with still more potential for further growth."

> "APAC IS ESTIMATED AT 25 PERCENT OF THE GLOBAL ECONOMY AND WITHIN 10 YEARS IT IS EXPECTED TO GROW TO 35 PERCENT
>
> **MARTIN DEWHURST** MCKINSEY & COMPANY

FREDRIK NYBERG
CEO, APACMed

ALAN ONG
Executive Vice President Asia Pacific and Global Head of Medical Devices and diagnostics, INC Research

After years of organizational focus on Japan as the advanced market in the region and the behemoth Chinese market, many Western companies have found themselves rather tangled when attempting to access traditionally undervalued markets across emerging Asia. "The inherently dynamic nature of the region has come as a surprise to some people —dwindling growth rates, rapidly rising inflation, and deepening devaluation of major currencies by as much as 40 to 80 percent over the past couple of years has of course been a challenge to navigate through from a business perspective," muses Takeda's president of emerging markets Giles Platford. "Although, these countries are extremely individual in nature, and lack the homogeneity of Europe, the sheer level of diversity and complexities actually introduces certain commonalities that you can leverage in terms of leadership styles and management capabilities," advises Platford.

Janssen's company group chairman of Asia Pacific Kris Sterkens believes "succeeding in Asia Pacific entails first coming to terms with the sheer level of diversity that you're dealing with. This region

Marina Bay Sands Property Overview Shot | Courtesy of: Marina Bay Sands

exhibits considerably distinctive dynamics and regulatory frameworks compared to say the convergence of healthcare systems in Europe." "But no matter what market you're in," he argues, "you're starting to see an evolution of how stakeholders choose to engage with pharmaceutical companies. They don't want to only interact with reps anymore, or at least not all the time, often opting instead for alternative channels including digital platforms. However, you still want to accept the fact that culturally there are differences, while identifying the shared commonalities that we as a regional team can capitalize on. We don't have to reinvent the wheel in each market, as there are some strategies we can execute across all or most of the markets. Ultimately, it's both a science and an art – constantly evaluating where exactly you can achieve commonality and where you should embrace diversity."

Zimmer Biomet's senior executive advisor for Asia Pacific Stephen Ooi is confident that the "key is not viewing the market from purely the company's perspective. For example, there are fewer regulators in emerging markets in comparison to the number of regulators in more

GILES PLATFORD
President Emerging Markets, Takeda

ANNA MARIA BRAUN
President Asia Pacific, B. Braun

developed markets to address the huge amount of reviews and approvals. At the same time, regulators in emerging markets also need training. That is why for us as a corporation it is much more beneficial to take the approach where we ask ourselves: how can we make their jobs easier and help them to better understand our technology?"

At times, regional leadership and management may seem an exercise in futility. However, the scope of challenges is such that individual actors, be they government institutions or companies, cannot hope to develop effective solutions in a timely manner. As APACMed's Frederik Nyberg explains, "The megatrends of a rapidly aging population, a growing middle class, and a rising chronic disease burden are all driving demand for quality healthcare. Addressing this growing demand will require a different kind of innovative thinking on the part of all stakeholders. We will need to collaborate differently to solve our common healthcare challenges." Asia might be a diverse patchwork of unique circumstances, but to bring access to healthcare to the vast majority of patients in the region actors will need to find ways to effectively collaborate, coordinate, and support one another across both organizational boundaries and national borders.

"In essence, the industry has a common overarching goal of driving innovation in the region and ensuring that access is available to a greater number of people over time," pinpoints Anna Maria Braun, president of B. Braun Asia Pacific and vice chairman of APACMed. "I strongly believe that a joint platform which promotes unity and neutrality of interests will foster interaction and generate better results with stakeholders. Moreover, engaging with doctors and nurses associations through organizations like APACMed can help elevate patient safety and actualize the industry's vision to deliver healthcare in the best way possible," stresses Braun.

Singapore has a clear role to play in facilitating and catalyzing such pan-Asian collaboration. After decades of hard work and investment, the country has become an irresistable platform for multinational businesses to manage their regional operations. With the immense challenge of bringing access to healthcare to hundreds of millions of people across the region serving as a massive impetus to create new ways of providing healthcare, many are looking towards the entrepreneurs, scientists, and experienced innovative life science companies based in Singapore to help define the way forward. Ultimately, "Singapore is a fantastic pilot ground for influencing the best medical practices in the region," says BD's executive vice president and president of Greater Asia James Lim. "With its prevalent forward-thinking attitude, the country effectively serves as an experimental basis for pioneering better technologies, processes, and solutions with the patient of the future in mind. Undoubtedly, Singapore will continue innovating higher up the value chain," he optimistically concludes.

JACK OF ALL TRADES

Preface: Takeda's President of Emerging Markets Business Unit, Giles Platford, speaks about his assignments across various global markets, his leadership philosophy, as well as the impressive international growth of the company.

GILES PLATFORD TAKEDA

HCLS: Spanning all the countries you've worked in, which one has left the most lasting impression? Which of your various assignments has helped you develop most as a leader?

GILES PLATFORD (GP): I have had the good fortune to work in different countries across multiple continents alongside a wealth of cultures, which has provided me with a better understanding of how to operate with a level of empathy and agility in those very different environments. I also had the great opportunity to learn from the various market archetypes and differing healthcare systems around the world, which offered me a broad perspective on how to maneuver in a diverse and dynamic region, most importantly the need to hire strong and capable leaders who know the local market environment.

HCLS: Who do you look up to as your role models? And how have they ultimately shaped your own leadership style and management philosophy?

GP: As a self-motivated individual, it is not a necessity for me to work for an inspirational leader. However, there have been a number of people throughout my career who have inspired me and shaped my own thinking around leadership - most recently, our Global CEO, Christophe Weber. He made a bold leap in globalizing Takeda, with it being a 235-year-old Japanese company. Currently, the company boasts a presence in 70 countries, spearheaded by a truly international leadership team with innovative product launches on a global scale and a strong corporate culture, especially regarding patient-centricity, ethics and access to medicines.

> "ONE OF THE BIGGEST CHALLENGES IN THE INDUSTRY TODAY IS MAKING SURE WE BALANCE THE NEED TO BUILD A SUSTAINABLE R&D MODEL, AT THE SAME TIME MAKING THE INNOVATIVE MEDICINES WE DEVELOP BROADLY ACCESSIBLE TO PATIENTS, WHICH IS A PARTICULAR CHALLENGE IN EMERGING MARKETS WITH EVOLVING HEALTHCARE SYSTEMS.

HCLS: What do you identify as the biggest challenge facing pharma leaders like you today?

GP: One of the biggest challenges in the industry today is making sure we balance the need to build a sustainable R&D model, at the same time making the innovative medicines we develop broadly accessible to patients, which is a particular challenge in emerging markets with evolving healthcare systems.

Also, people development is always a critical aspect when it comes to attracting, retaining and nurturing the best talent. This is something we put a tremendous amount of focus on, and the recognition Takeda is receiving as a Top Employer across the emerging markets is something I feel very proud of.

Front and center for most companies today is the agenda of ethics and compliance. For over 235 years Takeda has consistently held integrity at its core, and our decision-making model, which puts patients first, is gaining the trust of society, and reinforcing the reputation of the company. You can feel it alive in the organization and this becomes an important differentiator for our stakeholders across EM.

TAKEDA'S EMERGING MARKETS STRATEGY

THERAPEUTIC AREAS

KEY THERAPEUTIC AREAS:

GI

ONCOLOGY

DIABETES

PLUS VACCINES

INNOVATIVE CORE BRANDS:

ONCOLOGY: Ninlaro®, Mepact®

GI: Entyvio®, Dexilant®

DIABETES: Nesina®, Edarbi®

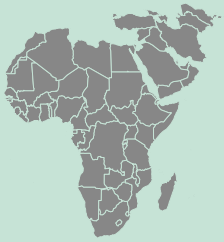
EMERGING MARKETS

FIVE GEOGRAPHIC AREAS:

ASIA-PACIFIC

GREATER CHINA

LATAM (Latin America)



NEMEA (Near East, Middle East and Africa)

Russia CIS (Commonwealth of Independent States)

- Around 35 countries across 15 time zones
- Emerging Markets represents 80% of the world's population, a region with significant unmet medical needs

ACCESS TO MEDICINES STRATEGY

TAKEDA'S ACCESS TO MEDICINES STRATEGY IS:

International, company-wide effort aimed at improving access and health for patients

Focused on areas of highest unmet medical need and going beyond medicines to address the range of access barriers, where Takeda can have the greatest impact on patients' lives

Product focus: innovative potentially life-saving, life transfroming specialty medicines and vaccine candidates

Geographic focus: evolving healthcare systems where access challenges remain a significant barrier to patients getting the treatments they need

THE ACCESS TO MEDICINES STRATEGY RESPONDS TO THE CHALLENGES OF EVOLVING HEALTHCARE SYSTEMS THROUGH:

Patient Assistance Programs: Giving more patient access to our innovative and potentially life-saving medicines	Capacity Building to 'Go Beyond' Medicines: Via partnerships in carefully selected countries	R&D: Goal for patients to access new, innovative, and differentiated medicines, regardless of where they live	CSR: Extensive prevention programs focusing on vaccination and maternal and child health	Expedited Access to Vaccines

TRANSFORMING TO TREAT

Preface: Bob White, President Asia Pacific at Medtronic, on how transforming healthcare begins with the patient, particularly in Asia Pacific where there is a rapid evolution in social demographics and concurrent emergence of unmet needs.

Bob White
MEDTRONIC

HCLS: You oversee one of, if not the most, dynamic and fast-changing regions in the world today. How is your time allocated between your various priorities?

BOB WHITE (BW): According to a 2016 study by The Lancet, total global healthcare spend now exceeds $7.8 trillion. Data from World Health Organization also showed that an estimated 20 to 40 percent of resources spent globally on health are wasted every year. This means that many governments, healthcare systems, health insurance companies, and other organizations need to adopt new approaches to decrease healthcare costs. These new approaches are moving healthcare from a fragmented, volume-based system, where providers are paid for each episode of care, to a value-based framework that integrates patient care across a full continuum to improve outcomes and costs. This brings us to another strategic imperative we are focusing on – value-based healthcare where we seek to collaborate with the stakeholders to discover and apply solutions that either drive operational efficiency within the healthcare system or augment the delivery of care through better patient care management.

HCLS: What would you highlight as the most salient trends impacting healthcare systems across the region today?

BW: In Asia Pacific, the coexistence of both highly developed and emerging markets exemplifies the complexity of healthcare systems. There are developed markets like Japan, Australia, and Korea, and then there are emerging markets like India and Southeast Asia. This means that there are over 2 billion people that we are serving across these countries in Asia Pacific, with over USD 1 trillion spent on healthcare every year – of which USD 50 billion is on medical devices alone.

In addition to rapidly aging populations and a burgeoning middle class, this region is facing a tsunami of non-communicable diseases, particularly when it comes to diabetes and cardiovascular disease. Consequently, you have got healthcare systems that need to fundamentally transform in order to address universal healthcare needs such as improving clinical outcomes, access, and cost-efficiency.

HCLS: I would venture to say that these three factors culminate in what the industry has fundamentalized as value-based healthcare—a concept that Medtronic has been a huge proponent of. What exactly does value-based healthcare entail in your eyes, Bob?

BW: Value-based healthcare means reaping benefits beyond the face value of a product. We believe this means sharing in direct accountability for clinical outcomes. We have a seven step framework to think about value-based healthcare very clearly; essentially, it entails selecting the right disease, identifying the right patient cohorts, understanding the costs that are being spent today, as well as the respective clinical outcomes, and how we're going to ultimately measure our impact. This is very much evolving from a fee-for-service model to a point where we position value at the center of everyone in the care continuum.

That is the direction I see healthcare systems moving towards. It will certainly take a while, and every country in this region moves at a different pace. But it all comes back to the three universal healthcare needs we need to address: better clinical outcomes, more access for people, and more efficient cost schemes.

IN THE TIME IT TOOK YOU TO READ THIS SENTENCE, **SIX MORE LIVES WERE IMPROVED**

Each year, Medtronic helps alleviate pain, restore health and extend lives for millions of people around the world. In fact, two people every second are positively impacted by our breadth of medical technologies and therapies.

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Medtronic
Further, Together

LEVERAGING LOGISTICS

Preface: DB Schenker's director of healthcare in Asia Pacific, Sugantha Natarajan depicts the company's presence across the region, while exclaiming the crucial need for localized solutions when it comes to specialized healthcare logistics across the different countries under her watch. She also describes the company's pivotal role in enhancing their clients' value chains and elaborates on how industry players are able to leverage logistics as a competitive differentiator.

Sugantha Natarajan
DB SCHENKER

HCLS: Could you start off by providing our readers with some insight into DB Schenker's history and presence in the region?

SUGANTHA NATARAJAN (SN): DB Schenker has been in Asia Pacific—the fastest growing region for the company—for approximately 55 years, active in 20 countries from Pakistan all the way to New Zealand, with Cambodia and Myanmar as the most recent additions to our portfolio. Except for a few countries where we partner with exclusive agents, we've mostly established our own offices with comprehensive logistics network setup in each location.

HCLS: How does the healthcare vertical align with the global organization's priorities, particularly in line with the ambitions set out in Vision 2020?

SN: As a part of our vision for 2020, there have been two sectors nominated as focus verticals, one of which is healthcare. If nothing else, this displays the sheer importance that we place on healthcare when it comes to driving DB Schenker to greater heights—moving from good to great.

Personally speaking, healthcare a sector that touches all peoples' lives in some way, shape, or form—knowing that alone brings me unparalleled levels of satisfaction.

From a corporate standpoint, this is an industry that requires a lot of focus and specialization, and is a niche exhibiting widespread demand and sustainable growth.

Healthcare is also rapidly growing worldwide, particularly here in Asia Pacific. Governments are increasingly seeking ways to enable healthcare to their citizens and overall improve their healthcare systems—be it a developing nation or a mature one. Consequently, you can't afford to take any risks in this industry solely because peoples' lives are at stake—and that's why, as a logistics player, this is an industry you simply cannot avoid.

HCLS: How have client expectations and demands evolved alongside this level of dynamism?

SN: Traditionally, healthcare has been very risk averse. But now companies within this industry are becoming more open to ideas and best practices that can be brought from other industries.

More and more people from other industries are joining supply chain in the healthcare space. If you look at other industries, they're definitely ahead of healthcare in terms of the way supply chains are handled. It wasn't by choice that the healthcare industry stayed behind, but really on account of regulatory and quality issues.

Currently, we try to determine how to best work with quality assurance teams more collaboratively, and see where we can improve efficiencies of the supply chain. But sheer willingness to partner with third parties is what's now starting to truly set in, mainly because

Photos courtesy of: DB Shenker

> YOU CAN'T AFFORD TO TAKE ANY RISKS IN THIS INDUSTRY SOLELY BECAUSE PEOPLES' LIVES ARE AT STAKE—AND THAT'S WHY, AS A LOGISTICS PLAYER, THIS IS AN INDUSTRY YOU SIMPLY CANNOT AVOID.

healthcare is a cost-driven industry and competitive pressures are forcing players to see supply chains as a source of differentiation and efficiencies.

Photos courtesy of: DB Shecnker

HCLS: How has DB Schenker needed to innovate upon its service offering to respond these changing market conditions and shifts in mindset?

SN: DB Schenker has recently partnered with a German university to leverage big data as a medium to identify underlying trends, better anticipate our customers' needs, and ultimately optimize the type of services we provide—both in terms of quality and efficiency.

Whenever our customers have requirements, we aim to convert those requirements into a value chain, rather than a supply chain. We work with them to understand their problem statements—sometimes hosting intimate workshops to gain this insight.

From a solutions standpoint, we look at who their customers and what their KPIs are. It's more about what's driving them, and what even their customer requirements are; only after coming to these terms are we able to craft a tailored solution.

HCLS: Your oversight covers a vast range of countries, varying largely in levels of income and wealth. How do you go about tailoring a strategy to effectively accounts for this discrepancy?

SN: Asia Pacific is not an easy market exactly for the inherent level of disparity between the rich and the poor, the developed and the developing. But the needs and qualifications of every country are completely different.

In Indonesia, you can become a be-all, end-all partner to the customer, contributing to all aspects of the business including regulatory, quality assurance, and government affairs. It's easy to only focus on traditional competencies such as warehousing, but that's simply not the approach that we've taken. That's what it takes to succeed in markets like Cambodia, Indonesia, and Vietnam.

Singapore, on the other hand, is a completely different ballgame. Here we're talking about how we can innovate, improve productivity, efficiency, where we can apply the Internet of Things, while also working with prominent government agencies such as the Economic Development Board (EDB) to bring more value to the overall system.

In certain countries we're now by far the leading provider of 3PL, and perhaps in the top three in others. But regardless, we hold a strong positioning in any country we operate in—whether that's China or Indonesia—because we work around the limitations and go beyond traditional 3PL by collaborating with broader supply chain stakeholders.

HCLS: What is the significance of a small country like Singapore to DB Schenker as both a market and strategic hub?

SN: Size doesn't matter—and Singapore is a classic example of that. I see Singapore as not just a standalone country, but as an integrator to the Asia Pacific market. From a logistics standpoint, the nation serves as a pivotal gateway to the broader region—namely because of its efficiency, established infrastructure, and high caliber talent. Many companies establish and stabilize their operations here first, before venturing off into the frontier. Any other market would be tough otherwise.

When it comes to domestic consumption, however, Singapore does not offer the same level of prospects as its neighbors, so the focus is really leveraging the country as a springboard, now with most of our clients also categorized as regional HQs.

PERFORMANCE WITH INTEGRITY

Preface: Christopher Snook discusses his dual role as Head of Group Country Management as well as Country President for Singapore, highlighting the importance of adhering to in-house as well as country-specific regulatory frameworks and the continued importance of Singapore to the global group.

Christopher Snook
NOVARTIS

HCLS: What are some of your highest priorities in your capacity as Head of Group Country Management?
CHRISTOPHER SNOOK (CS): Over the last few years, Novartis has gone through quite a few organizational changes and adjusting to these has been on the top of my priority list. To give an example, we have consolidated a lot of our support function in our division called Novartis Business Services. This transition period has lasted for approximately two and a half years and it has been a major focus for many of our offices around the world, not just at our headquarters in Basel.

Secondly, I have dedicated a great deal of my focus to operational priorities which concern business development and growth. Performance with integrity is a key priority, as it relates to our strict approach towards compliance particularly with regards to promotional practices. My key responsibility is to ensure that our country presidents and country executive committees around the world understand what local regulatory environments do and do not require from Novartis, how the local framework compares to Novartis's internal guidelines, policies and processes, and to ensure that their operations meet both internal and external requirements. Ultimately, this means we always default to the more stringent standards.

HCLS: With four manufacturing facilities in Singapore, can you give us an overview of the role Singapore plays in Novartis's regional and global supply chains?
CS: Three manufacturing facilities are currently in production, while the fourth is in the process of validation. Last year, we celebrated the tenth anniversary of our contact lens manufacturing while next year, our tableting facility will reach its tenth anniversary. More recently opened an aseptic filling facility as part of the Alcon group. At the moment, we are building an extraordinary biologics facility in Tuas, which is currently undergoing validation. These facilities reflect a USD 1.2 billion investment - spent or committed – and a workforce of 1200 people, both of which are very significant by any standard. Right now, we are expanding our presence, putting in new production lines at the Alcon contact lens facility. We expect our new biologics production facility to be operational in 2018, producing drug substances for our worldwide portfolio of biologics.

Furthermore, this manufacturing footprint opens up very interesting opportunities from a talent development point of view, as all four of these facilities are very distinct in terms of the manufacturing environments. This is why we launched an initiative called "Novartis TechOps Academy" in Singapore, a program in which we rotate young talents around those four facilities. For people joining us to develop a career in technical operations, we are providing them with a very unique opportunity to gain first-hand experience in four very different manufacturing environments, both in pharma and medical device manufacturing. In terms of attracting talent to Novartis, we are proud to be able to offer this program which is second to none as a reason to come to Novartis, and move beyond the usual competitive compensation packages.

> "PERFORMANCE WITH INTEGRITY IS A KEY PRIORITY, AS IT RELATES TO OUR STRICT APPROACH TOWARDS COMPLIANCE PARTICULARLY WITH REGARDS TO PROMOTIONAL PRACTICES

It's a patient, not a package.®

When patient care is on the line, logistics matter. Navigating the future of healthcare takes more than foresight. It takes a supply chain built with collaboration and integration at its core. UPS has specialized solutions to help protect your product, keep ahead of compliance demands, and wired to take advantage of emerging opportunities. That's staying future ready, while delivering today on patient care and profitability.

ups.com/healthcare

Peter Meinshausen & Dr. Stefan Randl, Evonik

CRAZY CHEMISTRY

Preface: Evonik, the creative industrial chemical company, recently announced that it will be investing EUR 500 million to build a second amino-acid synthesis facility in Singapore. Regional President Peter Meinshausen discuses Singapore's suitability for this investment, and Healthcare VP Dr. Stefan Randl shares some of the company's ambitions for innovative collaboration with the Singapore biomedical cluster.

HCLS: What would you highlight as the main economic development trends and dynamics in Southeast Asia over the last seven years?

PETER MEINSHAUSEN (PM): Evonik organizes its business around three global trends: Health & Nutrition, Resource Efficiency and Globalization. For healthcare and nutrition specifically, we work to provide solutions that enable people to stay healthy. According to projections the global population will reach 9 billion by 2050 and a significant portion of that population growth will occur in Asia. Feeding 9 billion people and ensuring they receive proper nutrition such that they can live healthy lives will be a major global challenge. Similarly, the steady development of Southeast Asia's economies, and the rise of the middle class drives demand for healthcare products and services, as well as changes in diet including an increased demand for quality meat. These are the challenges which Evonik's products help to address and solve.

More specific to the region, interesting dynamics exist just due to the geography of ASEAN being sandwiched between the two massive economies, India and China. This in combination with local policies designed to ensure connectivity among ASEAN members as well as with neighboring economies and trade zones, makes ASEAN countries very attractive for outside investors as they can ideally serve not only regional markets but also both the Chinese and Indian markets from Southeast Asia. As such, we see a convergence of foreign direct investment in the region, with Indian and Chinese companies making significant investments in Southeast Asia as well as other global players. Australia and New Zealand are another major sources of investment in the region. This apart from practical management considerations is one of the reasons why Evonik decided to manage Australia and New Zealand along with Southeast Asia – they are very much part of the Southeast Asia economic equation.

HCLS: We understand Evonik has recently announced plans to invest more than half a billion euros in another amino acid plant for animal feed here in Singapore – could you tell us a bit about this investment and the importance of DL-methionine?

PM: Given the mentioned global challenge of feeding a growing population, it's clear that efficient food and feed management is increasingly important. Thus, Evonik has for example developed portfolios of amino acids for both human applications as well as the animal nutrition field. For the efficient and healthy raising of livestock to supply societies demand for a healthy diet including meat, the availability of amino acids play a vital role in terms of cost, resource efficiency and the environmental impact of raising livestock.

Among others, the amino acid DL-methionine plays a vital role. Evonik as the market leader for this important animal feed supplement, operates several dedicated DL-Methionine production facilities worldwide. To also

efficiently meet the rising demand for meat in the Asia Pacific region, Evonik has completed its global production network and established a significant DL-methionine manufacturing capacity here in Singapore. Currently we have a capacity to produce 150 000 tons of DL-methionine locally, and have recently announced that Evonik will be investing another 500 million euros to establish a second manufacturing facility of the same magnitude.

PETER MEINSHAUSEN

Regional President, Evonik Southeast Asia, Australia & New Zealand, Evonik

DR. STEFAN RANDL

VP Sales & Services Asia, Evonik Healthcare

At the global level, Evonik has recently acquired certain fermentation biotechnologies geared towards amino acid production from the French company METEX. As the leader in the amino acid field, acquiring these technologies which complement our current technology platform, was a strategic decision to further enhance our capabilities in this core business area.

HCLS: Looking at the pharma industry in Southeast Asia, what would you highlight as some of the interesting areas where Evonik could have a particular impact?

STEFAN RANDL (SR): In healthcare, we serve the pharma industry with a variety of business models, as well as the medical devices sector, and finally the nutraceuticals or functional foods industry. For pharma in the Southeast Asia, Australia and New Zealand region, we see three main trends; growing local production, more R&D activities being carried out by both local companies and multinationals, and steadily advancing regulatory and quality standards. All of these factors play in our favor and as such we are increasing our presence in the region in terms of sales capabilities, technical support, and technical services – which can serve as a stepping stone to bringing R&D activities to the region. To this end, we have recently opened a formulation laboratory in Bangkok to provide our clients assistance in formulating oral drug and nutraceutical products.

This way, we can be closer to our customers and better support them in challenging development projects. Formulation solutions using our functional polymers, i.e. EUDRAGIT® for pharma and EUDRAGUARD® for nutraceuticals, which can control the release profile of oral drug and nutraceutical products are particularly interesting to local companies. These polymers can protect the actives present in a tablet or capsule until it reaches the right part of the intestine and accordingly maximize the bioavailability of the active compounds. Our portfolio of generic APIs and excipients are of the highest quality and relevant to any manufacturer looking to produce high quality products.

Recognizing the rapid pace of change in dietary habits and high incidence of chronic conditions such as diabetes across Southeast Asia, we see an increased need for health-minded nutrition and higher demand for nutraceuticals and functional foods. We are actively working on developing our portfolio of advanced food ingredients and already offer some interesting products with clinically proven health benefits, such as Healthberry and PentaQQ. We also offer a range of amino acids for human health under the brand REXIVA.

It is well known that Singapore has a highly developed industry with the highest R&D standards, and Evonik also supports R&D and manufacturing ventures here with relevant products. Taking the Singaporean biopharma industry as an example, we have developed a strong position in the supply of high purity amino acids and cell culture ingredients used as inputs in biotech manufacturing processes, for both R&D and commercial applications.

EMERGING ASIA: LEADING THE DIGITAL CHARGE

Preface: Despite underdevelopment in many facets; Southeast Asia is actually at the forefront of a digital revolution in healthcare; with digital solutions helping bring about more efficient, cost-effective, and tailored patient care.

When it comes to healthcare, Western societies are often hailed as the frontrunners in the digital age, exhibiting both the highest rates of internet and mobile penetration and electronic health records (EHR) adoption, according to a recent paper published by PwC, The Digital Healthcare Leap. Developed countries such as the Netherlands, Denmark, the US, Germany, and of course Singapore—leading the pack for its Southeast Asian brethren—have largely transitioned away from paper-based healthcare solutions to comprehensive electronic record systems and costly digital infrastructure. And while emerging markets may seem to be stuck in the Stone Age by relative standards, a new digital health model will soon warrant a shuffling in the leaderboard.

"The lack of legacy infrastructure can [actually] liberate health systems (both public and private) from the financially daunting capital costs which have led to government-sponsored initiatives such as Meaningful Use in the United States," observes John Forsythe, PwC's digital healthcare leader in Australia, Southeast Asia, and New Zealand. "Cloud-based technology, mobile enablement and fees for service models will lead to faster deployment and increased benefits for patients. Perhaps then the emerging markets will instead become the leaders, with the followers quickly shedding their 'on premises' technology," postulates Forsythe.

With many of these countries struggling to meet even the most basic medical needs, digital technologies provide a viable pathway to circumventing hefty infrastructure investments and pioneering new healthcare models to elevate care standards. Furthermore, implementation is more seamless, with fewer sunk costs, given existing infrastructure and equipment, lower fixed costs from building overcapacity, weaker vested interests and less divided public opinion than is typical in established markets—facets that have not gone unnoticed by the private sector.

Increasingly, for healthcare and life science companies, "digital strategy [has become] a key success factor for Asia Pacific and Southeast Asia," affirms Keith Lostaglio, partner and head of A.T. Kearney's health practice in Asia Pacific. "Access to patients and physicians poses such a challenge that it will be essential to use digital platforms to engage physicians and pharmacists effectively," he stresses.

Merck (MSD), for example, has recently invested in a global innovation hub in Singapore, dedicated to

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JOHN FORSYTHE PwC

harnessing digital technologies. It effectively consolidates end-to-end capabilities in data analytics, cyber security, and UX/UI—collectively working in tandem to ultimately enable a greater understanding of patient behavior.

"These are the new skillsets that may not traditionally exist in a healthcare company, but are areas that we increasingly see as important for the industry," analyzes Ho Weng Si, the director of biomedical sciences at Singapore's Economic Development Board (EDB).

In the realm of the digital age, other players have chosen to leverage the power of connectivity, bridging geographical and physical limitations. Worldwide leader in orthopedic medical devices, Stryker, broadcasted the first surgery ever completed at Shanghai Hospital No. 6 over a WeChat channel subscribed to by 70,000 surgeons in China. "This example alone demonstrates the impact that social media and digital technology can have on training, education and communication," attests the company's president of Asia, Brent Scott.

Similarly, Hitachi Medical Systems is utilizing digital technologies to link and promote telemedicine, specifically in the more rural areas of places like Thailand or Vietnam that lack clinical expertise. "We are training technicians to send images to a regional hub where qualified doctors can diagnose and decide whether to send the patients to the larger institutions, which may require them to travel for many hours," illustrates Leslie Chua, the general manager of Asia Pacific for the company's solutions division. "We are focusing on the less developed areas where it is of benefit to bring medical care to the people instead of the people to the medical care," he succinctly remarks.

Recently appointed as GE Healthcare's president and CEO in ASEAN, Myra Eskes largely recognizes the profound impact of digital innovations in closing healthcare gaps, but also reveals its limitations. "Advancements such as image-data sharing capabilities present tremendous opportunities in healthcare – yet these sophisticated technologies are still highly dependent on the level of education and training of healthcare professionals in the region. The ease and speed in which an image could be shared, for example, will only go so far without a skilled radiologist to accurately analyze the data. This dire reality of remote rural areas is compounded by the complexity of data privacy concerns, which we need to mitigate as we become more digitalized," she cautions.

Nevertheless, A.T. Kearney's Lostaglio maintains a bullish outlook on digital adoption in emerging Asia. "There are some very positive signs that things are moving in the right direction, at least in Southeast Asia. First, most of the companies I have spoken to have autonomy in Asia such that they can develop an effective digital strategy that fits the specific opportunities and challenges in the region. The leadership of these companies understands that the challenges for digital platforms in Asia are different than in Europe or the US. Many also regard the opportunities are bigger, and understand that local and regional organizations need the flexibility to develop an appropriate strategy as such."

From the creation of highly sophisticated telehealth platforms to filling very basic primary care gaps with technology, clearly innovation can take multiple forms across all types of healthcare systems. Private sector stakeholders are effectively redefining the way stakeholders approach or even think about healthcare. Although many still need to focus on closing critical gaps in healthcare, developing countries entering the digital era can now leapfrog traditional constraints such as access or costs and start to find themselves standing on equal footing with their peers in the developed world, if not greater.

THE SCIENCE OF HOSPITALITY

Preface: Ong Wee Min, Executive Director of Sales, highlights why Marina Bay Sands is the venue of choice for many international and regional healthcare conferences, the importance of being a true partner in accommodating very diverse client needs, and how Marina Bay Sands has been able to significantly contribute to Singapore's economic development strategy.

HCLS: How would you assess Singapore's positioning within the competitive global Meetings, Incentives, Conferences and Events (MICE) industry?

ONG WEE MIN (OWM): Singapore is a leading Asian city for all MICE events and we have been the number one meeting destination for many years, for numerous reasons. Singapore benefits from its strategic geographical location as well as being a hub for trade, outstanding hotels and world-class infrastructure right in the heart of town.

Today, people do not choose a MICE destination simply because it is a nice destination to visit, with wonderful hotels and fantastic convention centers – these are indeed part of the equation, but many other factors come into play as well. Given the needs of the modern traveler, accessibility is key and thus Singapore as a whole is well positioned and is being served by Changi Airport, which is voted as the best airport in the world in 2016. Moreover, event organizers want their attendees to be "wowed" and they want to co-create memorable experiences together with their stakeholders. Singapore and Marina Bay Sands are very good at doing exactly that; creating and co-creating memorable experiences for our clients, their stakeholders and their immediate community.

ONG WEE MIN
Executive Director of Sales, Marina Bay Sands

HCLS: Singapore has a clear economic development strategy with objectives for strategic industries – how has Marina Bay Sands been able to support the growth of the wider Singapore economy?

OWM: We are very much a part of the Singapore success story. Since we opened in 2010 we have hosted events in every single strategic sector for Singapore, in both the traditional sectors like oil & gas, finance and architecture as well as newer, innovative cross-sector industries, such as FinTech, a mix of finance and technology, and of course the life sciences. We are seeing a trend where events of such nature, where two or three industries crossover, are becoming more prevalent in the future. The convergence between industries tends to drive innovation, and it is of great benefit to Singapore and Marina Bay Sands to be involved in such globally innovative discussions.

From another perspective, Marina Bay Sands' diverse offerings can significantly add to the success of almost any event. Using an example from the healthcare industry, when we hosted Medical Fair Asia in 2016, the show floor grew by 30 percent compared to the previous edition in 2014, along with similar increases in other key performance indicators such as interest and stakeholder satisfaction. We like to say that this is a "win-win", situation for everyone, and given the success this year we are delighted to welcome Medical Fair Asia back to Marina Bay Sands for its 2018 edition as a multi-year show.

> WE ARE VERY MUCH A PART OF THE SINGAPORE SUCCESS STORY.

WINDOWS INTO THE FUTURE OF HEALTHCARE

Preface: Callum Bir, Director of Health and Social Services APAC for Microsoft, explains the tech giant's four-point plan for using technology to transform healthcare.

When speaking about the power of technology to disrupt and transform healthcare systems and delivery models, a company like Microsoft with a presence in every industry and in billions of lives is well positioned to discuss the full scope of 'healthcare digitization'. "When we look at overall healthcare spending, we see the biggest opportunities for transformation lie in delivery of care as this accounts for the largest portion of cost and resources," explains Callum Bir, Director for Health & Social Services for the APAC region at Microsoft. With that in mind, Mircrosoft has "identified four broad topics where we significant potential for technology to transform healthcare."

Essentially, these four topics are: how patients engage with care providers; using technology to empower healthcare workers to achieve more; areas of clinical operations where the efficiency and efficacy of clinical operations can be improved; and improving the efficiency of healthcare administrative operations.

Bir makes it clear however that "Microsoft does not supply finished products for the end user in general, rather we are a platform and resource provider. Whether its Artificial Intelligence (AI) or data management and analytics, we provide the plumbing or infrastructure and the platform level innovation to make other developers' disruptive ideas work." Their clients and partners, the companies that actually innovate with the context of a specific industry's challenges and drive disruptive business models "typically fall into three categories; established software developers that aim to sell software as a product, healthcare IT providers like Philips who use our platforms as a base for building their own systems, and disruptive startup companies."

When asked which of Microsoft's capabilities currently on offer to innovators has the most potential to revolutionize healthcare, Bir immediately answers AI. "According to a recent CB insights report, healthcare is the largest investment category for AI globally," explains Bir, adding that "from our discussions with startups, VCs and inventors, it is also apparent that

CALLUM BIR

Director of Health and Social Services APAC, Microsoft

AI is one of the most dynamic investment categories in the APAC region at present." One contributing aspect to this dynamism has been the quickly increasing access to AI technologies, as "in the past companies had to reach a certain size to higher PhD's to develop their own AI systems and then invest in significant computing power to make it work," whereas today "Microsoft has made significant investments in developing AI, where we have 6000 people globally working to democratize AI platforms and make them highly accessible to startups." With the innovative community having access to powerful platform technologies, it is only a matter of time before their solutions begin to revolutionize patient access to healthcare in developing markets across the Asia Pacific region and around the world.

SHIFTING THE PARADIGM

ELISABETH STAUDINGER

President Asia Pacific, Siemens Healthineers

Preface: Siemens Healthineers' president of Asia Pacific, Elisabeth Staudinger, speaks about the company's redefined strategy—an overarching move from product-centric to value-centric services—and how this ultimately serves to benefit their customers and the patients.

HCLS: How would you describe the main pillars of Siemens Healthineers' new strategy and how does Asia Pacific fit into this framework?

ELISABETH STAUDINGER (ES): One key pillar is to be more engaged in the services space and embrace more complex business models. This is a fundamental shift away from our traditional product-centric approach because moving into services platforms requires partnerships, joint ventures, and having more assets in the book, therefore necessitating a difference in organizational dynamics.

Another key pillar is the strengthening of the regional organizations within Siemens Healthineers' global setup. The rationale behind it is connected to the core of the strategy – developing our service offering. In order to establish a relationship with our customers, it is imperative to have a tailored understanding of their needs and build our offering together with the customers themselves. Customer proximity is extremely valuable as we can keep up with the development of the regional markets and their needs.

HCLS: How does a small market like Singapore fit into the larger Asia Pacific context?

ES: Singapore is a unique market in that it is mature and therefore characteristically closer to a market like New Zealand or even Europe than to the neighboring markets surrounding Singapore. The regional headquarters of Siemens Healthineers is located in Singapore given favorable factors such its geographic and politically stable position, as well as significant activities in the medtech sector. Additionally, as a wealthy and mature market with an advanced healthcare system, Singapore essentially sets the standards for the rest of the region. Singapore serves as a reference point for many countries both in terms of the regulatory environment and the infrastructure of healthcare delivery systems in Southeast Asia.

HCLS: For Siemens Healthineers, more specifically, what significance does Singapore play in terms of its operational activities?

ES: Singapore houses a main office of the regional headquarters for our customer services organization, in addition to having sales activities in the region. Unlike some of the other countries in the region, we do not have manufacturing activities here, as they would be very costly, in addition to the lack of a supplier base. Nonetheless, our presence in Singapore is leveraged by its strong intellectual power base through collaborative research and working with top-notch academia and research centers, particularly in the likes of National University of Singapore (NUS), Nanyang Technological University (NTU) or A*STAR.

Within A*STAR, for example, there are two areas where we entered into very promising discussions – namely with the Clinical Imaging Research Center (CIRC), a joint venture setup with NUS, and Singapore Bioimaging Consortium (SBIC), which are two agencies that are very involved in the imaging space. One focuses more on the pre-clinical cardiac imaging for animals, whereas the other focuses on radiopharmaceutical technology for humans. Both are of prime interest to us, and we are also looking to expand our presence in Singapore in other areas of research and development in the coming 12 months.

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