

Singapore's HealthTech Ecosystem

An Overview

July 2019

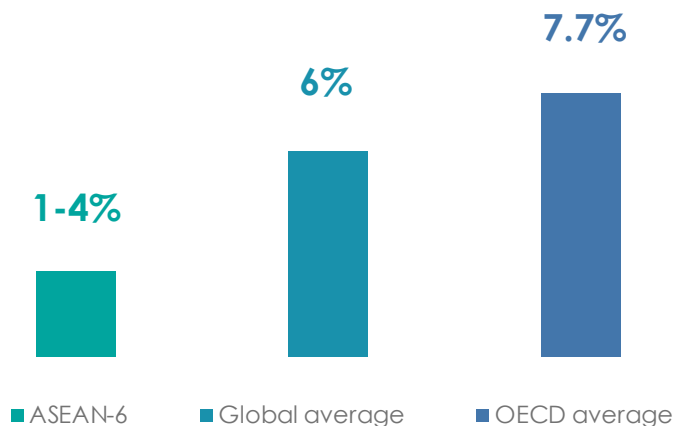
Demand for cost-effective solutions for consumers and health systems is driving the growth of an emergent HealthTech industry in ASEAN

Public healthcare expenditure in ASEAN-6 nations* is **US \$420 B** today and projected to grow to **US\$ 740 B** by 2025, but still less than the rest of the world by % of GDP.

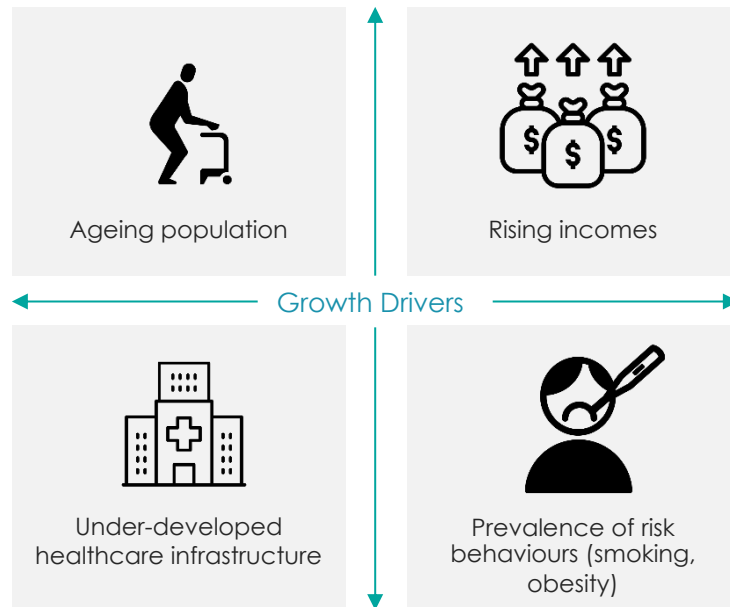
Healthcare: one of the fastest growing segments of consumer household expenditure at **6.4%** per annum.

(Source: DBS Asia 2030 Insight SparX)

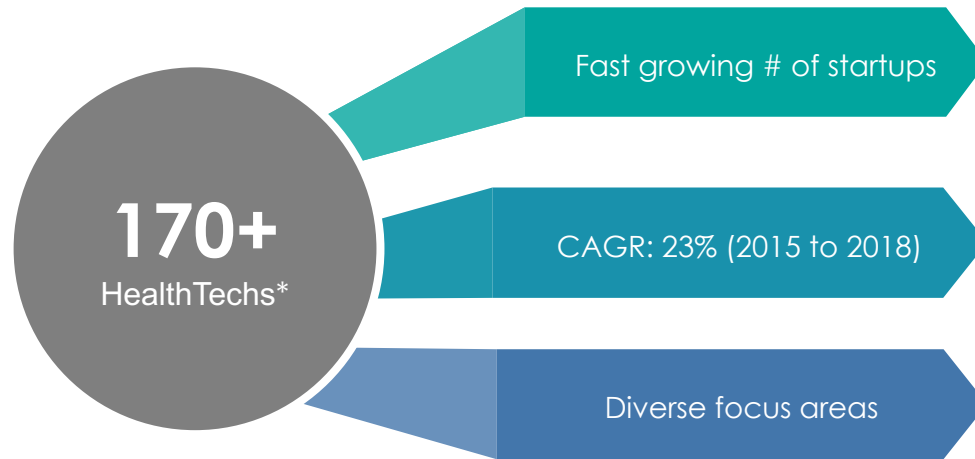
Figure 1: Public expenditure as a % of GDP (Source: WHO)



*ASEAN-6: Singapore, Malaysia, Indonesia, Thailand, Vietnam, Philippines

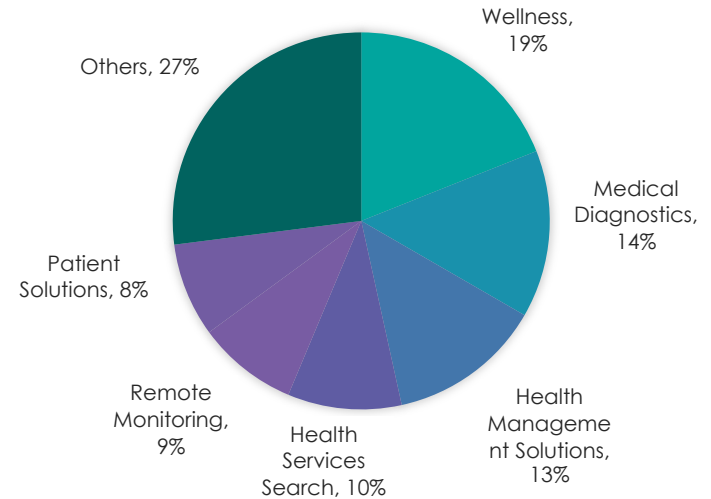


Singapore is home to a fast-growing HealthTech start-up ecosystem



*As of 2018

Figure 2: Singapore HealthTech Ecosystem by category share



Despite being nascent, the HealthTech sector in Singapore has grown in maturity



Top 20* HealthTech startups & focus areas

Maturity Score ¹	Startup	Business Model Type	Primary Value Proposition	Primary HealthTech Category
74	Attune Technologies	B2B	Treatment	Health Management Solutions
68	mClinica	B2B	Administration	Health Management Solutions
63	MyHealth Sentinel	B2C	Treatment	Health Management Solutions
63	Vault Dragon	B2B	Administration	Health Management Solutions
57	Clinicea	B2B	Treatment	Health Management Solutions
62	Image Labs	B2B	Prevention	Wellness
67	Holmusk	B2B2C	Research	Patient Solutions
61	Biofourmis	B2B2C	Disease Management	Patient Solutions
64	AEvice Health	B2C	Disease Management	Patient Solutions
64	Healint	B2C	Disease Management	Patient Solutions
73	CXA Group	B2B2C	Administration	Population Health Management
67	MyDoc	B2B2C	Treatment	Population Health Management
60	Manadr	B2B2C	Treatment	Population Health Management
69	Kinexcs	B2C	Disease Management	Remote Monitoring
61	Homage	B2C	Disease Management	Remote Monitoring
76	Docquity	B2C	Awareness	Medical Education
59	Hello Health Group	B2C	Awareness	Medical Education
63	Docdoc	B2B2C	Awareness	Health Services Search
66	Ark	B2B	Diagnosis	Medical Diagnostics
66	Aureus Analytics	B2B	Administration	Payments & Administration

Notes: *By maturity score; (1) For more information regarding the Galen Growth Asia's Maturity Score, please refer to slide 29

Source: Galen Growth Asia

Today's HealthTech landscape in Singapore reflect the broader Healthcare & Wellness macro trends in Southeast Asia

DIGITALISATION OF HEALTHCARE SYSTEMS



biofourmis

holmusk

Vault Dragon

AUREUS
ANALYTICS

mClinica

ATTUNE
Innovation Software

CONSUMERISATION OF HEALTHCARE



hello HEALTH

Homage

mydocu
Simplify Healthcare

Singapore: A hub for ASEAN HealthTech startups to raise capital

In 2018, Singapore boasted the **largest # of HealthTech deals in Asia** excl. China & India & ranked 2nd after Japan in total deal value:

\$6.3B in total funding
294 deals across Asia Pacific

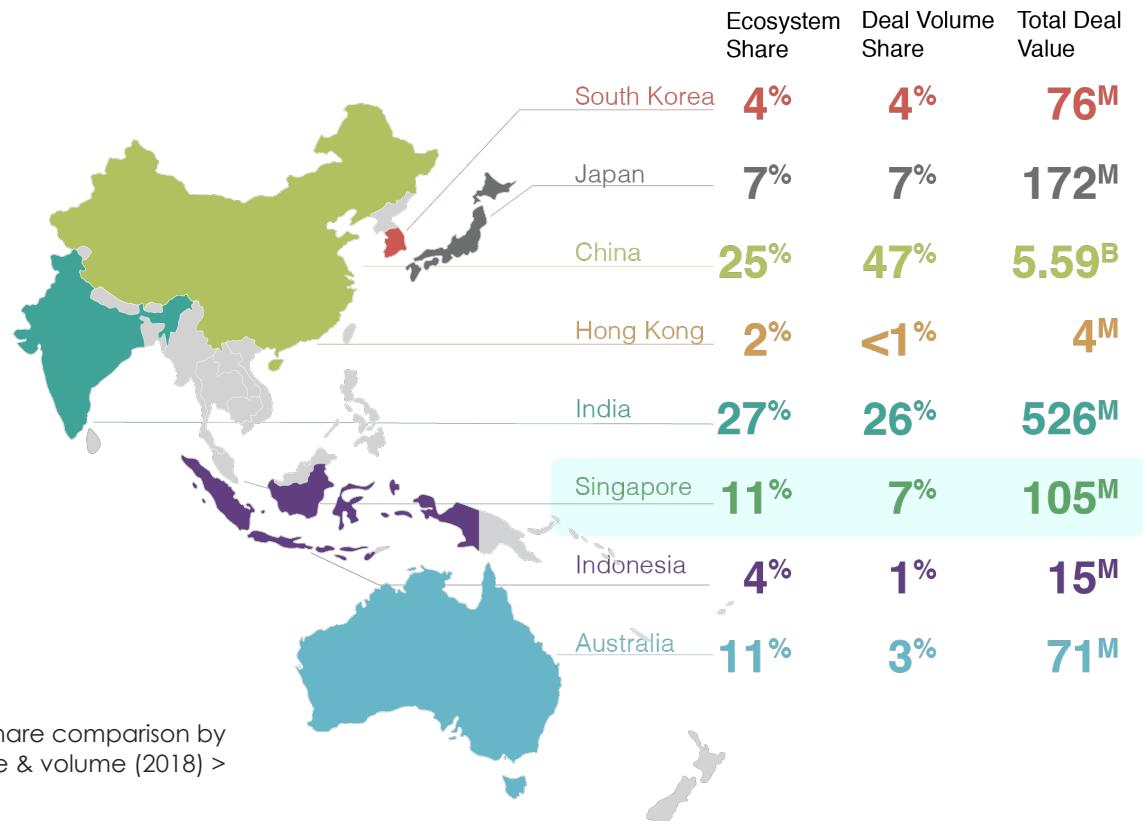
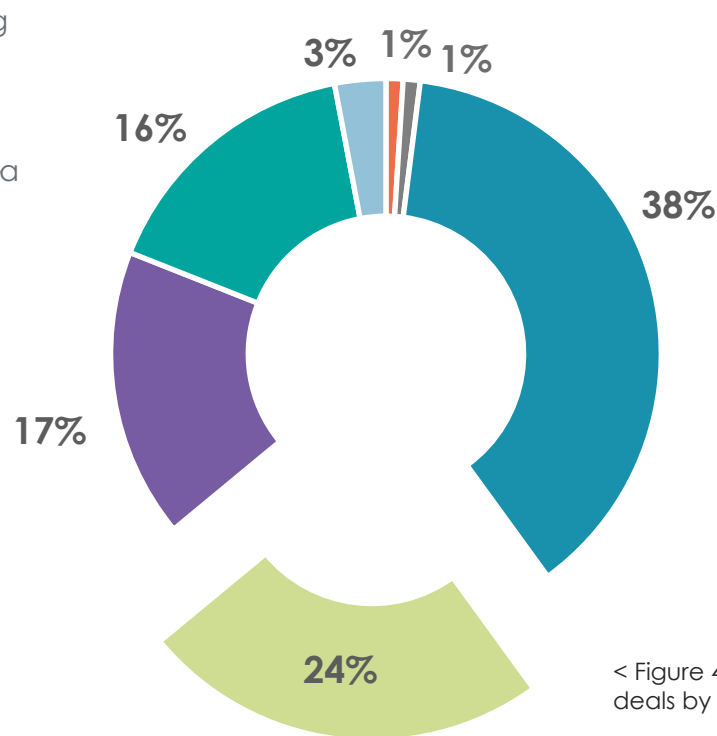


Figure 3: Singapore digital health deal share comparison by value & volume (2018) >

Singapore attracts more than its fair share of investments in the 'Rest of Asia'



In 2018, HealthTech startups in Asia excl. China and India raised **\$433M** of venture funding.

Singapore accounted for **\$105M** or **24%** of total RoA funding, second only to Japan

< Figure 4: Singapore's share of HealthTech deals by value vs Rest of Asia (RoA)

HealthTech investor activity in Singapore in the past 12 months

Overview

58

Unique investors

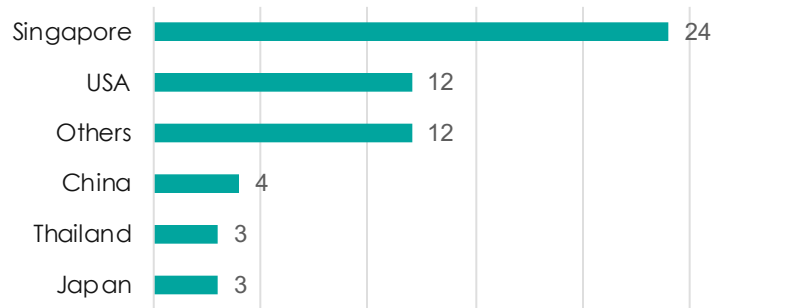
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with ≥ 2 investments

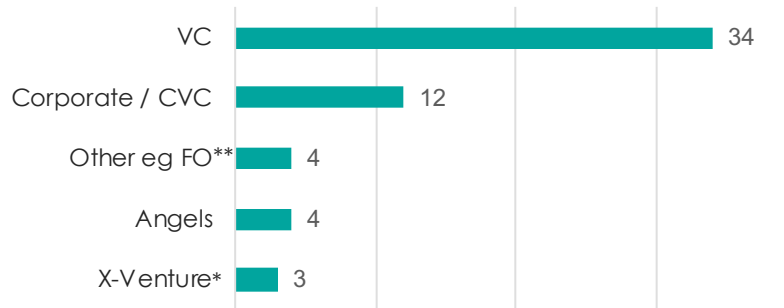
Noteworthy Singapore-based Investors

Investor	# of Investments	Country of Origin	Type of Investor
SG Innovate	4	Singapore	VC
Heritas Venture Fund	2	Singapore	VC
Venturecraft	2	Singapore	VC
Wavemaker Partners	2	Singapore	VC

Investor Origin



Investor Type



*x-venture: a startup investing in another startup; **FO: family office

Case Study #1: Building a global startup from Singapore

Company Profile



Biofourmis, a fast-growing global leader in **digital therapeutics**, discovers, develops and delivers clinically validated software-based therapeutics to provide better outcomes for patients, advanced tools for clinicians to deliver personalized care, and cost-effective solutions for payers. Biofourmis has built Biovitals™, a highly sophisticated personalized AI-powered health analytics platform that predicts clinical exacerbation in advance before a critical event, which is the backbone of their digital therapeutics product pipeline across therapeutic areas including heart failure, coronary artery disease, pain and Oncology.

Spotlight on the CEO

CEO Kuldeep Singh was born and raised in India. Trained as an electrical engineer, he did a stint at the MIT Media Lab working on biosensor processing for predicting cardiac exacerbation before moving to Singapore in 2013 to pursue his PhD. While researching implants for neuromodulation at the National University of Singapore, Singh founded Biofourmis. He later decided to leave his PhD to work on the startup full-time.



Highlights of the growth journey

Biofourmis' 50-man team in Singapore oversees its product development, data science and clinical operations activities.

Growing the startup in Singapore provided **cost advantages over the US** when hiring digital health talent. With ready access to the breadth of Pharma companies based locally, Biofourmis also had the opportunity to pursue **clinical validation** of its products and services through partnerships with Pharma and local hospitals.

The company recently closed a US\$35M Series B round, to support its internationalization plans, particularly to grow its market presence in the US and China.

Investment History

Date	Investors	Stage	Amount
05 / 2019	Sequoia Capital, Mass Mutual Ventures, EDBI, Jianke	Series B	US\$ 35M
08 / 2017	Openspace Ventures, Aviva Ventures, SGInnovate, Mayo Clinic	Series A	US\$ 7M
08 / 2016	SpesNet, Eden Strategy Institute	Seed	US\$ 1.8M

The startup community is highly diverse & have international ambitions

Figure 5: Nationality Distribution Of Singapore-based Top 20* HealthTech CEOs

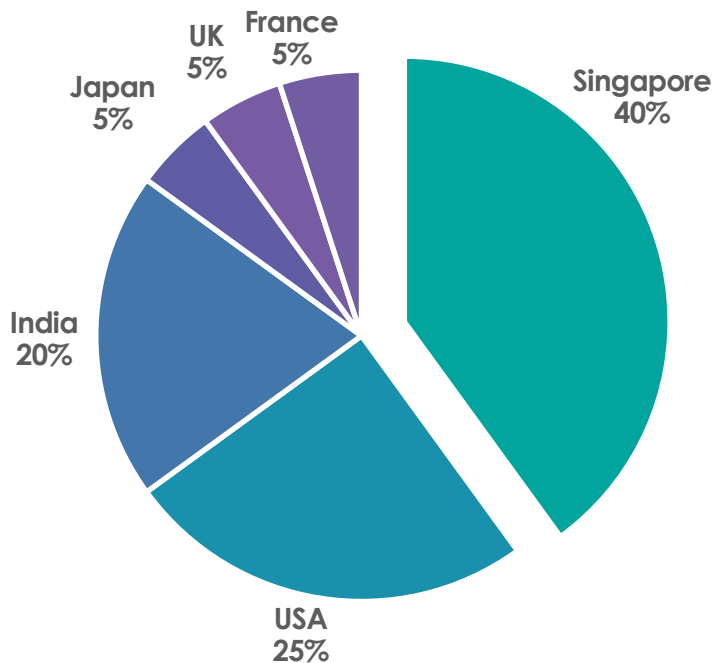
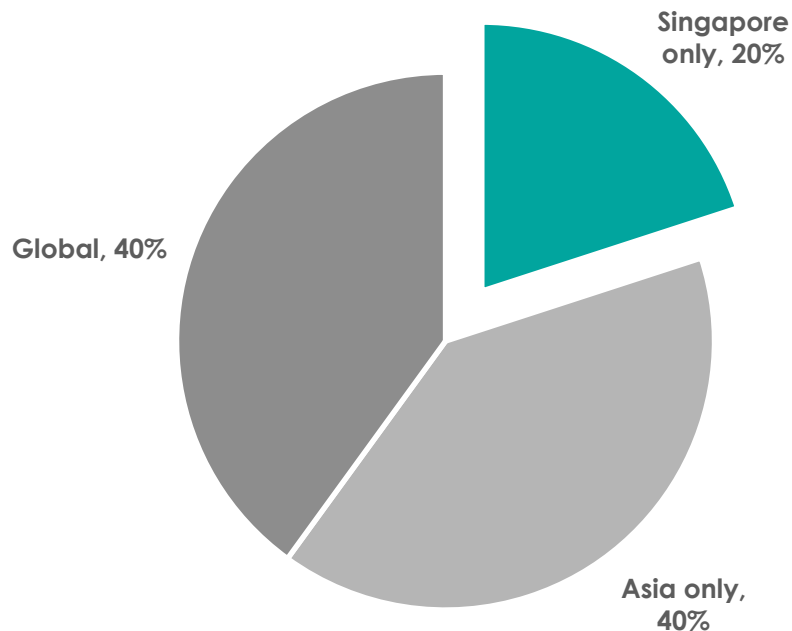


Figure 6: Markets where the Top 20* Singapore-based HealthTechs operate in



Case Study #2: Regional startup accelerating growth through Singapore

Company Profile



Hello Health Group is a Singapore-based startup that builds healthcare information portals in emerging markets across Southeast Asia. It currently operates 8 offices outside of Singapore in Vietnam, Indonesia, Thailand, Malaysia, Myanmar, Cambodia, Taiwan and India and expects to reach 200 million monthly users over the next 3-4 years. Today, Hello Health employs more than 130 employees and expects to grow to a 200-person team by the end of the 2019.

Highlights of the growth journey

Hello Health's full corporate structure is based out of Singapore, providing regional support and insights for clients and local teams across Asia.

While the startup's early business was in IndoChina, Singapore had enabled the growth of its business there in the form of deep clusters of tech and marketing talent, financing networks, the vibrant startup ecosystem and support networks, as well as the latest regional HealthTech insights.

In the next phase of growth, Hello Health envisions moving key members of the leadership team to Singapore, in addition to building a team that will drive regional business development, data & analytics development and corporate finance functions.

Investment History

Date	Investors	Stage	Amount
08 / 2017	Charles Toomey + Angels	Seed	US\$ 1.5M

Spotlight on the CEO



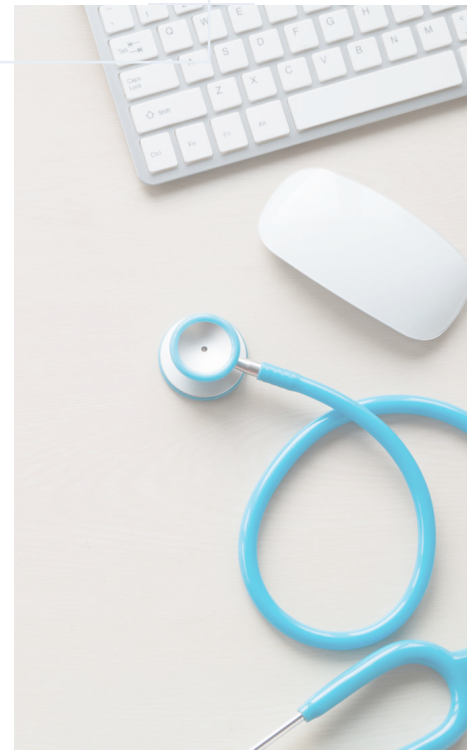
Mr. James Miles-Lambert, originally from the United Kingdom, spent 4 years in Malaysia, working with Rocket Internet, Nova Founders with a focus on Lion&Lion (exit to Septeni) and most recently Co-Founding Consider Digital (exit to Dentsu) before moving to Saigon, Vietnam. He found strong support for the idea of Hello Health in Mr. Charles Toomey (now Chairman), who reached out over LinkedIn to express interest in investing. As both happened to be traveling to Singapore the following week, they agreed to connect and the rest was history.

Most important healthcare problem in Asia?

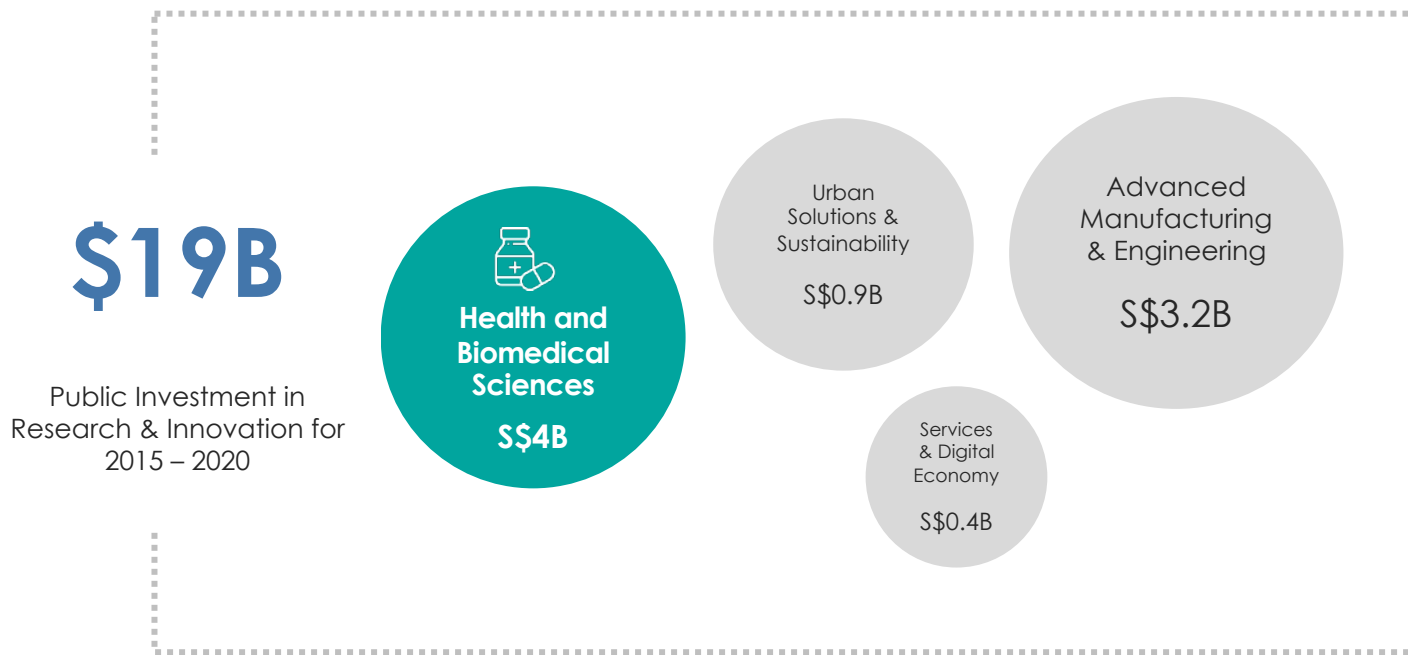
“We believe that tackling health issues and improving people lives at a macro scale starts with healthcare education and awareness. Our premise in democratizing healthcare information, so as to understand people's needs, provide answers and in so doing leading people to solutions, is in our view, the foundation of a thriving "consumer healthcare digital system". The importance of this Healthcare digital system will only grow as household incomes increase across the region and as such we believe the best time to start is now.”

Singapore's HealthTechs

lie at the heart of a
broader digital health
innovation ecosystem
of **public** and **private**
players

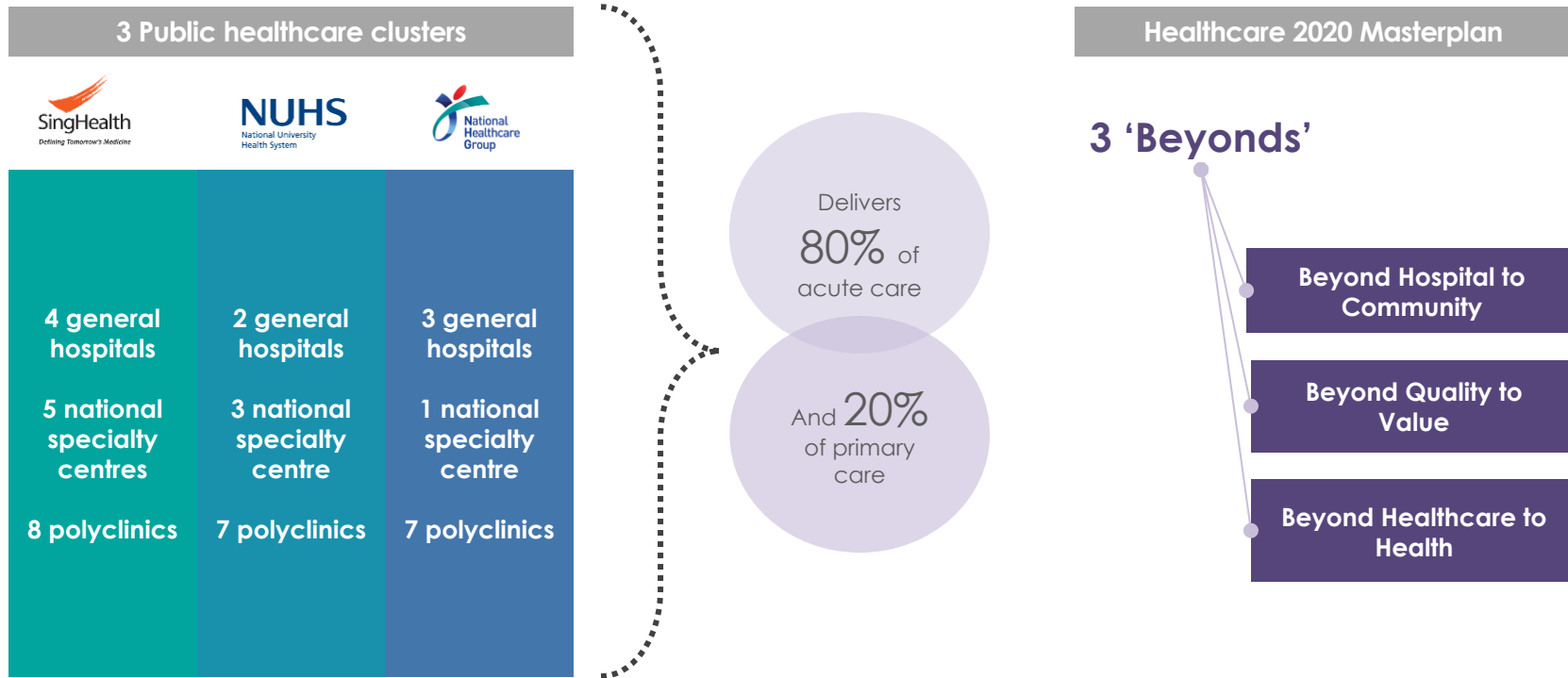


Singapore has built depth in health & biomedical Sciences R&D capabilities through sustained public investment in the sector



Singapore's healthcare system

An integrated network of primary healthcare polyclinics, acute care and tertiary hospitals, national specialty centres and business divisions, enabling patient-centric care across the care continuum.



Singapore has a diverse MNC corporate landscape for healthcare...

>100

Global Pharma & Medical Devices manufacturers run commercial regional HQs in Singapore



....as well as tech

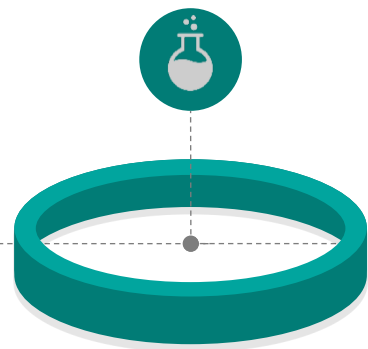
Many are involved in the business of technology or healthcare, or both.

>80

of the world's top 100
tech companies call
Singapore home and
account for 6.5% of our
GDP

DIGITAL INFRASTRUCTURE	DEVICES & HARDWARE	SOFTWARE & IT SERVICES	INTERNET PLATFORMS	CONTENT & MEDIA
 EQUINIX	 dyson	 Microsoft	 Google	
 HUAWEI	 lenovo.	 NVIDIA.	 facebook	
 amazon web services™	 SAMSUNG	 accenture	 Garena connecting the dots	
 Hewlett Packard Enterprise	 JABIL	 IBM	 Grab	
 BT	 gemalto security to be free	 AUTODESK.	 Alibaba Group 阿里巴巴集团	
 DIGITAL REALTY	 DELL	 McLaren APPLIED TECHNOLOGIES	 LinkedIn	
 CISCO.	 mi	 FUJITSU	 FOX	
			 Ctrip 携程	
			 Rakuten	

Corporates undertake different approaches to healthcare innovation



In-house R&D Teams

Are common among MNCs with deep R&D capabilities in Singapore. They focus on developing digitally-enabled products and services to augment core business lines.



Open Innovation Teams

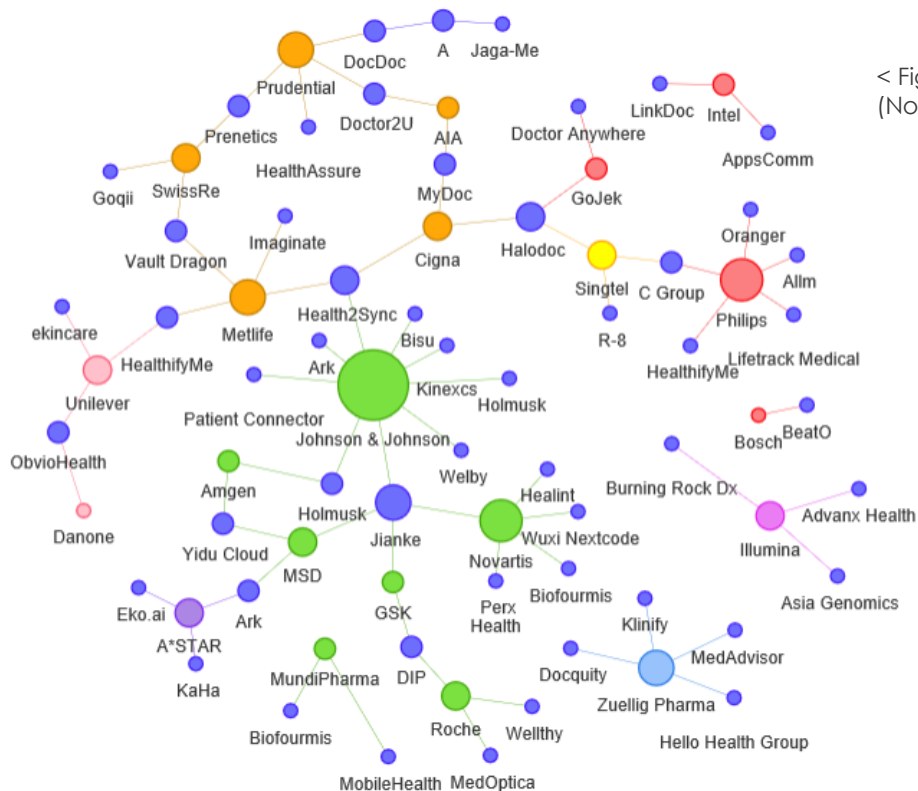
Focus on scouting for innovation, forming partnerships, and working with commercial/ R&D teams to test and pilot solutions in various markets.



Corporate Investment Teams

Have become more active in this region, contributing capital and expertise in navigating complex and fragmented Asian healthcare markets.

The growing web of Corporate-HealthTech activity in Singapore



< Figure 7: Partnerships between startups and corporates (Non-exhaustive). Size of bubble denote # of partnerships



Case Study #3: Applying open innovation to transform business models

Company Profile



*Novartis is a global multinational pharma company. In Asia, the company seeks to leverage data, digital and exponential technologies to address the most pressing health challenges in the region. From Big Data, Machine Learning, Telemedicine, the use of sensors to Virtual Reality, Novartis aims to harness all these technologies to **create disruptive opportunities, transform the healthcare landscape and save lives**. To do so, Novartis is looking to partner key health-tech startups in Asia.*

Novartis' ambition for digital health

The short-term objective is to **co-develop solutions** and programs to address pain points in the patient journey and bend the curve on outcomes. These include utilizing AI for faster diagnosis, reducing re-hospitalizations through predictive analytics and wearable diagnostic devices, and complementing the conventional "push model" with a "pull-based" digital customer engagement model. In the long-term, Novartis aims to commercialize digital medicines or digital therapeutics and become a **global digital innovation hub**.

Last year, we launched **Novartis Biome** in San Francisco, California. The Novartis Biome is a digital health innovation lab network and series of open innovation initiatives. In the future we might explore opening a Biome Franchise in Asia.

An interview with Mr. Alexis Serlin

EDB spoke to Mr. Alexis Serlin, Head of the Asia Cluster at Novartis, to learn more about the company's interest and approach to digital health innovation.



The open innovation approach

Novartis aims to create a **lean and agile** approach to partnerships that will allow us to **pilot solutions** in the market quickly and **constantly iterate through feedback** to improve them and take quick decisions on whether to escalate or stop solutions. Novartis is also aiming to be the **partner of choice for startups**. We plan to identify Singapore-based health tech companies that are aligned with our long-term goal and our Global Leadership Team can sit down with them to discuss business development agreements on a much broader scale. We conduct regular feedback sessions and interviews to get inputs and insights from the startups we are working with.

Key challenges encountered include uncertainty in the long-term commitment and sustainability of start-ups, balancing start-ups valuation and ability to attract investment with our approach to pressure-test and pilot with them, and internal hurdles related to procurement and IT, among others.

Case Study #4: Corporates' Centre of Excellence

Company Profile

Zuellig Health Solutions (ZHS), headquartered in Singapore, leverages the partner network of Zuellig Pharma's distribution & solutions business with 350,000 hospitals, clinics & pharmacies that it serves across 13 markets in Asia. ZHS focuses on the development of digital solutions & data driven insights, in line with the Group's mission of **making healthcare more accessible**. Since 2015 when it was founded, the ZHS team has had a major role in the company's digital transformation, introducing numerous new digital health solutions & data driven insight services.

How does ZHS work with start-ups and other partners in Singapore and the region?

Zuellig Pharma is a **strategic partner** for start-ups, bringing expertise, networks & capital. We are flexible in ways of engagement, including through minority equity investments (eg. Docquity), joint-ventures (eg. MedAdvisor) & acquisitions (eg. Klinify).

Challenges

Most digital health start-ups tend to focus on disruptive B2B solutions, while many investors in Singapore tend to focus on B2C applications. Therefore many startups & investors do not easily align on vision, ZHS as a **B2B player** is trying to fill that gap. That said, partnering with a corporate can be time-consuming as decision-making processes are highly structured & tend to take some time from beginning to end.

An interview with Maarten Kelder

EDB spoke to Maarten Kelder, SVP, Strategy & Corporate Development of Zuellig Pharma, one of the largest healthcare services groups in Asia.



Examples of innovation outcomes

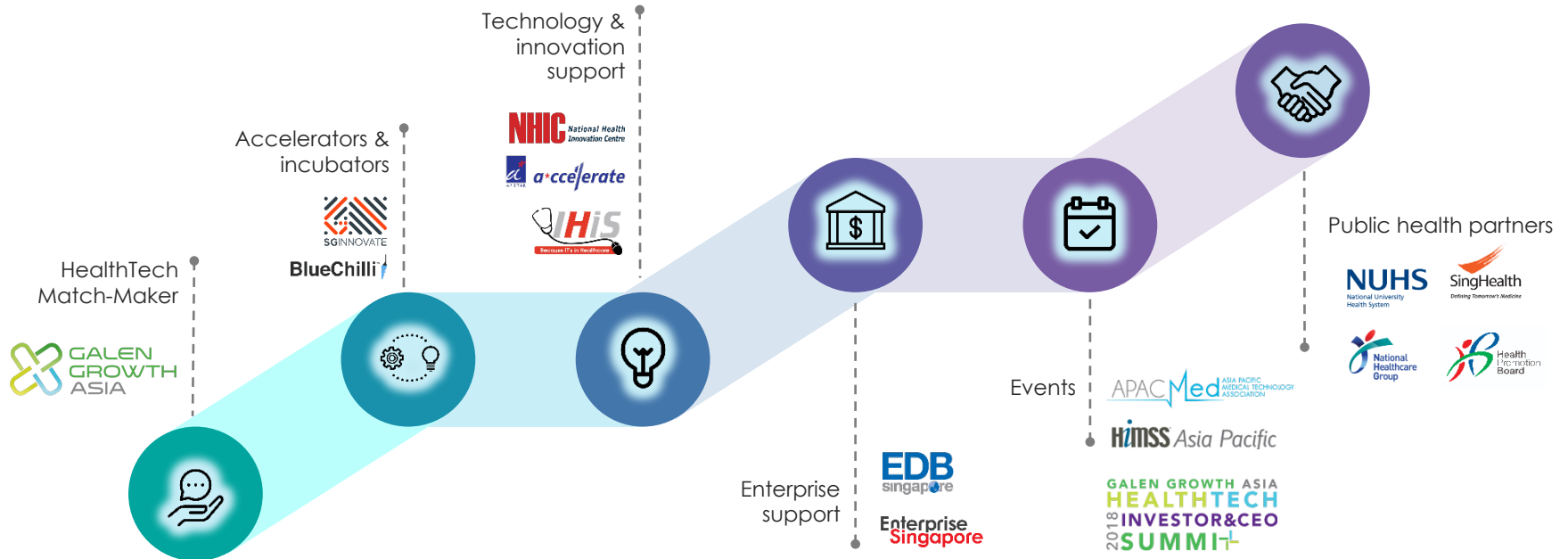
With several **investments & partnerships** in 2 years, we have become one of the most active investors & strategic partners for the digital health ecosystem in Singapore & the region. Examples include:

- **Switch**, a lifestyle & wellness platform
- **Klinify**, a cloud based medical assistant designed to help doctors provide better care
- **Docquity**, the largest social network for doctors in SEA
- **MedAdvisor**, a high impact medication management platform connecting pharmacists to their patients

Data driven insights were built from scratch & has become a high impact solution providing insights to our pharma & corporate/insurance clients to help them **optimise their business**.

In addition, we recently launched **eZTracker**, a blockchain-based solution to help our clients & customers keep track of **counterfeits & parallel trade**.

Where would your journey in Singapore start?



DOING BUSINESS IN SOUTHEAST ASIA AND SINGAPORE

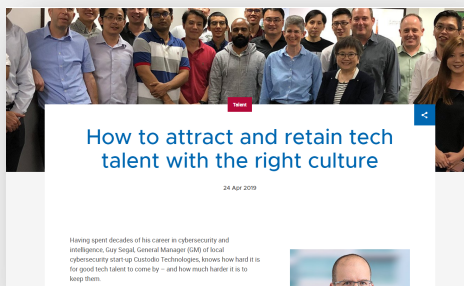
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About EDB

The Singapore Economic Development Board (EDB), a government agency under the Ministry of Trade and Industry, is responsible for strategies that enhance Singapore's position as a global centre for business, innovation, and talent. Our mission is to create sustainable economic growth, with vibrant business and good job opportunities for Singapore.



ABOUT GALEN GROWTH ASIA



OUR PROFILE

Galen Growth Asia, a Singapore company, is the leading exclusive HealthTech research, analytics and advisory firm in Asia Pac serving Fortune 500 companies and global investors

Our Mission

Founded in late 2015 by Singapore based HealthTech innovators, Galen Growth Asia (GGA), is at the epicentre of HealthTech innovation, aka digital health, currently a \$75+B startup ecosystem

GGA has built a portfolio of solutions which enables it to be the catalyst of direct collaboration between enterprises, startups and investors to prototype, evaluate and implement HealthTech solutions to solve healthcare system pain points and create significant financial and social value in the region

We partner with enterprise, investors and startups to accelerate and deepen their understanding of this exciting ecosystem. We offer client specific analytics and advisory solutions to help them find the right options and scale their innovation plans

We Fast Track HealthTech Strategies

Accelerate Strategies

By leveraging its thought leadership, research, data and unique ecosystem network, GGA is in the enviable position of assisting enterprise, investors and startups ventures to accelerate the design and execution their HealthTech growth strategies

Discover Solutions

GGA has built the most advance HealthTech ventures analytics platform allowing it and its clients to scan, screen and develop valuable insights. Through its rich network and this unique database, GGA is the leading authority in the Asia Pacific HealthTech ecosystem

Engage Innovators

GGA has established the most comprehensive and relevant network of HealthTech startups and innovators across the region which includes entrepreneurs, investors, enterprise innovation teams, and many other key stakeholder groups allowing innovators to embed within the ecosystem faster

OUR BUSINESS MODEL

HealthTech Acceleration

Specialist Digital Health Advisory to Enterprise, Investors & Startups

Design: The Why&What - Accelerate the design of a client's digital health strategy incl. alignment of internal stakeholders

Execution: The How&Who – Construct & kick-off the strategy execution plan incl. identification of suitable startups for potential partnership

HealthTech Alpha

The **Moneyball of Asia HealthTech!** Continuously curated and updated.

Asia HealthTech's most advanced ecosystem **analytics platform**, used by investors, enterprise and startups, giving access to **unique insights on the thousands of digital health startups to make better informed decisions**

Open Innovation HealthTech Council

The HealthTech Council **propels the ambitions of innovation leaders** through their **peer-to-peer** collaborative and reflective practices to build and enable the future of healthcare in Asia. An enterprise-to-enterprise Innovation Lab!





It is tailored to provide timely insights to help each member to accelerate the delivery of their digital health strategies, make timely decisions and be recognised as innovation champion

HealthTech Tribe

Asia's only dedicated annual **HealthTech Summit**: The Summit for the most innovative minds in Asia HealthTech: **Investor Day** and **Enterprise Day**, culminating in the much coveted **Most Innovative HealthTech Startup in Asia Award**.

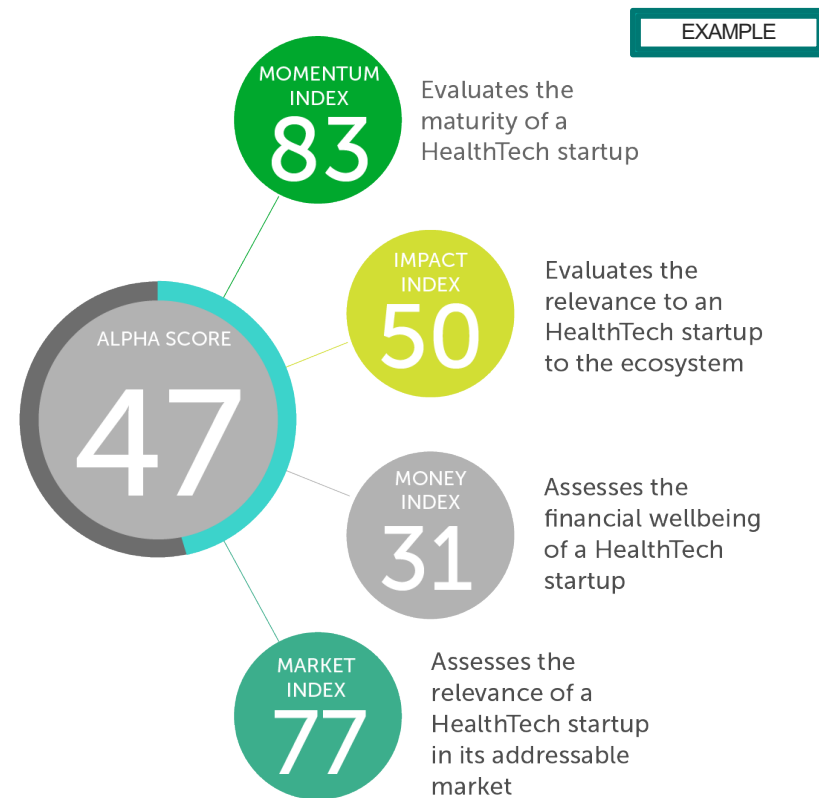
Quarterly HealthTech Deal Flow events – **connecting the ecosystem movers and shakers** – by invitation only

ABOUT HEALTHTECH ALPHA

					Remarks
No. of HT ventures captured	2100+	300+	1000+	1400	
No. of HT deals captured	2000+	300+		1450	
Total funding tracked (since 2010)	US\$30B	US\$2B		US\$10B	
No. of investors captured	1300+	350+			
Funding Deal & Financial Profiling					
Investors	Yes	Yes	Yes	Yes	eg. Sequoia
Stage	Yes	Yes	Yes	Yes	eg. Series A
Valuation	Yes	Yes	No	No	
Future Valuation	Yes	Yes	No	No	
Financial Statements	No	Yes	No	Yes	eg. P&L
Business Model Profiling					
Commercial Partnerships	Yes	No	No	No	eg. Lilly
Value Proposition Mapping	Yes	No	No	No	eg. Patient Acquisition
TA Mapping	Yes	No	No	No	eg. Oncology
HT Capability Categorisation	Yes	No	No	No	eg. Telemedicine
Enabling Tech Classification	Yes	No	No	Yes	eg. Biosensors
Geographic Mapping	Yes	Yes	Yes	Yes	eg. Jakarta, Indonesia
Other					
Management Team	Yes	Yes	Yes	Yes	eg. CEO Name
Incorporation Status	Yes	Yes	Yes	Yes	
Contact Details	No	Yes	No	Yes	HTA protects privacy of the team
Venue Indices					
Social Media	No	Yes	Yes	No	eg. Website traffic
Biz Maturity	Yes	No	No	Yes	eg. Operating model momentum

ABOUT OUR ANALYTICS

- The **first of-a-kind analytics platform dedicated to HealthTech** with the sole mission of fostering greater transparency in a sector.
- We calculate a number of comparative indices, via our own unique algorithm, by leveraging and analysing the multiple data points we capture and calculate for each venture.
- There are **four distinct and independent Alpha Indices** that are computed into one final Alpha Score as follows:
 - **Momentum index:** measures the performance and fitness of a HealthTech venture business model relative to itself and ecosystem peers.
 - **Market index:** measures the relevance of a venture to its ecosystem by assessing and comparing the health of the category and sub-category in which a HealthTech venture competes and how it measures up.
 - **Money index:** quantifies the “investability” of a venture, in other words the financial strength and wellbeing of a HealthTech venture based on its financial history, and investor quality.
 - **Impact index:** Evaluates the degree to which an HealthTech venture and its solution(s) is solving healthcare pain points.
- The **Alpha Score or maturity index** is calibrated composite score, based on the four Alpha indices which also enables a comparison ranking



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