Medtronic | EDB SINGAPORE

Asia Pacific's Healthcare Technologies Ecosystem:

Enhancing start-up and SME success

Written by ECONOMIST IMPACT

Foreword

Chris Lee
President
Medtronic APAC

Innovation is one of the cornerstones for Medtronic. Earl Bakken, the late Founder of Medtronic etched the concept of life transforming innovation into Medtronic with the company's mission in 1960. At Medtronic, we have a bold ambition to become a global leader in healthcare technology. For us, that means transforming healthcare driven by innovations in advanced computing, smallest-size solutions and hyper-personalization. This is precisely what we've done in APAC with the launch of the three arms of open innovation platform – Medtronic APAC Innovation Challenge (External Innovation Program), MDT Spark (Internal Innovation Program) and the soon to be launched Digital Medtronic Innovation Center (dMIC).

This report is an extension of our commitment to truly serve the needs of the region – through the insights that we gather from the start-up community. The results have certainly reaffirmed our belief that no one entity can solve the problems of healthcare alone while recognizing the fact that Technology can enable us to find a solution. The need for collaboration is much more critical now. The pandemic has reinforced the fundamental role health plays in the global economy. And it has caused rapid change around the globe, requiring cross-sector partnerships and innovation to deliver on critical patient needs. One such collaboration that has seen great success for Medtronic in APAC – particularly in APAC is with the Singapore Economic Development Board (EDB). A supporter of our Open Innovation Platform – launched in October 2021 – we thank them for their extension of support to this report as well.

APAC is a diverse region for Medtronic, with complex healthcare challenges facing developed and developing markets within. With our passionate team of nearly 10,000 employees across APAC and portfolio addressing more than 70 disease states – We look forward to and welcome collaborative efforts from all the stakeholders within the healthcare ecosystem, to improve healthcare access for the region. Most importantly, our customers and patients. Join hands with Medtronic towards this exciting journey of collaborative innovation. Let's Go Big with Medtronic.

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About this project

Asia Pacific's Healthcare Technologies ecosystem: Enhancing start-up and SME success is a white paper report written by Economist Impact, and commissioned by Medtronic in support of the EDB. The report reflects the findings from a survey of over 150 executives from healthcare technology organisations that operate in 15 markets in the Asia-Pacific region, as well as interviews with six health technology sector experts. The report aims to establish the present state of the healthcare technology sector in Asia Pacific and explores the challenges that early-stage start-ups and middle-stage companies face in either establishing a business or scaling up.

The findings of the programme are editorially independent, and it is sponsored by Medtronic in support of the EDB. The Economist Impact research team comprised Emily Tiemann, Gerard Dunleavy, Rachna Malik, Rohini Omkar and Rohit Sahgal. The report was written by Jessica Mudditt and Georgia McCafferty, and edited by Gerard Dunleavy, Maria Ronald and Georgia McCafferty.

Economist Impact would like to thank the participants of the survey and the interviewees who generously offered their time and insights, in particular:

- Lalitha Bhaskara, Vice President, SAP.iO Foundries Asia Pacific Japan & China
- Dr Keren Priyadarshini, Regional Business Lead, Worldwide Health, Microsoft Asia
- Jean-Luc Butel, Board Member, Novo A/S, Rani Therapeutics, Takeda Pharmaceutical, SGInnovate, and former Executive Vice-President, Group President International, Medtronic

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- Dr Loke Wai Chiong, Head (Integrated Health Promotion), Clinical Director (Programmes), MOH Office for Healthcare Transformation (MOHT)
- Jonathan Ley, Assistant Director of InHealth and Finance Redesign, MOH Office for Healthcare Transformation (MOHT)

The findings and views expressed in this report are those of Economist Impact and do not necessarily reflect the views of survey respondents, interviewees, contributors or the project sponsor.

Executive summary

This programme aims to provide data and analysis to help illustrate and understand the present state of the healthcare technologies ecosystem in the Asia-Pacific region, as well as the challenges companies in the industry face. It also explores how start-ups and small and medium-sized enterprises (SMEs) can be supported and how healthcare technology can improve healthcare accessibility.

Key findings from this project are:

- **Finding the right talent is the most significant challenge for the healthcare technology sector.** Most respondents (84%) agree or strongly agree that talent recruitment is the most significant challenge for early-stage start-ups. Support with recruitment and upskilling also ranked as the most important type of support start-ups/SMEs need to reach their next strategic milestone. Whether that support comes from government or private organisation programmes, or a mixture of both, strategies and pathways to attract talented graduates and executives to the healthcare technology sector are needed to support future growth.
- **A more cohesive partnership and collaboration ecosystem needs to be developed with greater integration across multiple stakeholders.** Over 75% of respondents identified partnerships and collaborations with government, industry, and other technology innovators as a significant challenge for early-stage start-ups, ranking it third highest of all challenges. A further 65% rated the role of partnerships with health system stakeholders like industry groups, government and other companies as very important to their organisation's success. Healthcare technology requires cross-domain collaborations and building support networks that facilitate collaboration could have a sizeable impact on innovation.
- **Government support is identified as a critical factor to foster healthcare technology sector innovation.** Almost 40% of respondents identify better government support as the highest-ranked factor that would best support innovation in the market. Considering their own organisation's trajectory, 29% of executives view government support targeted towards innovation or start-ups as the third most critical factor to help their organisation reach its next strategic milestone.

- **There is a gap between the patient/disease pathways that healthcare technology companies are investing in, and what they believe are the greatest unmet patient/disease needs.** This could be from a lack of information sharing, whether between private and public sectors or within the sectors themselves, that distorts market signals, or perhaps the comparative profitability of sectors. Any market failure like this indicates a need for government intervention, while private companies could also collaborate on how to improve information sharing.
- **The covid-19 pandemic has removed multiple institutional and cultural barriers to adoption of digital solutions in the healthcare technology setting, although some remain.** Digitisation has grown far more rapidly than was previously thought possible and ushered in an acceptance of remote medical products and services, and alternative care models. It has fostered greater industry innovation—while 35% of respondents said the pandemic had resulted in the stagnation or demise of an idea, 55% said that it had enabled innovative ideas to come to fruition.
- **Data security should be a future focus for healthcare technology companies.** Data security is a global and inter-sectoral issue, and over 45% of respondents ranked data security as the most significant barrier to the delivery of patient healthcare. Despite the magnitude of the challenge, data security could prove to be a lucrative opportunity for existing companies or those considering entering the healthcare technology sector.

Methodology

The report is based on the results of a quantitative survey of 150 executives from healthcare technology companies across the Asia-Pacific region and qualitative interviews with six leading healthcare market executives, academics and technology companies with applications in healthcare from the region to provide context, examples and insights into the findings.

For the purposes of the report, healthcare technology is defined as the "application of organised knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of life", as per the World Health Organization (WHO).[1]

Medical technology (Medtech) is defined as the "technologies that diagnose, treat and/or improve a person's health and wellbeing, encompassing both low- and high-risk medical devices", as per APACMed.[2]

Digital health is defined as the "usage of connected devices, wearables, software including mobile applications (apps) and artificial intelligence (AI) to address various health needs via information and communications technologies", as per the Health Science Authority (HSA).[3]

The survey comprised 15 questions, five of which were demographic and ten of which related directly to the topic. Issues covered included an exploration of challenges, the patient/disease pathway, innovation and data, market partnerships and support, and the impact of covid-19 on innovation and growth *(see Appendix 1 for the full questionnaire)*.

The respondents surveyed include board members, c-suite executives, senior vice presidents, presidents and directors, all of whom are involved in helping set their organisation's strategy. Two-thirds of the respondents are c-suite level executives. The

[1] WHO Health product and policy standards. https://www.who.int/teams/health-product-policy-and-standards/assistive-and-medical-technology/medical-devices

[2] APACMed, What is medical technology? https://apacmed.org/the-medtech-industry/what-is-medical-technology/

[3] HSA. Digital Health: Understanding digital health products and their regulations, https://www.hsa.gov.sg/medical-devices/digital-health

Figure 1: In which countries does your organisation operate?

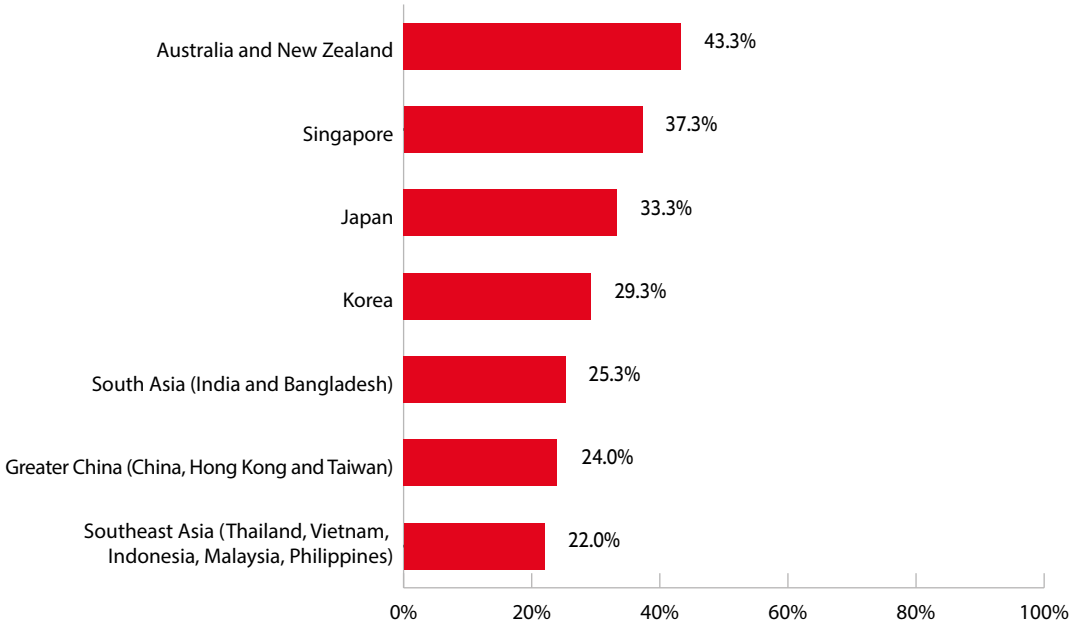
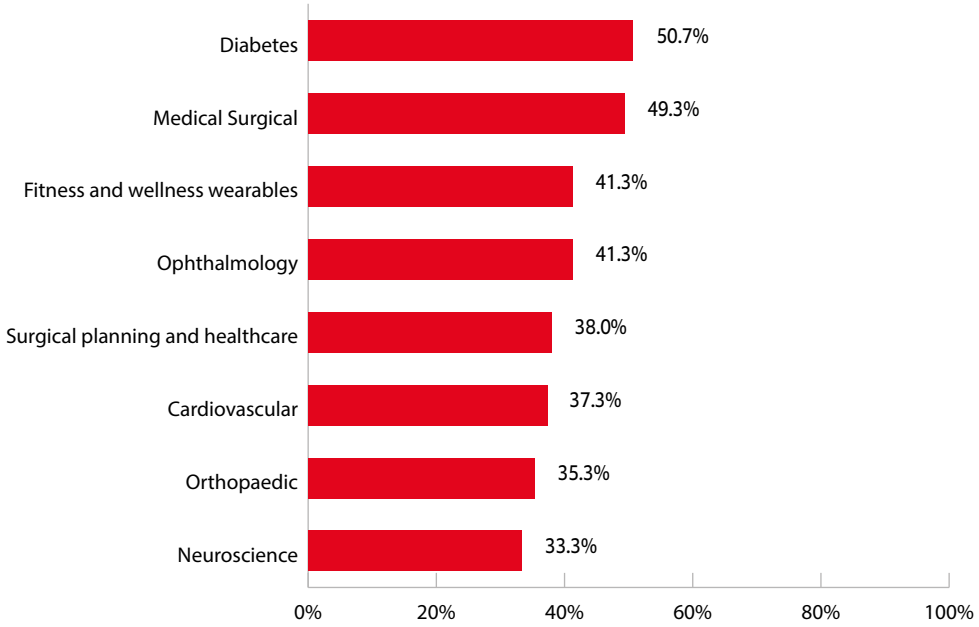


Figure 2: In which of the following sectors is your organisation involved?



location of respondent organisations is evenly distributed across five markets: Australia, Japan, India, South Korea and ASEAN, which includes Singapore and one respondent each from Thailand and Cambodia.

The organisations surveyed include start-ups and small and medium-sized enterprises (SMEs), and all had reported ≥US$1m in revenue in the previous financial year. The smallest (9%) reported annual revenue of ≤US$10m, 29% reported between $10m and $50m, 32% reported between US$50m and US$100m, and 31% reported annual revenue of ≥US$100m. Respondent organisations were involved in one or more businesses spanning eight healthcare sectors, or therapy areas, ranging from diabetes to neuroscience.

Introduction

Asia-Pacific is a diverse and complex region. It includes emerging economies like Vietnam, Indonesia and Thailand, as well as some of the world's largest economies, like China, Japan and India. The demand for healthcare across these nations is acute and growing. The region is home to approximately 60% of the world's population, or over 4.1bn people as of June 2021,[4] and this is expected to increase to almost 5bn by 2050.[5] Average life expectancy in the region is now 71 for males and 75 for females,[4] rapidly driving the need for aged care. Other demographic trends, like falling fertility rates, growing morbidity rates, increasing urbanisation and significant migration flows[4] create further complexity.

The regional diversity is reflected in the plurality of healthcare systems across the various countries. Economies like Singapore and Hong Kong have highly developed, public healthcare systems that operate alongside a thriving private sector. Developing countries like India and Bangladesh, on the other hand, lack sufficient infrastructure and are currently grappling with how they can enhance their healthcare systems to meet the demands of an ever-growing population, and face significant challenges with regards to the accessibility of healthcare.

The diversity of the region is also evident in the innovation and start-up environment. New Zealand, Singapore and Hong Kong are consistently ranked in the world's top places to do business,[6] and the Asia-Pacific region includes three of the world's top-ten global start-up hubs: Singapore, China and Australia.[7] These countries have highly developed technology and healthcare infrastructure and the funding and support systems to maintain them. In contrast, endemic corruption in some nations, as well as widely differing regulatory environments and taxonomy, make the region

[4] United Nations Population Fund, World Population Dashboard, https://www.unfpa.org/data/world-population-dashboard

[5] United Nations Economic and Social Commission for Asia and the Pacific, 2020 Fact Sheet, https://www.unescap.org/sites/default/d8files/knowledge-products/SDD-PS-data-sheet-2020-v6-1.pdf

[6] Doing Business 2020, The World Bank, http://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf

[7] Start-up Blink. The Global Start-up Index Ecosystem Report 2021, https://report.startupblink.com

a complex business landscape for start-ups to navigate.

"APAC is an amalgamation of markets that vary in size and maturity," says Dr Keren Priyadarshini, Regional Business Lead, Worldwide Health, Microsoft Asia. "Australia and Japan have very advanced healthcare systems, while Vietnam and Cambodia are still developing. On the other hand, the boundaries of healthcare technology are increasingly expanding by convergence with biotechnology, telecommunication, artificial intelligence (AI), and even consumer health and wellness."

Despite the challenges, the opportunities for healthcare technology start-ups in the Asia-Pacific region have never been so vast, nor the rate of change so swift. Healthcare technology has become one of the fastest-growing verticals regionally, with consumer-centric digital health systems forming at record speed and scale.[8]

The Asia-Pacific region is expected to account for more than 40% of the growth in global healthcare spending over the next decade—expanding at a rate almost double that of the rest of the world.[9] Other estimates indicate that digital health in the region could spike in value from US$37bn in 2020 to US$100bn by 2025.[10] The region's telemedicine market alone is expected to grow from US$8.5bn in 2021 to US$22.5bn by 2025.[11]

The impact of covid-19

The covid-19 pandemic has been both an enabler and an inhibitor of growth and development in medical and healthcare technology start-ups and mid-growth organisations. The global crisis has put healthcare systems and professionals under enormous strain and upended the global supply chains that healthcare systems relied upon. The restrictions on movement created problems for doctors and patients and saw demand for products like personal protective equipment and services like testing rise dramatically almost overnight.

As a solution to some of these issues, digital transformation accelerated rapidly across healthcare and was adopted willingly by consumers. In India, for example, in-person healthcare appointments fell by 32% between March and November 2020, and the number of people using online consultations grew 300%.[12]

The rapid pace of change created challenges for some healthcare technology businesses but resulted in new opportunities for others. Over half of the respondents (55%) reported that covid-19 had enabled the development and implementation of innovative ideas, although the positive impact on innovation differed markedly across markets. Far more Indian (77%) and Australian (63%) companies felt

[8] Mint. In Apac, health-tech is one of the fastest-growing verticles: Navdeep Manaktala, https://www.livemint.com/companies/start-ups/in-apac-health-tech-is-one-of-the-fastest-growing-verticals-navdeep-manaktala-11632074717267.html

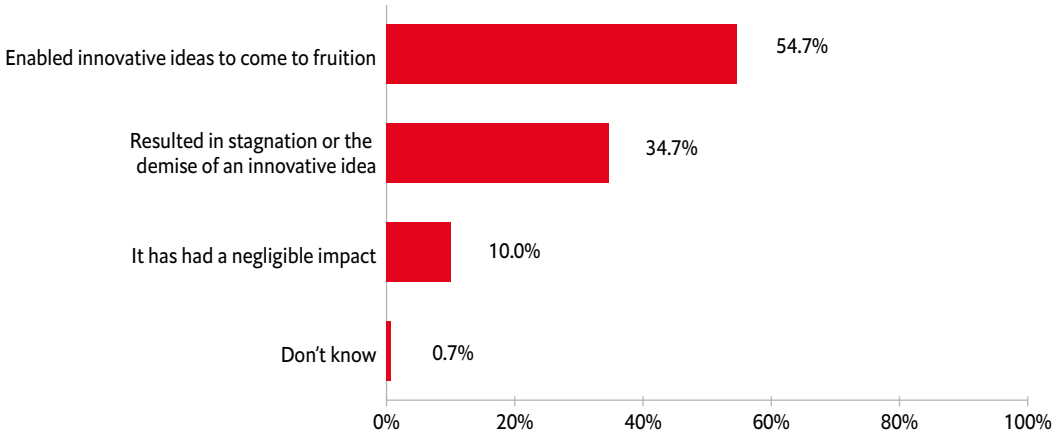
[9] Bain & Company. Asia-Pacific Front Line of Healthcare Report 2020, https://www.bain.com/contentassets/a1d1395b809d424a8db679657f95b19d/bain_report_asia-pacific_front_line_of_healthcare.pdf

[10] McKinsey & Company. The future of healthcare in Asia: Digital health ecosystems, https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/the-future-of-healthcare-in-asia-digital-health-ecosystems

[11] The Japan times. Pandemic bolsters case for telemedicine across the Asia-Pacific region, https://www.japantimes.co.jp/news/2020/07/27/business/economy-business/coronavirus-telemedicine-asia/

[12] World Economic Forum. Covid-19: watershed moment for digital healthcare? https://www.weforum.org/agenda/2021/01/watershed-moment-for-digital-healthcare/

Figure 3: How has the covid-19 pandemic impacted innovation and growth for your firm?



the benefits of increased innovation from the impact of the pandemic, compared to those in South Korea (17%), Japan (40%), and ASEAN (47%).

Companies that found themselves with the right solutions at the right time, and which were able to harness the people, funding, and networks they needed to rapidly scale their business, turned the pandemic into a unique business opportunity. In 2021, US$8.7bn of venture funding was deployed across 317 digital health deals in the Asia-Pacific region, an increase of 11.2% as compared to 2020, showing the growth in VC backed start-ups in the region and the willingness of venture capitalists to invest here.[13]

Indian start-up PharmEasy, founded in 2015, is an example of the almost overnight success some healthcare technology companies in the region experienced. Its revenue virtually doubled during the pandemic due to an unprecedented surge in demand for telehealth services, and online shopping for pharmaceuticals and medical devices. In April 2021, it raised US$350m in a funding round led by Prosus Ventures and TPG Growth, and became the first Indian e-pharmacy to gain status as a unicorn.[14] Just seven months later, in November, it filed an initial public offering (IPO) of US$842.43m, joining the handful of Indian top-tier start-ups across all industries who have pursued a domestic stock listing.[15]

In South-East Asia, Indonesian telemedicine company Halodoc also thrived. Its business that connects patients with licensed doctors, insurance, labs, and pharmacies on the one

[13] Galen Growth. Digital Health ecosystem in the Asia Pacific in 2021. https://www.galengrowth.com/product/fy-2021-asia-pacific-digitalhealth-ecosystem-report/

[14] A unicorn is a privately held start-up company valued at over $1bn

[15] The Economic Times. 2021 Year in Review: Indian startups come of age with 8 IPOs in 2021, https://economictimes.indiatimes.com/tech/startups/2021-year-in-review-the-year-of-the-startup-ipo/articleshow/88588466.cms

mobile application gained regional traction with consumers, while its mission to solve the problems some people in the region experience accessing affordable consultations and medicines also struck a chord with investors. It attracted US$80m in series C funding in the second quarter of 2021.[16]

*"There has been an **explosion** of technological **innovation in healthcare** through **start-ups** and unicorns. I believe we have entered **a golden era**; a pivotal point for healthcare."*

Dr Keren Priyadarshini, Regional Business Lead, Worldwide Health, Microsoft Asia

Yet not all companies saw innovation and investment thrive during the pandemic. Over one-third of respondents (35%) said that the impact of covid-19 had resulted in the stagnation or demise of an idea, and for them, the disruption often proved hard to navigate.

The challenges that these companies faced were the result of the enormous strain placed on healthcare organisations during the pandemic, as well as the fragmentation of healthcare systems, according to Dr Keren Priyadarshini.

Digitisation may have offered new ways of doing business, but she says that the large number of legacy technology systems proved challenging to integrate and that digital solutions take time to implement. "This is particularly an issue in the public healthcare system where the scale is huge and decisions need multiple approvals," she explains. "Private healthcare systems tend to move faster."

This is reflected in the difficulties faced by many start-ups regionally. Lalitha Bhaskara, Vice President of SAP.iO Foundries Asia Pacific Japan & China, told Economist Impact that of the 256 start-ups that SAP works with globally across multiple sectors, just two have reached unicorn status. Within the Medtech sector, Jean-Luc Butel, Board Member of Rani Therapeutics, Novo A/S, Takeda Pharmaceutical, SGInnovate and former Executive Vice-President, Group President International of Medtronic, estimates that of the 100 start-ups in the Asia-Pacific region to have emerged over the past three years, only five could be considered as genuinely successful.

Yet while the start-up environment is challenging, there is no denying that growth in the region's healthcare technology sector from the pandemic is evident. "There has been an explosion of technological innovation in healthcare through start-ups and unicorns. I believe we have entered a golden era; a pivotal point for healthcare," says Microsoft's Dr Priyadarshini.

The pandemic caused enormous disruption to the healthcare industry and healthcare technology start-ups and SMEs in the Asia-Pacific. It placed systems under unprecedented strain and forced governments to rethink global supply chains, prompting a shift towards decentralisation. Despite this, some start-ups found opportunity in the chaos and were able to provide the right solution needed at a time of rapid digitisation. Healthcare technology has thrived to become one of fastest-growing industries in the Asia-Pacific region, and is expected to account for more than 40% of the growth in global healthcare spending over the next decade.

[16] Halodoc. Astra Leads Series C Funding in Indonesia's Largest Healthtech Platform Halodoc, https://www.halodoc.com/media/astra-leads-series-c-funding-in-indonesias-largest-healthtech-platform-halodoc

Challenges within the healthcare technology ecosystem

Although the region's healthcare technology sector is growing exponentially, early-stage start-ups and SMEs within the sector face many and varied challenges, according to the executives surveyed for this report. Chief among these is talent recruitment, with 84% of respondents agreeing or strongly agreeing that finding the right people with relevant skills is presently the biggest challenge for early-stage start-ups/SMEs in the region. Navigating data privacy and security regulations ranked second (80% of respondents agree or strongly agree) among potential roadblocks.

Other challenges also rank highly, with 75% of respondents agreeing or strongly agreeing that regulatory compliance issues, partnerships and collaborations present significant hurdles for early-stage start-ups, as well as market saturation and established competitors (74%), and difficulty accessing funding and financing (73%).

These challenges are particularly acute in India, where 93% of executives agree or strongly agree that talent recruitment is a significant problem. 90% agreed or strongly agreed that early-stage start-ups/SMEs have difficulty accessing funding and face regulatory and compliance issues, while 93% face problems with intellectual property disputes.

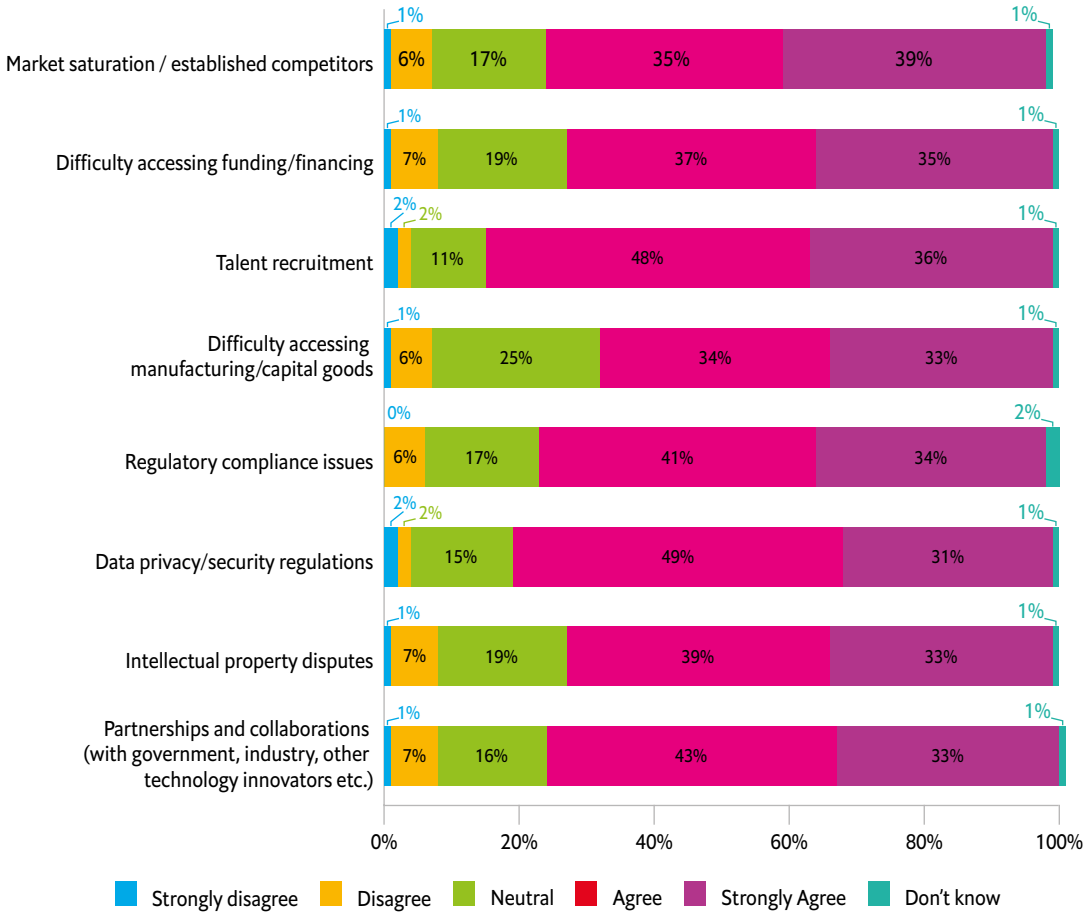
In comparison, start-ups in South Korea are less impacted by these challenges than other markets, with just half reporting difficulty accessing funding, 67% reporting regulatory or compliance hurdles, and 50% facing problems with intellectual property disputes.

However, talent recruitment is a region-wide problem, with 93% of South-East Asian respondents, 87% of Australians, 77% of Japanese, and 70% of Koreans agreeing or strongly agreeing that talent recruitment is a significant challenge for early-stage start-ups. Navigating data privacy and security regulations is also difficult regardless of location, with over 70% of respondents in all markets agreeing or strongly agreeing that it is a significant challenge for start-ups.

Skills gap

The skills gap is not unique to the healthcare technology sector. Along with ageing populations and a pandemic-induced acceleration of digitisation, the demand for digital skills has increased rapidly, and many

Figure 4: To what extent do you agree or disagree that the following are a significant challenge for early-stage start-ups?



industries globally are experiencing shortages of well-trained people.[17] However, the manpower constraint in healthcare is particularly acute. The World Health Organization (WHO) predicts a global shortfall of 14.5 million healthcare workers by 2030,[18] with shortages predicted to be most acute in the world's poorest regions.

For healthcare technology companies, the need for talent can be even more specialised, making finding the right people with the right competencies and training that much harder. According to global consultancy firm, *Accenture*, while Medtech has an abundance of sales and marketing staff, the sector has a massive skills gap in regulatory expertise,

[17] Deloitte. The global labor shortage: How covid-19 has changed the labor market, https://www2.deloitte.com/xe/en/insights/economy/global-labor-shortage.html

[18] WHO. Health workforce requirements for universal health coverage and the sustainable development goals, https://apps.who.int/iris/bitstream/handle/10665/250330/9789241511407-?sequence=1

digital skills, and operations and supply chain competencies.[19] Filling this gap won't be easy; the industry needs to not only re-skill the existing workforce, but, in parallel, provide training for new staff and graduates.

To achieve this, Mr Butel believes that the education system requires fundamental reforms. "Many medical schools have been unable or unwilling to embrace the latest teaching tools that rely on highly advanced technology to improve the speed and quality of education." He says that technology also has huge potential to shorten medical degrees, such as using 3D printing for anatomy classes, rather than waiting for cadavers. "But very few universities have invested in that," he adds.

*"Many medical schools have been **unable or unwilling to embrace the latest teaching tools** that rely on highly advanced technology to **improve the speed and quality of education**"*

Jean-Luc Butel, Novo A/S, Rani Therapeutics, Takeda Pharmaceutical, SGInnovate, and former Executive Vice-President, Group President International, Medtronic

At least part of the solution may come through partnerships between education institutions and tech companies. *SAP University Alliances*,[20] for example, partners with 2,300 universities worldwide to develop the next generation of talent in the intelligent enterprise and the experience economy. It provides opportunities to engage with SAP events, build industry partnerships, launch graduates in the SAP ecosystem, and inspire young thinkers.

These types of collaborations may help overcome one of the fundamental weaknesses among healthcare technology start-ups/SMEs, which Mr Butel describes as a lack of the right breadth of skills to create a viable product or service. "Most of the time, the start-up doesn't understand the convergence of patient flow, big data analytics, the competition and the regulatory framework. That to me is the biggest problem. The winners are those that connect the dots and really bring it together," he explains.

Most experts agree that there has been insufficient investment in relevant training to date, and that this has worsened during the pandemic. Some training and development programmes had to pause so that funds could be redistributed to support remote work, fix supply chain issues, or focus on vaccine development and distribution, while others had to be completely abandoned due to lockdowns and travel restrictions.

[19] Accenture. APAC MedTech: How do we fill the talent gap? https://www.accenture.com/us-en/blogs/life-sciences/apac-medtech-how-do-we-fill-the-talent-gap

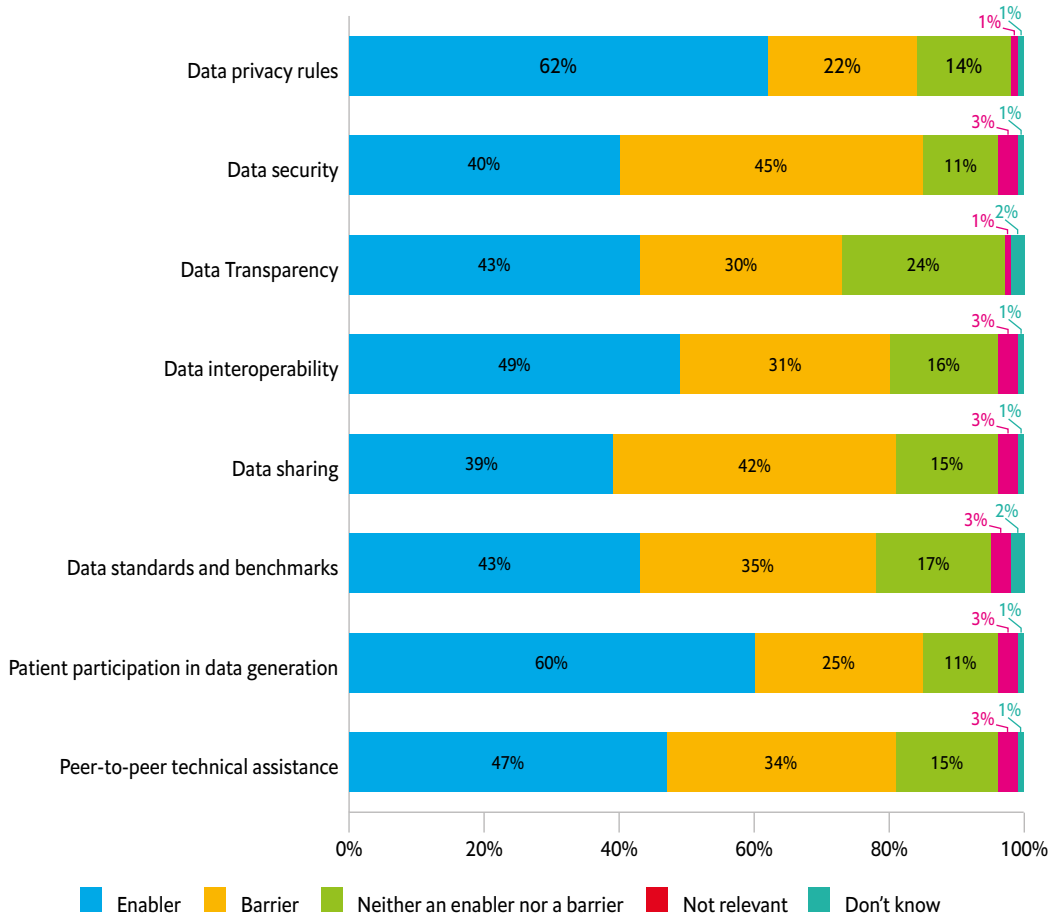
[20] SAP. SAP Next-Gen, https://www.sap.com/australia/about/company/innovation/next-gen-innovation-platform/university-alliances.html

Data privacy and security regulations

Data privacy and security regulations were cited as the second biggest challenge for early-stage start-ups and SMEs, with 80% of respondents agreeing or strongly agreeing that it poses an obstacle. Data security was identified as the most significant barrier to the delivery of patient healthcare, with data sharing coming in second. As Dr Priyadarshini notes, "with many hospitals moving their medical data to the cloud, issues of data protection and privacy have gained prominence."

In the digital era, data is central to innovation: the majority of growth is delivered through developments in digital health, connected devices and AI. "What we tell every start-up company is that you have to solve a very specific need of the user. And that involves three things: giving them new data, securing that data, or explaining the data," says Ms Bhaskara. The regulatory framework is therefore critical to the success of start-ups and SMEs.

Figure 5: If your organisation works with patient/population health data do you consider the following an enabler or barrier in the delivery of patient healthcare?



Here, however, the experts interviewed agree that technology almost always outpaces regulations: there is a sense of collective frustration that a solution may exist for a particular health condition, but the regulations hinder its ability to be rolled out.

In Australia, for example, the regulatory regime governing medical devices had not kept pace with advances in the development of standalone software and integrated technology platforms which could be used to diagnose or treat diseases. This creates challenges for start-ups, and leaves healthcare technology behind other sectors such as finance and retail. As a result, in February 2021, the Department of Health, via The Therapeutic Goods Administration (TGA), introduced several exclusions and exemptions for specific types of software products aimed at reducing unnecessary regulatory burdens.[21]

"I can carry out 99% of my banking needs on my iPhone," says Mr Butel. "Healthcare is so far from that, and that is mainly because of safety regulations and because it is an incredibly fragmented system."

Interestingly though, as much as data privacy and security can be perceived as a barrier, they can also be enablers for some healthcare technology companies. For executives who work in organisations that deal with patient or population health data, 62% see data privacy rules as an enabler in the delivery of healthcare and 60% view patient participation in data generation in the same way.

This ability for data privacy and regulation to be both an enabler and a barrier to healthcare technology is reflected in the way some companies find opportunities in challenges.

Singapore start-up *Dr Anywhere*, for example, has developed an alternative healthcare delivery model that overcomes fragmentation in regional regulation. It delivers healthcare services through its mobile platform, using its network of nearly 2,800 doctors and medical professionals. The company has more than 1.5 million users in Singapore, Thailand, Malaysia, Vietnam and the Philippines. It has tech hubs in Bangalore, India and Ho Chi Minh City in Vietnam.

"[Doctor Anywhere's] mission is to be the largest tech-enabled omnichannel healthcare provider in Southeast Asia and applying innovative technology to improving patient outcomes is core to our differentiated offerings," Lim Wai Mun, the founder and CEO of *Doctor Anywhere* said when the company announced its success in raising US$65.7m in a Series C funding round, led by growth equity investor *Asia Partners*.[22]

The success of *Dr Anywhere* lies in being consumer centric, according to Mr Butel. "You don't need to be attached to one doctor. It gives patients the choice that they want, while removing so many inefficiencies."

Mr Butel also believes it has hit on a viable business model. "The worst thing you can do in healthcare is try to create a new marketplace: it's incredibly expensive and complicated. The

[21] TGA. Regulatory changes for software based medical devices, https://www.tga.gov.au/sites/default/files/regulatory-changes-software-based-medical-devices.pdf

[22] Mobi Heath News. Singapore-based telehealth startup Doctor Anywhere nets $66M in Series C round, https://www.mobihealthnews.com/news/asia/singapore-based-telehealth-startup-doctor-anywhere-nets-66m-series-c-round

best thing is to reorganise it. That is to say, keep the same players in place, but take away all the inefficiencies of the system, and provide incentives for existing players to adapt to your platform."

Ms Bhaskara believes that the new trend of healthcare-on-demand has "immense potential" and that it is a market ripe for future growth. "Nowadays, a consumer expects to be able to do retail shopping while sitting on a beach in Bali. You can even buy something as costly as a Tesla car without physically visiting a dealership. Consumers of healthcare also want to access healthcare-on-demand anywhere, any place, anytime. We are just scratching the surface of distributing drugs; imagine the access to research that could be provided in the same way. Or a doctor could be provided across continents for certain kinds of healthcare issues which some of the emerging markets don't have access to treat."

*"Consumers of healthcare also **want to access healthcare-on-demand anywhere, any place, anytime**. We are **just scratching the surface** of distributing drugs; imagine the access to research that could be provided in the same way. Or **a doctor could be provided across continents** for certain kinds of healthcare issues which some of the emerging markets don't have access to treat."*

Lalitha Bhaskara, Vice President, SAP.iO Foundries Asia Pacific Japan & China

The challenges faced with talent and data privacy, as well as other identified issues like building partnerships and collaborations, managing regulation and compliance complexities, and difficulty accessing funding and financing, are not unique to the healthcare technology sector. Start-ups and SMEs in many industries face similar hurdles. However, the solutions to these challenges will need to be unique. Aside from being company-specific, any solution needs to be able to adapt to the fragmentation and safety regulations of the healthcare systems, and to consider the range of complex cross-domain knowledge that new talent in the industry is required to be abreast of.

Innovation pathways

One of the key factors for healthcare technology companies to fundamentally drive change and increase access to healthcare is the adoption of new technology. Not surprisingly, according to the survey results, this is one area in which healthcare technology start-ups and SMEs excel. They presently utilise a wide range of technology innovations in their businesses, from big data and predictive analytics,[23] which is used by 32% of companies surveyed, to AI,[24] used by 29%, polymer science/surface coating/drug delivery (27%), all the way through to value engineering (7%).

The strengths of the region's healthcare technology sector lie not only in the types of technologies, but the breadth of technologies they presently employ. Whether it be software, hardware, AI or analysis, these organisations are at the forefront of advancing digitisation in healthcare.

Healthcare technology start-ups play a vital role in improving the access to, and quality of, healthcare throughout the region, especially in developing countries where healthcare systems are not as advanced, and some populations can be hard to reach.

The uses for AI in healthcare are already extensive. In Singapore, for example, AI has been used to develop an emotionally intelligent chatbot, called Wysa, to assist with mental health concerns during lockdown and isolation throughout the pandemic.[25] Google's DeepMind has created an AI for breast cancer analysis that outperformed human radiologists on pre-selected data sets to identify breast cancer, on average by 11.5%.[26]

And in China, Tencent's AI-powered medical imaging company, Tencent AIMIS, continues to expand its diagnostic medical imaging service with the launch of AIMIS Medical Image Cloud

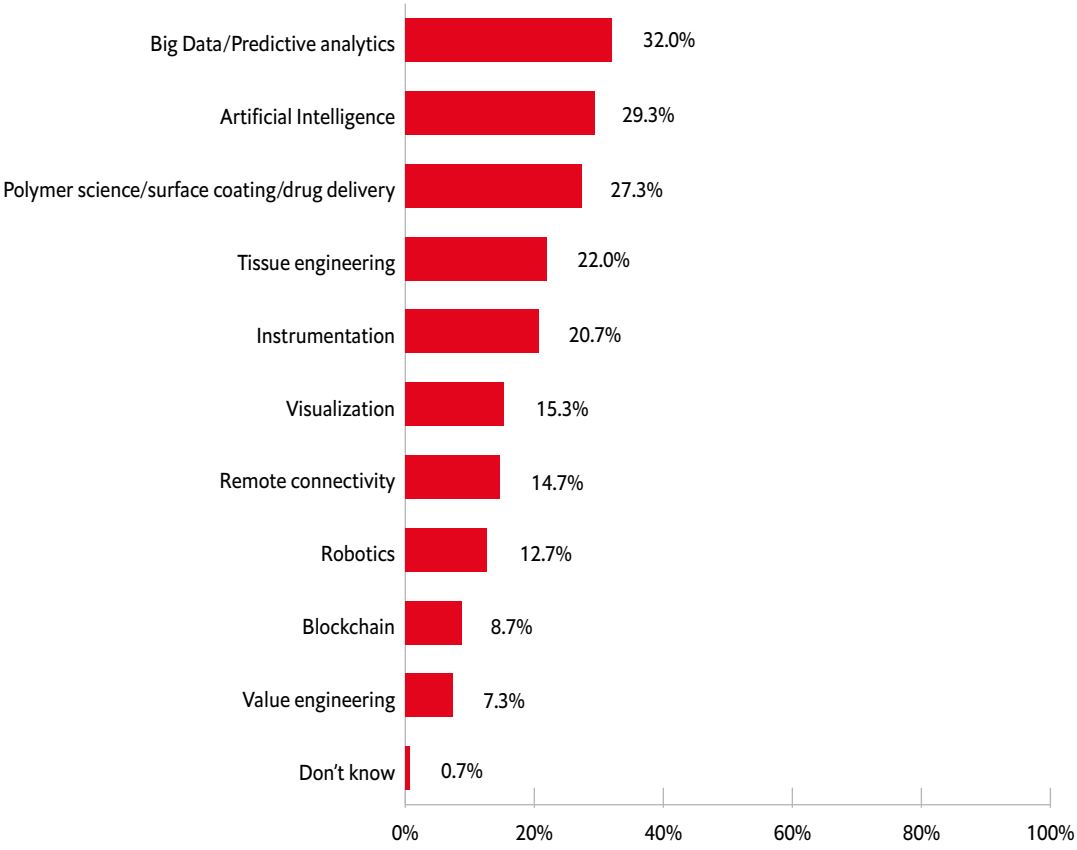
[23] Big Data has to deal with cleansing and interpretation of vast amounts of information and it can be used in a broad area of business activities. Predictive analytics is a branch of advanced analytics that makes predictions about future outcomes using historical data combined with statistical modelling, data mining techniques and machine learning.

[24] Artificial intelligence (AI) is the ability of a machine to learn from experience and perform tasks normally attributed to human intelligence, for example, problem solving, reasoning, and understanding natural language.

[25] The Straights Times. New 'emotionally intelligent' chatbot to help Singaporeans stressed by pandemic, https://www.straitstimes.com/singapore/community/new-emotionally-intelligent-chatbot-to-help-singaporeans-stressed-by-pandemic

[26] McKinney, S.M., Sieniek, M., Godbole, V. et al. International evaluation of an AI system for breast cancer screening. Nature 577, 89–94 (2020). https://doi.org/10.1038/s41586-019-1799-6

Figure 6: Which of the following medical technology innovations does your organisation use most? Select top two.



and AIMIS Open Lab in 2020.[27] In a 2017 study, the foundational technology behind AIMIS was found to have accuracy rates of over 90% for preliminary diagnoses of oesophageal cancer, 95% for lung sarcoidosis and 97% for diabetic retinopathy.[28]

Beyond AI, and the big data that powers it, technological applications abound. Robotics can be used in surgical robots, exoskeletons and to create companions.[29] Virtual reality is being used to dramatically improve surgeons' performance,[30] and wearables and tracking and measurement devices are revolutionising the way many diseases are monitored and managed.

[27] Tencent Press Release, https://www.tencent.com/en-us/articles/2201092.html

[28] Lifesciences Asia Pacific Network. Digital Health in Asia Pacific, https://www.cms-lawnow.com/-/media/lawnow/pdfs/sozu/lan---digital-health-in-asia-pacific.pdf?rev=c625d854-7b2e-4e61-8959-806cca64d289&la=en&hash=1F073DB3C2A35389804BC3F245145C94557EA57D

[29] The Medical Futurist, Ten Ways Technology is Changing Healthcare, https://medicalfuturist.com/ten-waystechnology-changing-healthcare/

[30] Harvard Business Review, Research: How virtual reality can help train surgeons, https://hbr.org/2019/10/research-how-virtual-reality-can-help-train-surgeons

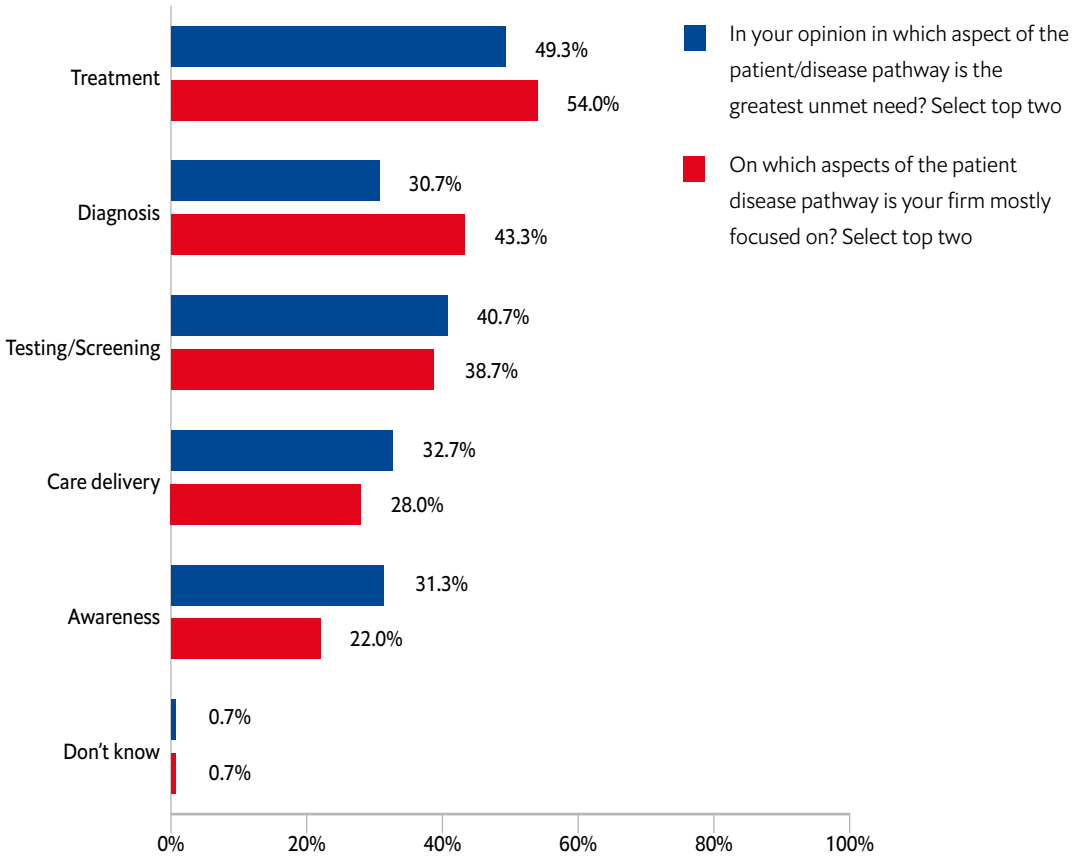
Pathways to commercialisation

The areas of research and application of these new technologies will often be guided by patient/disease pathways, which are standardised, evidence-based management plans for a patient or a disease.[31] According to the executives surveyed for this report, the greatest unmet needs of the patient/disease pathway are presently treatment (49%), testing and screening (41%), and care delivery (33%).

However, as Figure 7 illustrates, there is a mismatch between what these companies believe are the unmet patient needs at present and where healthcare technology organisations are focusing their development and investment.

According to the survey, healthcare technology companies presently place too much attention on diagnosis (43%), which ranks second in terms of focus, and not enough on testing and screening, care delivery or awareness-raising.

Figure 7: A mismatch between patient needs and the current focus of healthcare technology organisations.



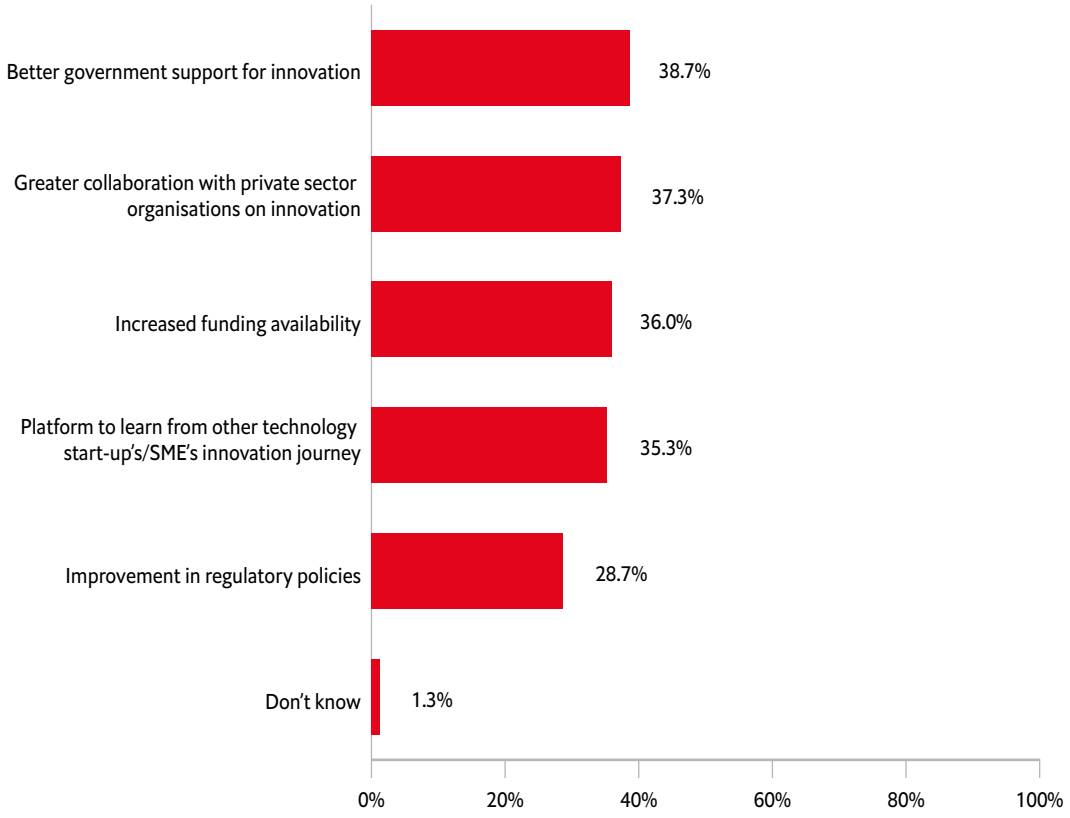
[31] Tencent Press Release, https://www.tencent.com/en-us/articles/2201092.html

It is unclear what is causing the mismatch, but part of the problem could lie in the way that business deals have evolved in the Asia-Pacific market, according to Mr Butel. He says that many successful deals in recent times have involved a business-to-business (B2B) model and that companies that become too customer-centric often ignore the overall health ecosystem in which they need to operate, to their detriment.

"Business-to-consumer seldom pays in healthcare, because people are used to getting things for free on the internet. Unless you do a B-to-B-to-C, with an insurance company, a corporate, or a hospital in between, it's very hard," he explains. "I want to see a start-up that understands the health economics of the model. A new product needs to be adopted within a healthcare system by someone who can see where it will fit in the patient and money flow."

When it comes to solutions for helping healthcare technology start-ups better harness technologies and innovations, what is clear is that there is no "one size fits all", and that different types of companies require different

Figure 8: In your view, what would best support innovation in the market? Select up to two.



types of support. Indeed, the survey results show that any type of assistance, whether government promotion of innovation, increased funding, or greater collaboration, can all help support innovation in the region's healthcare technology market.

Healthcare technology start-ups and SMEs excel at innovating with new technology, but they need to more carefully consider the patient/disease pathways they focus on to ensure what they are developing meets an actual unmet need, not just what they believe is needed. Investment models may be part of the problem. In healthcare technology, innovative solutions that are successfully commercialised need to focus on the whole health ecosystem, not just the customer. There is no "one size fits all" approach that will enable healthcare technology start-ups to successfully commercialise technologies and solutions. But business environments that promote innovation and facilitate access to funding and collaboration can all help support innovation and deal-making for the region's healthcare technology start-ups and SMEs.

Support through partnerships

In the survey, 37% of the respondents (see figure 8) identified collaboration with private sector organisations on innovation as one of the top three avenues for support and reported such partnerships as critical to market growth. Most survey respondents agreed that partnerships with government, industry, and other technology innovators were also vital to success, with 65% describing it as very important, and a further 31% regarding it as moderately important.

The levels of support for innovation that healthcare technology start-ups in the Asia-Pacific region perceive they receive from each sector can differ. Regionally, the highest level of perceived support comes from healthcare service delivery organisations, with 84% of respondents ranking it as supportive or very supportive. Healthcare professionals are also seen as supportive among 77% of respondents, with 70% also believing the private sector and industry to be supportive. Regulators and payor reimbursement organisations are perceived as providing the lowest levels of support.

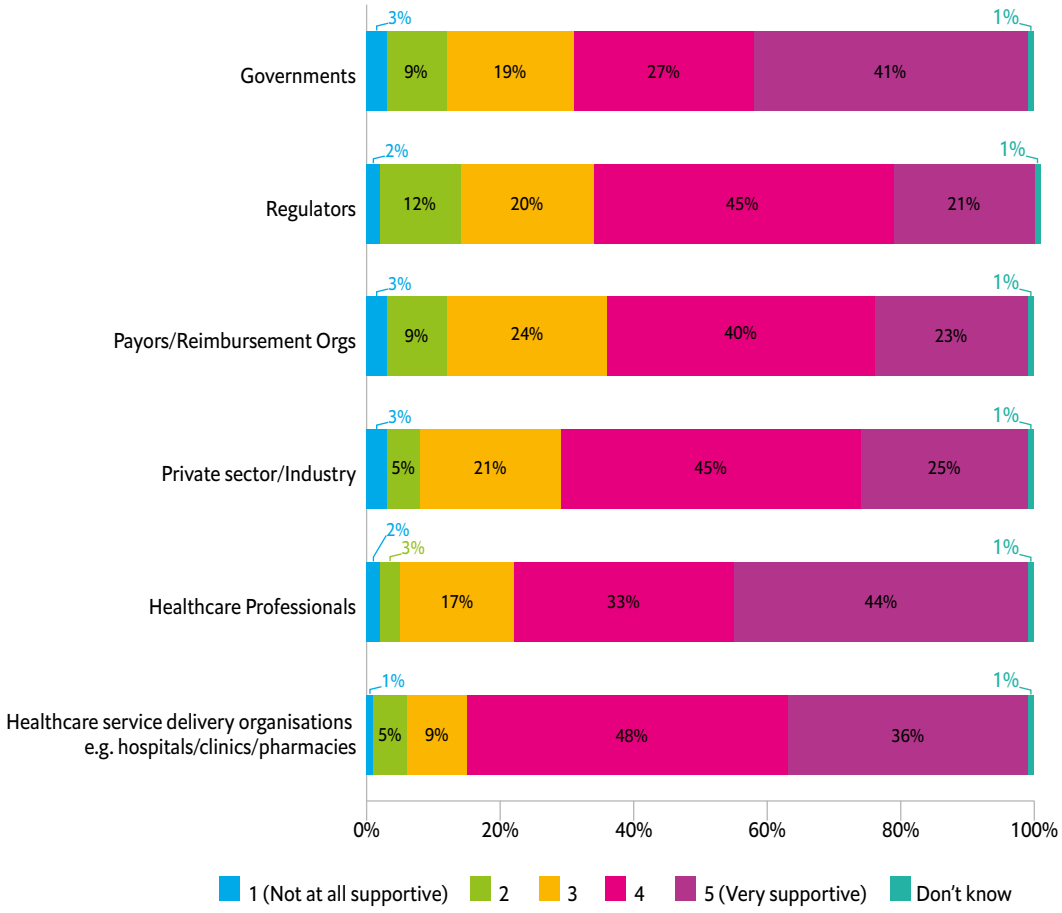
Although the overall support for innovation in the region seems relatively high, levels vary greatly when examined by country. In Australia, for example, the government (83%), regulators (73%) and private sector and industry (77%) all rank as supportive or very supportive of innovation. In Japan, however, the government (50%), regulators (47%) and private sector and industry (47%) are perceived as less supportive. Indeed, in Japan, 27% of respondents ranked the private sector and the government as not supportive.

South Korea also has much lower rankings for levels of support for innovation from the government (43%), regulators (50%) and private sector and industry (57%); by contrast, in India, 87% of respondents believe the government and regulators support innovation and 97% believe the private sector and industry is supportive. In South-East Asia, perceptions of support from the government (77%), regulators (70%) and private sector and industry (73%) is also stronger in comparison to South Korea.

A new era for PPPs

The pandemic significantly increased the level of public-private support (PPS), with many new public-private-partnerships (PPPs) created to manage healthcare operations, such as the distribution of vaccines. It was a change

Figure 9: On a scale of one to five, where one equals not at all supportive and five equals very supportive, please score the following stakeholders in terms of support of innovation.



that Mr Butel wholeheartedly welcomed because most governments are financially strained and cannot invest adequate resources.

"No one alone could handle the pandemic," says Mr Butel. "Governments suddenly said, 'Wait a second. I'm dependent on the outside world. I don't have personal protective equipment, and I don't have a factory that can make a vaccine.' All of these players came together to hurry up to get the vaccine on the market in 12 months. That shows how fast change could be."

During the pandemic, PPPs have also provided innovative solutions. For example, SAP has partnered with Singapore-based firm Accredify, to facilitate a safe return to work by using Blockchain technology to develop a digital passport that proves the covid-19 infection and vaccination status of an employee—or someone arriving into Singapore from overseas. This gives employers,

as well as border authorities, the right level of access to personal health data along with data protection for the citizen.

> *"If you're commercialising digital health, the **higher level of regulatory clarity** you have, the **more competitive your product** is. Your **technology** is **worth more** when you have the evidence to back up your claims—it triggers **higher-value innovation**."*
>
> Bronwyn Le Grice, CEO and Managing Director, Australian digital health commercialisation organisation, ANDHealth

"There has to be some way of sharing [personal] data in order for us to come out of the pandemic, and that's exactly what the Singaporean Ministry of Health has done together with Accredify," says Ms Bhaskara. "They don't open up all the health data of the patient that they hold: they identify only whether a person is vaccinated or not. This is stored in the blockchain with a person's identifier number, and the start-up creates a QR code which becomes a digital passport."

The role of regulators

Partnerships with regulators have also increased the pace of change. One recent improvement is the introduction of regulation around software as a medical device in most major Asia-Pacific jurisdictions that limits the claims that developers can make around the healthcare impacts of their products.

"The US is the leader in medical device regulation, and we are starting to see the regulators in this region catching up," says Bronwyn Le Grice, CEO and Managing Director of Australian healthcare technology accelerator, Australian digital health commercialisation organisation, ANDHealth. "There are countless numbers of health apps. Some claim that they can do things like help manage diabetes, when in reality they are just weight loss apps, or step counters, and have no clinical evidence to support claims that they can have a meaningful clinical outcome for diabetes sufferers. That is where regulation and classification of Software as a Medical Device comes in, to safeguard safety, quality and efficacy of products that claim they can improve outcomes for patients."

Regulations introduced in February 2021 in Australia recognise that software could, in and of itself, be classified as a medical device or therapy, with the same level of risk if used incorrectly. For example, if a product claims to be a type II diabetes management tool, then it must have run trials with specific controls to prove that the product makes a difference, just like any other therapy.

For these reasons, Ms Le Grice believes that regulation does not hinder innovation, but rather raises standards, and therefore increases value, for start-ups. "Regulations exist for patient safety. If you're commercialising digital health, the higher level of regulatory clarity you have, the more competitive your product is. Your technology is worth more when you have the evidence to back up your claims—it triggers higher-value innovation."

Overcoming barriers to access

Partnerships, with both governments and industry, can also help start-ups overcome one of the biggest challenges to success, which is accessing the market—particularly markets beyond a company's national borders, according to Ms Bhaskara.

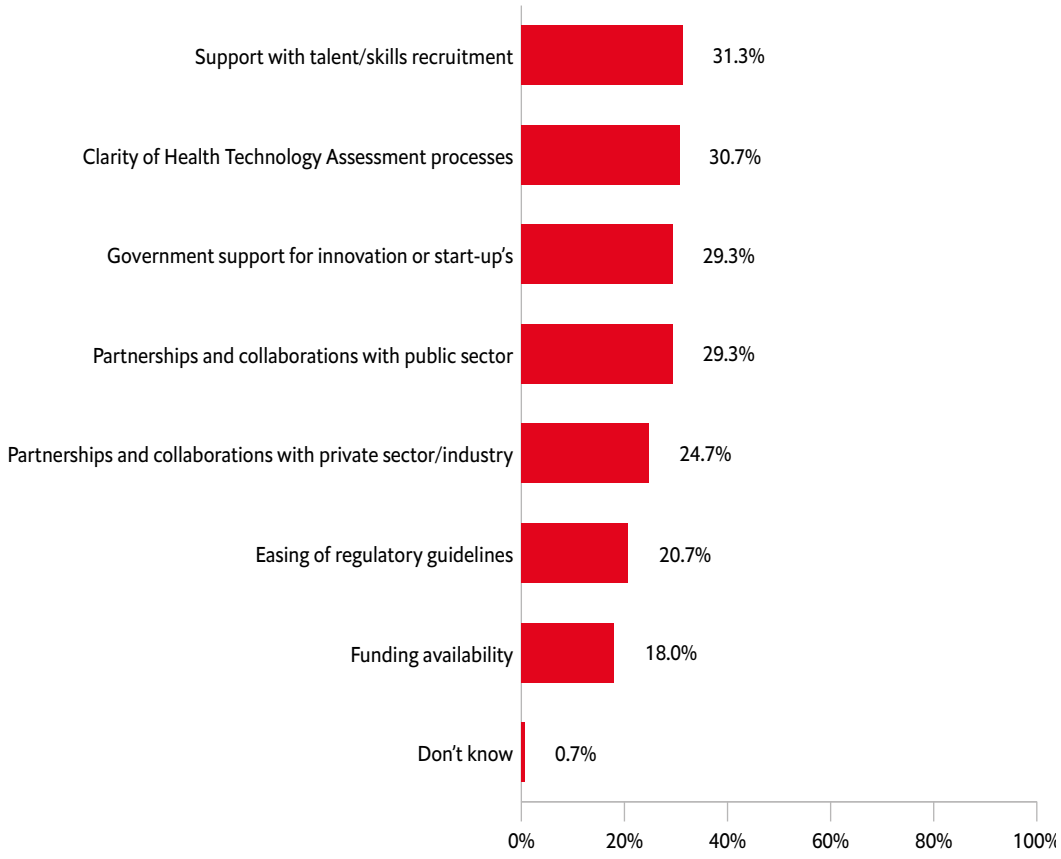
"Getting the first two customers is easy: getting the next 10 and the next 100 is the biggest challenge," says Ms Bhaskara. "When a start-up partners with a big company such as SAP, that company provides access that matters, because we have close to 440,000 customers worldwide, including the Fortune 500. We work with start-ups to help them scale up in the marketplace. And because they are endorsed by a large software vendor like us, the Venture Capitalists take notice."

Partnerships can be powerful tools for healthcare technology start-ups and SMEs, and they should not be limited to one stakeholder group. Collaborating with private and public healthcare organisations, as well as regulators, incubators and other technology start-ups can enhance innovation and open doors to new customers, funding, knowledge and talent. Partnerships can also help start-ups and SMEs expand beyond national borders and often ensure that new technologies can be applied quickly and efficiently to provide greater access to healthcare support and advice to those who need it.

Steps for a healthy future

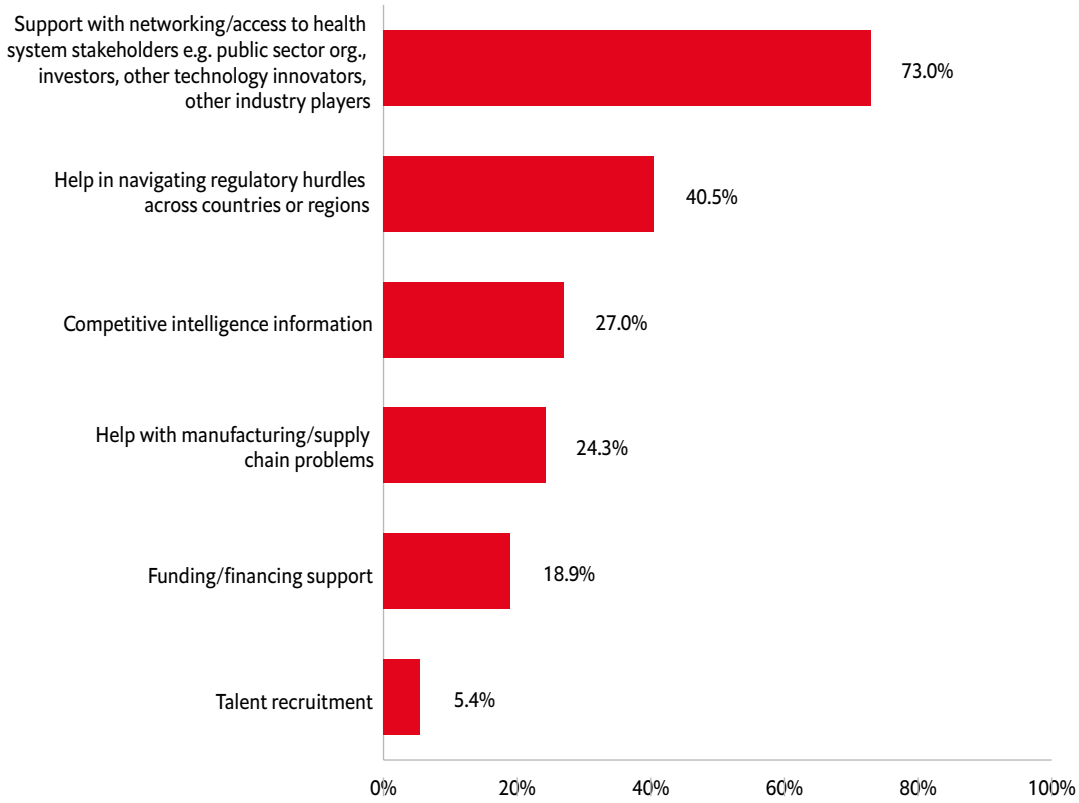
From the perspective of healthcare executives, several different types of support and partnerships could help healthcare technology start-ups identify potential opportunities and grow. Chief among these is support to overcome the talent and skills recruitment gaps that start-ups/SMEs are grappling with, followed by greater clarity of the Health Technology Assessment processes, and expanding partnerships/collaboration with the government.

Figure 10: In your opinion, what would best support your organisation's journey to reach the next strategic milestone. Select up to two.



They also believe that the private sector can play a significant role, particularly with networking and stakeholder engagement and helping start-ups better navigate cross-boundary regulatory hurdles. Furthermore, respondents identified manufacturing/supply chain issues as one of the primary areas that could use support from the private sector.

Figure 11: In your opinion, what role can the private sector play to best support your organisation? Select up to two.



Collective success equals commercial success

Although partnership opportunities have expanded since the pandemic, Ms Le Grice believes that a scarcity mindset is still holding back some start-ups in the healthcare technology sector, who need these types of cross-collaborations to grow and succeed.

"I come from a purely commercial space as a venture capitalist, and my view is that if we can grow a really big digital health sector, there'll be enough to go around for everyone. I believe that all the leaders have a responsibility to collaborate, and to adopt a 'rising tide floats all boats' attitude.' If I want to have the best possible pipeline in the future, then I've got to grow the best possible ecosystem around me," she says. "For a successful industry, you've got to have talent, capital, customers and policymakers. We need to work collaboratively, promote each other's activities, grow this market and make it a globally leading industry sector, together. Otherwise, we are just competing for crumbs."

Great change requires collaboration and improved cooperation among all industry stakeholders, as well as those from other industries like finance and technology. Not only will this enhance innovation and reduce systemic inefficiencies, most importantly, it can often improve patient outcomes and reduce costs. Increasing accessibility should be one of the key drivers for start-ups and SMEs. Partnerships between stakeholders make for more successful investments, create new markets and revenue streams, and ensure that the impact of change is shared more evenly across societies.

Enhancing start-up and SME success : In conversation with Dr Loke Wai Chiong and Jonathan Ley

In addition to the private sector perspectives presented above, Economist Impact invited two public sector healthcare stakeholders to share their views on the present state of the healthcare technologies ecosystem in the Asia-Pacific region, and to provide additional independent context to the findings.

The views expressed in this interview are solely the interviewees' own and do not represent those of the MOH Office for Healthcare Transformation or the Singapore government.

Dr Loke Wai Chiong,
Head (Integrated Health Promotion), Clinical Director (Programmes), MOH Office for Healthcare Transformation (MOHT)

Jonathan Ley,
Assistant Director of InHealth and Finance Redesign, MOH Office for Healthcare Transformation (MOHT)

Economist Impact: How do you think the covid-19 pandemic has impacted the healthcare technology sector in the Asia-Pacific region?

Dr Loke: "Covid-19 did a few things. First, it made us stay very local and, at the same time, supply chains were disrupted, so every country had to figure things out on its own. I think there was a lot of local innovation and digital acceleration, but there were a lot of situations where things didn't get delivered, because there's insufficient manpower, and facilities aren't able to run production concurrently. That's led to a realisation that there is a need to shift towards decentralisation. Governments started to realise that there needs to be a degree of decoupling of the global supply chains."

"Remote working and communicating using tools like Zoom also became the norm, and this changed the deal-making environment for Medtech start-ups, as well as the investors and funders in this space. There was a short period where it slowed investment into Medtech, but it increased again as people adapted to the idea that you could do investments without even visiting or meeting people face to face. That also accelerated the acceptance that you can do business interactions and due diligence digitally. And the data shows that 2021 was a record year, especially in terms of Medtech transactions."

"But covid really disrupted the entire healthcare business. A lot of priorities were shifted towards more critical care and emergency settings where the need for medical consumables and equipment escalates, so the demand here escalated. While in many usual areas, like surgical equipment, demand declined drastically because many of these types of procedures were put on hold due to covid restrictions. As the disruption eases, the market is expected to rebound, fuelled by the rising prevalence of chronic diseases and attempts to return to normalcy."

Mr Ley: "The pandemic brought huge disruptions to the global supply chain and highlighted the potential vulnerabilities associated with a centralised and highly integrated supply chain network. As firms continue to pursue a more resilient and nimble supply chain that is attuned to their business needs, I would envision a gradual diversification of risks via a shift towards decentralisation, with a more regional focus, or even a more country-specific focus to avoid a domino effect in supply chain disruptions during times of crisis."

"By being such a disruptive global event, covid-19 brought healthcare to the fore in terms of attention. As a result, inflows of talent and capital have increased. So, I think in the coming years, we could see more people involved in this sector, whether investing into it, or choosing it as a career."

"The unprecedented test on the healthcare system also compelled many to relook at its current modus operandi and technological challenges. On the regulatory approval front, the pandemic has underscored the need for an evidence-based and coordinated approach to support pandemic responses. In the coming years, I envision technology playing a larger role in the healthcare system to help frontline workers meet the demands of the new reality. We are seeing those trends already, and that augurs well for even more rapid innovation."

Economist Impact: How do you think growth in healthcare technology and Medtech help increase the accessibility of healthcare in the Asia-Pacific region?

Dr Loke: "I think it will accelerate the search for lower and lower cost solutions. For example, in India, bringing heart cardio devices to the masses through so-called reverse innovation. The idea of frugal innovation will grow at an even faster rate. I think the disparity between rich and poor has come about from always trying to protect the higher-paying markets from lower-paying markets."

"Now, I think that bridging and blurring of lines between the two markets will accelerate. I'm not sure how that will happen, whether it be through offering products at two price points. But all countries, rich and developing, will be a bit more budget-strapped in the coming years after enormous reserve spending to cope with covid-19. I don't think we can afford to keep on spending more and more on new technologies in health care, even though it's accelerating, so that will force a rethink of how healthcare technology and Medtech innovation is developed."

"MNCs can struggle a bit here. Start-ups sometimes have faster traction, partially because there's less bureaucratic red tape in the organisation so they are nimbler, which means they have the ability to fail fast, but then to adapt very quickly and acclimatise their offerings to suit the needs of the ground. To me, they're like trailblazers, in terms of testing new approaches and ensuring that the model is right. Start-ups are naturally closer to the ground and as the approaches change to have more localised healthcare—think global, do local, is the term—start-ups are able to adjust and really prove that feasibility, the efficacy, the cost-effectiveness within a local context, much faster than let's say maybe a big corporate MNC, so I think the opportunity is to be able to support them to do that."

Economist Impact: In your opinion, how does the Asia-Pacific region differ from the rest of the world in terms of its healthcare technology and Medtech industry?

Mr Ley: "The demand for healthcare in Asia has fundamentally changed, wealth in the region has been growing. Based on a 2018 McKinsey report , Asia will eclipse Europe to become the second-largest regional market by 2023.[32] This is supported by the growth of health care coverage in places like China, Korea and Indonesia, which are aiming for universal health coverage. So, accessibility to health care is going to rise, which also means the consumption of medical devices or equipment, consumables will escalate continuously over the next five years."

"The pace of digitisation in Asian societies is progressing at an unprecedented speed and there is also clear evidence that the broader healthcare system is looking to uplift their

[32] McKinsey & Company. The rise and rise of medtech in Asia, https://www.mckinsey.com/industries/life-sciences/our-insights/the-rise-and-rise-of-medtech-in-asia

capabilities, including their current workflow processes, IT infrastructure, and cybersecurity. Despite current apprehensions towards the risks and ethical concerns of AI-based solutions, many Asia Pacific healthcare networks have gradually embraced the technology to address specific gaps along the care continuum to increase workflow efficiency and patient outcomes."

Economist Impact: What would you identify as the most pressing challenges for Medtech companies in the Asia-Pacific region at present?

Dr Loke: "I think the biggest problem is with the rapid digital acceleration, the associated risks from security breaches are growing everywhere and are a very real threat. Our privacy, our private healthcare data, personal data, is now more exposed than ever and while many people are thinking of the potential for how to use it for human health and good, others have malicious aims, and thinking of how they can abuse it. There are a lot of brains actively thinking of how to hack through many of these systems, and that is to me the biggest risk, and it could slow things down because of concerns on those fronts."

"Going digital makes things much more easily accessible, which is a great thing for the spread of technology and for the scaling up of medical technology. But that is exactly the risk that all digital workplaces are facing. Because detrimental events like this may actually slow things down and, of course, if we start becoming extra risk-averse, that will also slow down innovation."

Economist Impact: What excites you the most about the future of healthcare technology and Medtech in the Asia-Pacific region?

Mr Ley: "Digital technology is dear to my heart because when you look at the pace of digitisation and its positive impact on Asian societies, it is progressing at unprecedented speed. There is also very clear evidence that when you see a lot of money is being invested by governments and private healthcare providers to uplift the capabilities or the current IT infrastructure, it opens new opportunities, whether that's improved access or exploring remote telemedicine solutions or even remote surgical procedures. "

"I think there is a fair shift, as we build more connectivity in the ecosystem, where information services enable interoperability. At present, digitisation can lead to social isolation—certain groups of people get isolated because digitisation tends to only cater to a certain segment. But I think as we start building this connectivity, it's going to see more exploration of how we can blend the physical and the digital in a way that's cohesive. I think you are going to see more solution-based developments as a result."

"New technologies also enable people to model out epidemiological trends over time and that will then affect and influence policy. I think it's just amazing how this human ingenuity and intelligence work. We have seen how quickly this enabled healthcare organisations and stakeholders to respond during the pandemic, and the sharing that has happened across jurisdictions. From that perspective, it has developed new capabilities in these areas that will benefit healthcare technology into the future."

Conclusions

The insights from the survey and industry experts highlight that while the healthcare technology sector in the region is growing at an impressive rate, all stakeholders could make several improvements to better support healthcare technology start-ups and SMEs to expand and succeed in the region.

Focus on innovative approaches to education and reskilling

The skills shortage will not be solved overnight, but there are many ways that governments throughout the region can help healthcare technology start-ups. Many of the expert interviewees emphasised that that needs to start with the education sector, with innovative ways of training graduates, and a greater focus on combining medicine with technology.

It also needs to come through partnerships. Whether that be universities partnering with corporates, or companies working with local and national governments to instigate reskilling programmes, it needs to be an immediate focus for all industry stakeholders.

Foster cross-domain collaboration

The survey results (see Figure 11) and interviews highlight the importance of private sector support to foster networks and access to health system stakeholders, as well as the need for partnerships and collaboration to span multiple different business domains for start-ups to thrive.

Whether it be companies from finance, insurance or data analytics and beyond, partnerships between healthcare technology businesses and cross-domain sectors will help the start-up sector and result in greater industry innovation. These networks can be industry or government, formal or informal, but healthcare technology start-ups that aim to thrive should also aim to seek out organisations that foster cross-domain business relationships and collaboration.

Create more robust supply chains

Global supply chains were upended across all sectors by the pandemic and need to be transformed to become more resilient. Although a problem for countries everywhere, supply chain issues have been an even bigger

problem for start-ups and SMEs due to their relatively smaller scale. Bolstered resilience is important not just for the current pandemic or future ones, but because disruption is virtually guaranteed as a result of climate change, trade-policy or regulatory changes, cybersecurity or intellectual-property theft or bankrupted suppliers.

The weaknesses exposed by the pandemic included inflexible planning cycles and an inability to swiftly increase or decrease production as demand for some products surged and others diminished. Over a ten-year period, supply chain shocks could cause some Medtech companies to lose approximately 38% of annual earnings.[33] While the higher inventory levels typically provide more protection compared with other sectors, inventory is not a bulwark against all shocks.

Diversify investment locations

Traditionally, the world's top multinationals have focused almost exclusively on a nation's wealthiest—or tier-one—cities in the Asia-Pacific region when choosing their Medtech investments.[34] These cities tend to have stable and secure infrastructure and are easier to access.

However, experts interviewed for this report underscored that such investment should be spread out more broadly across the region if large organisations want to tap into start-up innovation. MNCs can often face competition from local players in tier two and tier three cities, but they need to keep an open mind and explore potential options to engage with players in these locations, including through better utilisation of local distributors, or the acquisition of local distribution centres and industrial.

Cultivate new ecosystems

Greater stakeholder collaboration is needed to build healthcare technology ecosystems with the capacity to reshape the healthcare industry. This could improve and optimise patient and stakeholder experiences and reduce existing inefficiencies. At the same time, effective collaboration could reduce healthcare costs, thereby improving access regardless of income.

"A lot of non-healthcare players are entering into the health and wellness ecosystem to bridge the gaps that exist in prevention, prediction and treatment," says Dr Priyadarshini. "I now work very closely with industry leads in finance, manufacturing, retail and insurance in helping to build these ecosystems for our clients. In healthcare, they have the potential to deliver a personalised and integrated experience to consumers, enhancing doctor and nurse productivity and improving outcomes and affordability."

To successfully create new ecosystems and partnerships, healthcare technology companies will need to find new ways of training and recruiting talent, cultivate cross-domain business relationships, raise awareness of the potential value in such partnerships, and overcome providers' apparent preferences for working with bigger medical equipment companies.

[33] https://www.mckinsey.com/business-functions/operations/our-insights/the-resilience-imperative-for-medtech-supply-chains

[34] China Briefing. China's City-Tier Classification: How Does it Work? https://www.china-briefing.com/news/chinas-city-tier-classification-defined/

Appendix – Survey questionnaire

C1. In which countries/regions does your organisation operate? Please select the top three.

- Australia and New Zealand
- Greater China (China, Hong Kong and Taiwan)
- Japan
- Korea
- Singapore
- South Asia (India and Bangladesh)
- Southeast Asia (Thailand, Vietnam, Indonesia, Malaysia, Philippines)
- Others, please specify

C2. In your opinion, in which aspect of the patient/disease pathway is the greatest unmet need? Please select the top two.

- Awareness
- Testing/Screening
- Diagnosis
- Treatment
- Care delivery
- Others, please specify
- Don't know

C2a. On which aspects of the patient/disease pathway is your firm mostly focused on? Please select the top two.

- Awareness
- Testing/Screening
- Diagnosis
- Treatment
- Care delivery
- Others, please specify
- Don't know

C3. Which of the following medical technology innovations does your organisation use most? Please select the top two.

- Value engineering
- Robotics
- Polymer science/surface coating/drug delivery
- Tissue engineering

- Instrumentation
- Remote connectivity
- Big Data/Predictive analytics
- Artificial Intelligence
- Blockchain
- Visualisation
- Others, please specify
- Don't know

C3a. If your organisation works with patient/population health data, do you consider the following an enabler or barrier in the delivery of patient healthcare?

- Data privacy
- Data security
- Data transparency
- Data interoperability
- Data sharing
- Data standards and benchmarks
- Patient participation in data generation
- Peer-to-peer technical assistance

C4. Thinking about the market/s in which you operate, how do different players in the health market space interact? Please select one.

- Very competitively
- Moderately competitively
- Both collaboratively and competitively
- Moderately collaboratively
- Very collaboratively
- Don't know

C5. How would you describe the role of partnerships with health system stakeholders, e.g. government, industry, other technology innovators etc., in achieving success for your organisation? Please select one.

- Critical to success
- Very important
- Moderately important
- Not important
- Not relevant to my organisation
- Don't know

C6. On a scale of one to five, where one equals not at all supportive and five equals very supportive, please score the following stakeholders in terms of support of innovation.

- Governments
- Regulators
- Payors/Reimbursement Organisations
- Private sector/industry
- Healthcare Professionals
- Healthcare service delivery organisations e.g. hospitals/clinics/pharmacies

C7. To what extent do you agree or disagree that the following are a significant challenge for early stage start-ups? Please select one for each row.

- Market saturation/established competitors
- Difficulty accessing funding/financing
- Talent recruitment
- Difficulty accessing manufacturing/capital goods

- Regulatory compliance issues
- Data privacy/security regulations
- Intellectual property disputes
- Partnerships and collaborations (with government, industry, other technology innovators etc.)
- Others, please specify and rank

C8. How has the covid-19 pandemic impacted innovation and growth for your firm? Please select one.

- Enabled innovative ideas to come to fruition
- Resulted in stagnation or the demise of an innovative idea
- It has had a negligible impact
- Others, please specify
- Don't know

C9. In your view what would best support innovation in the market? Please select up to two.

- Improvement in regulatory policies
- Better government support for innovation
- Increased funding availability
- Greater collaboration with private sector organisations on innovation
- Platform to learn from other technology start-up's/SME's innovation journey
- Others, please specify
- Don't know

C10. In your opinion what would best support your organisation's journey to reach the next strategic milestone? Please select up to two.

- Easing of regulatory guidelines
- Clarity of Health Technology Assessment processes
- Government support for innovation or start-up's
- Partnerships and collaborations with public sector
- Partnerships and collaborations with private sector/industry – If selected go to next Question
- Funding availability
- Support with talent/skills recruitment
- Others, please specify
- Don't know

C10a. In your opinion what role can the private sector play to best support your organisation? Please select the top two.

- Support with networking/access to health system stakeholders e.g. public sector org., investors, other technology innovators, other industry players
- Funding/financing support
- Help in navigating regulatory hurdles across countries or regions
- Talent recruitment
- Help with manufacturing/supply chain problems
- Competitive intelligence information
- Others, please specify

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