

Global

Corporate

Venturing

Pharma looks out for innovation

INSIDE

The impact
of strategic
investment

China's
high-speed
modernisation

Review of
Venture Houston

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Global Corporate Venturing

Address:

52-54 Southwark Street,
London SE1 1UN

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Editor-in-chief: James Mawson

Email: jmawson@globalcorporateventuring.com

News editor: Rob Lavine

Email: rlavine@globalcorporateventuring.com

Analytics: Kaloyan Andonov

Email: kandanov@mawsonia.com

Supplements: Edison Fu

Email: efu@globalcorporateventuring.com

Features: Alice Tchernookova

Email: atchernookova@globalcorporateventuring.com

Contributing editor: Tom Whitehouse

Email: twhitehouse@globalcorporateventuring.com

Reporter: Robin Brinkworth

Email: rbrinkworth@globalcorporateventuring.com

Reporters: Jack Hammon, Callum Cyrus

Chief operating officer: Tim Lafferty

Tel: +44 (0) 7792 137133

Email: tlafferty@globalcorporateventuring.com

Production editor: Keith Baldock

Website: www.globalcorporateventuring.com



EDITORIAL

Strategic thinking requires looking at the longer term

James Mawson, editor-in-chief



At the end of the year, and with a host of insights shared by the community through the GCV Leadership Society's annual survey, it is worth reflecting on the impact the corporate venturing industry is having. The newsflow has been quieter than usual this past month following the Thanksgiving weekend in the US. That, however, does not mean there has been a lack of big stories, such as tobacco maker Altria said to be seeking an expanded footprint in the e-cigarette market through a proposed investment in Juul, which is reportedly valued at \$16bn.

But one of the interesting emerging areas of tension is the challenge of trust and how investments in the future could bring unintended consequences. Juul was set up to help the billion smokers switch from cigarettes, but has drawn attention for effectively encouraging a younger group to start vaping through different flavours.

The issue of consequences and impact is drawing attention from the investors who back the parent companies of the largest corporate venturing units. Digital agency Edelman released results from its Trust Barometer Special Report: Institutional Investors, which surveyed more than 500 chief investment officers, portfolio managers and buy-side analysts in five countries, representing firms that collectively manage over \$4.5 trillion in assets.

Among the findings is that 98% of respondents think public companies are urgently obligated to address one or more societal issues, with cybersecurity, income inequality and workplace diversity being top priorities.

In a book – Corporate Venturing Survival Guide, to be published in January at the GCVI Summit by Heidi Mason and Liz Arrington at Bell Mason Group, in conjunction with Global Corporate Venturing – a series of case studies explores the different metrics and frameworks used by top CVCs to develop as units mature. But the book also casts an eye over the history of corporate venturing and maps out a potential future where the issues of risk, return and impact become increasingly important.

Also at the GCVI Summit in Monterey, California, at the end of January will be a private roundtable on behalf of the United States Agency for International Development – with \$27bn, one of the world's largest development agencies – to explore how governments and corporations together can “mobilise the power of practitioners around corporate venturing for impact”.

There is approximately \$22 trillion in cash, cash equivalents and short-term investments on corporate balance sheets and while CVC remains a small fraction of these assets its power is magnified by enabling entrepreneurs to change the world. Governments have multiple responsibilities, but keeping people safe while encouraging future high-paying jobs in their jurisdictions remain two of the highest.

Attempting to square the circle, Amgen-backed Wuxi NextCode has not only raised \$200m in a series C round led by Irish sovereign wealth fund Ireland Strategic Investment Fund, but also acquired Genomics Medicine Ireland, a genomics platform backed by GV, in a deal that is expected to be worth a total of \$400m once milestone payments are made.

Wuxi NextCode has big plans for Genomics Medicine Ireland, not least a genome sequencing program that will attempt to sign up 400,000 volunteers, or one in 10 Irish citizens, but behind the move is the thinking from the Irish state-owned fund that improving its population's health will bring huge benefits in reducing healthcare bills and potentially in productivity – let alone the more immediate benefits from jobs.

It is smart strategic thinking at the highest level from Ireland's fund, but they are not alone in realising the impact that can be made by lifting the sights from purely short-term financial ones.

Our sights for the next few weeks will remain focused narrowly on the year-end and preparing our annual review, World of Corporate Venturing, as well as our GCV Rising Stars awards, both to be published at the GCVI Summit in Monterey – expected to sell out for its fourth year – but my thanks to all the society members, readers and attendees for their advice, feedback and support to enable us to continue trying to improve. ♦

There is approximately \$22 trillion in cash, cash equivalents and short-term investments on corporate balance sheets



NEWS

Juneja jumps to SoftBank investment role

Japan-based internet and telecoms group SoftBank has hired Sumer Juneja to lead its India investment team, the Economic Times has reported. Juneja came from venture capital firm Norwest Venture Partners (NVP), where he had been a partner since 2009, working on growth equity and VC deals for Indian companies across the telecoms, technology, financial services, infrastructure and manufacturing sectors.

Prior to joining NVP, Juneja helped investment banking firm Goldman Sachs launch its Asian Special Situations Group in India having previously worked as an investment banking analyst at the firm for merger and acquisition deals.

Bulthuis leaves M Ventures for Inkef

Roel Bulthuis, senior vice-president and managing director at M Ventures, the corporate venturing unit of Germany-based drugs group Merck, has joined Netherlands-based venture capital fund Inkef Capital as head of healthcare. He will co-manage the Inkef fund alongside Robert Jan Galema, head of the technology team.

Dutch pension fund ABP founded Inkef with €500m (\$660m) in 2010.

Bulthuis originally set up what was then called MS Ventures in 2009 and in 2016 saw the evergreen strategic venture fund double to €300m and broaden from a focus as one of the leading early-stage investors in the healthcare field to all areas of interest for the parent company.

Before establishing M Ventures he was responsible for negotiating a range of licensing deals for subsidiary Merck Serono. Previously, he was director in the biotech investment banking team at Fortis Bank, and before that he worked at Devgen in Belgium as a business analyst.



Bulthuis

Agarwal joins LG Tech Ventures as team expands

Dong-Su Kim, chief executive of electronics conglomerate LG's corporate venturing fund LG Technology Ventures, has hired Anshul Agarwal from diversified conglomerate Mitsui. As a director at LG, Agarwal has a wide brief but is expected to stay focused on mobility, the internet of things and the cloud.

Agarwal was at Mitsui for five years and his deals there included automated vehicle company Peloton Tech, mobility software developer Ridecell, electric cars manufacturer Lucid Motors and automotive and energy storage company Proterra. He celebrated several exits, including software developer Axeda, was acquired by

software company PTC, and cloud storage provider Box and electronic signatures technology developer DocuSign, both of which have gone public.

One of LG Tech Ventures' first deals this month has been Ridecell, which Agarwal backed in February.

Kim joined LG from peer Samsung in May this year to set up Tech Ventures. His other hires as investment directors include Michael Fallon from Bandgap, Taejoon Park from Applied Ventures, the corporate venturing arm of semiconductor manufacturer Applied Materials, and Robert McIntyre from Artemis Advisors, while Troy Chun moved over as senior director from LG Chem in August.

Burr burrows out of Humana

Busy Burr, chief innovation officer for US-based health insurance provider Humana and head of its Humana Health Ventures investment subsidiary, has left the firm after three years. Burr stepped down from her board observer positions at Livongo, Aspire Health and Omada Health, portfolio companies for Humana Health Ventures, in September this year. It is understood the portfolio has moved to the corporate development and mergers and acquisitions team. Burr was a founding partner of Humana Health Ventures. Before joining Humana, Burr was a managing director at Citi Ventures, the venture capital arm of financial services firm Citi, as well as global head of disruptive innovation at the bank.



Burr

Taborin rattles into Capita

Serge Taborin has joined UK-based outsourcing company Capita as chief digital officer after three years leading UK-based insurer Aviva's global digital innovation function.

At Aviva he had responsibility for identifying emerging opportunities, developing partnerships with startups, VCs and accelerators and driving execution across the group's markets in Europe, North America and Asia.

Earlier Taborin co-founded mobile ordering platform Q App Mobile, which was acquired in 2015 by mobile wallet developer Yoyo Wallet. He was also managing director at Archant Digital Ventures, the investment arm of publisher Archant.



NEWS

Howard steps away from CapitalG

Gretchen Howard, a partner at internet and technology conglomerate Alphabet's growth equity arm, CapitalG, has left to join US-based online trading platform Robinhood, TechCrunch has reported.

Howard has ended a four-year spell at CapitalG to become a vice-president at Robinhood. She helped source CapitalG's first investment in Robinhood in May this year, a \$363m series D round that valued the company at \$5bn. She was also involved in CapitalG's investments in fintech platform Credit Karma, ridesharing app Lyft, home rental marketplace Airbnb and food delivery service Gusto.

Howard joined Google in 2006 as a manager director in sales and business operations and the co-site lead of Alphabet's internet subsidiary Google's San Francisco office. Prior to joining Google, she was vice-president of market development and field sales for financial services group Fidelity Investments.

GV's Kraus crosses over to Lime

Joe Kraus, a general partner at corporate venturing unit GV since 2009, is leaving to become chief operating officer of US-based scooter and bicycle rental service Lime, Bloomberg has reported.

GV, the corporate venturing subsidiary of internet and technology conglomerate Alphabet, led the \$335m round Lime closed in July this year which valued it at \$1.1bn.

Kraus joined the startup's board as part of the deal. Since then he has helped the company hire a chief business officer, general counsel, head of engineering and head of operations and strategy. He will take over some of the day-to-day duties of Lime co-founder and CEO Toby Sun.

Kraus will retain a venture partner position at GV, according to the unit's website..

Anand abdicates CapitalG position

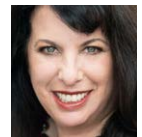
Kaushik Anand, head of India for internet and technology conglomerate Alphabet's growth equity arm, CapitalG, has left to join a new venture capital fund, the Economic Times has reported.

Anand, who had led CapitalG's investments in India since 2015, is joining A91 Partners, a mid-stage fund recently launched by former senior executives at venture capital firm Sequoia Capital. At A91 Partners, Anand will explore investments in the consumer, pharmaceutical, healthcare, financial services and technology sectors, according to the Economic Times.

Prior to joining CapitalG, Anand was an early-stage investor at Sequoia Capital. He was previously a business analyst at management consultancy McKinsey and Company and founded four companies in US and India, including Kreyada and Clever Layout.

Suennen to supervise Manatt's venture activities

Lisa Suennen, previously a managing director at corporate venturing unit GE Ventures, has joined US-based legal and consulting firm Manatt Phelps & Phillips to lead its corporate venturing fund. In addition to overseeing its strategic investments, Suennen will manage Manatt's digital and technology businesses, spanning digital media, financial technology and education. She joined GE Ventures, the corporate venturing arm of power, automation and industrial equipment maker General Electric, in late 2016 and led its healthcare investments.



Suennen

Kozhevnikov splits from Sistema

Kirill Kozhevnikov has ended a four-year stint at Sistema Asia Fund, a corporate venturing unit operated by Russia-based conglomerate Sistema, to join venture capital firm RTP Global as a partner. In his new role, he will work on expanding the firm's India portfolio through early and mid-stage investments.

At Sistema, most recently as managing director, Kozhevnikov was involved in deals in sectors such as healthcare and life sciences, artificial intelligence and machine learning, enterprise software and education technology.

Before joining Sistema in 2014, he worked for VC fund AMC Investments. He previously mentored startups and entrepreneurs during a two-year spell at Early Stage Enterprises and executed M&A opportunities as an associate director at ABN Amro Bank.



NEWS

In-Q-Tel hires Tague for UK and Australia offices

In-Q-Tel, the strategic venture investment unit of the US intelligence services, has opened its first international offices and hired Peter Tague from financial services firm Citi as executive vice-president. Tague will lead the international investments teams, which will be based in London, UK, and Sydney, Australia. He was previously vice-chairman and co-head of global mergers and acquisitions at Citi.

See *Government House*

Finn finishes Salesforce Ventures stint

Meredith Finn, senior director at Salesforce Ventures, the corporate venturing arm of cloud software producer Salesforce, who helped launch its \$50m Impact Fund, has left to do "great work" for herself.

Claudine Emeott, a director of Salesforce Impact Fund, now oversees Impact Fund, having joined the unit in 2017 after a five-year stint at non-profit organisation Kiva Microfunds, which loans its \$150m annual fund to low-income entrepreneurs.

Finn has said the Impact Fund's launch was one of her biggest achievements.



Finn

Sledzik joins Saudi Aramco Energy Ventures

Jim Sledzik has joined Saudi Aramco Energy Ventures (SAEV), the corporate venturing unit of Saudi Arabia-based oil producer Saudi Aramco, to head its US team.

Sledzik spent nearly a decade as senior partner and president of venture capital firm Energy Ventures, helping it raise about \$1bn for its funds. SAEV hired him to work under unit CEO Majid Mufti, at a time when it has been increasing its activity.

Separately, Imran Kizilbash has resurfaced from a career at oil services firm Schlumberger to join energy-focused private equity firm CSL Capital Partners as a senior adviser.

Paul leaves Driscoll's for Yamaha

Japan-based manufacturing conglomerate Yamaha has hired Nolan Paul from US-based fruit supplier Driscoll's to develop its agricultural technology corporate venturing practice at its Silicon Valley innovation hub.

As head of research and development strategy and emerging technology, Paul led Driscoll's agtech investment portfolio for four years, looking at genetics, phenotyping, automation and robotics, biologicals, plant sensing, controlled environment, post-harvest practices and data analytics.

He is now general manager of agricultural robotics and data at Yamaha Motor Ventures and Laboratory Silicon Valley, a subsidiary of motorised equipment maker Yamaha Motor that helps startups and entrepreneurs accelerate the development of disruptive technology.



Paul

Two leave Intel Capital

Sanjit Singh Dang, investment director at semiconductor and data technology provider Intel's corporate venturing unit Intel Capital since 2009, has left to set up a corporate-focused venture capital service.

Singh Dang has co-founded U First Capital as chairman with partner Ekta Dang, who is CEO. It will help corporations access external innovation through links with entities such as startups and universities.

Before joining Intel Capital, Singh Dang had worked as an engineer at the chipmaker for nine years.

Meanwhile, Larry Cook, finance director at Intel Capital since 2013, has joined investment firm Omidyar Network as head of operations for its financial inclusion division.

During his five-year stint at Intel Capital, Cook man-

aged equity investments and M&A strategy across the firm's artificial intelligence, data centre and autonomous driving portfolios.

In previous roles at Intel, Cook was finance business manager for sales and marketing, working with accounts held by computing equipment producers Dell and HP. He was also a strategic financial analyst for Intel's Flash Memory group, having joined the company in 2006.

His role at Omidyar Networks will involve managing finance as well as internal and external reporting, and investment portfolio processes.

The departures comes as the unit is reorganised, cutting its investment team to concentrate on fewer larger investments.



NEWS

Almeida makes tracks from Stefanini

Marcos Almeida has left Brazil-based IT services firm Stefanini after more than three years leading its corporate development and venture investments.

Almeida said his role covered Stefanini's subsidiaries and affiliates, mergers and acquisitions, start-ups and investor relations activities, telling GCV: "I am leaving the company to pursue a new career opportunity."

Before joining Stefanini, Almeida founded and ran a family office-backed micro-VC and seed-stage fund NH Investimentos, and worked in business and corporate development for Visa Vale and Grupo RBS, as well as consulting for Capgemini and Aquanima since the late 1990s.



Almeida

Gaceta makes tracks to Mondelēz

Mel Gaceta has joined Nasdaq-listed packaged food and beverage producer Mondelēz International to set up its new venture capital unit.

Gaceta has nearly 20 years' experience in corporate venturing under his belt, including more than 13 years at Motorola Ventures, a subsidiary of telecoms product maker Motorola. He was director of finance for Motorola Ventures from its November 2000 formation. In late 2004, he became an investment manager. He joined mobile network operator US Cellular at the end of 2013 and became managing director of Synchrony Ventures in mid-2016.



Gaceta

Murphy resurfaces at Amaranthine

Patrick Murphy, former head of Universal Music's corporate venture capital fund, has resurfaced at Amaranthine, a \$50m fund being set up by Ireland-based conference organiser Web Summit.

Founded in 2010, Web Summit promotes technology conferences across the world, linking entrepreneurs and start-ups with prospective investors. Amaranthine's new fund aims to raise \$50m to back companies at all stages.

Murphy will co-lead Amaranthine with Web Summit co-founder David Kelly, and they will be supported by Web Summit's head of investors, Declan Kelly. Murphy spent three years at Universal Music.

Google's Eisnor makes Obvious choice

Di-Ann Eisnor, a director at internet technology provider Google's Area 120 incubator, has joined US-based venture capital firm Obvious Ventures as a venture partner.

Eisnor joined Area 120 five months ago and has concentrated on incubating new urban systems. As a venture partner at Obvious Ventures, she will be responsible for adding startups to the firm's urban infrastructure portfolio.

Eisnor has worked for Google since 2013 when it acquired Waze, the traffic navigation platform developer where she had been director of growth since 2009, a position she retained post-acquisition.

Kodner crosses from Comcast to DFJ

Jen Kodner has left mass media group Comcast's corporate venture capital unit, Comcast Ventures where she had been head of talent since February this year, to join venture capital firm Draper Fisher Jurvetson (DFJ) as a talent partner. She will be responsible for working with DFJ's portfolio companies to identify and recruit new executives as they scale.

Prior to Comcast, she worked as a partner on the executive talent team at venture capital firm Andreessen Horowitz for nearly two years. She previously spent over four years at cloud content management company Box, one of DFJ's portfolio companies, where was part of the recruitment team.

SoftBank Vision Fund vies for \$4bn in debt

The SoftBank Vision Fund, managed by telecoms and internet group SoftBank, has hired Goldman Sachs and Mizuho to raise a \$4bn credit facility, Reuters has reported. The facility is being sought alongside a sepa-

rate \$9bn facility from an assortment of financial services firms. It will support the \$93bn at which the fund initially closed in May 2017 and the \$4.7bn SoftBank added in November 2017.



NEWS

Fortune VC finds favour with \$667m fund

China-based venture capital firm Fortune Venture Capital has secured RMB4.63bn (\$667m) for its latest renminbi-denominated fund from limited partners including property developer Century Golden Resources Group, China Money Network has reported.

Financial services firm Industrial and Commercial Bank was also among the investors, as was Shenzhen Yunneng Fund, Kpeng Capital and the city of Shenzhen's guidance fund.

Founded in 2000, Fortune VC focuses on technology, media and telecoms; consumer goods and services; agricultural technology and cleantech. The firm began raising money for the Shenzhen Fortune Chuangtong Equity Investment fund in November 2017 and has so far invested about \$190m in 30 companies.

NTT notches up \$500m for VC fund

Japan-based telecoms group NTT has raised \$500m for a US-based corporate venturing fund, according to a regulatory filing. The fund, NTT Venture Capital, is headed by Vab Goel, who is still listed as a general partner at Norwest Venture Partners, the VC firm funded by financial services firm Wells Fargo.

Goel's speciality areas include mobile, cloud, networking, security and internet technology. The fund was initially announced by NTT in August this year, at which time the firm said it would concentrate on global innovation and digital technology. Its capital was supplied by two partners, according to the filing.

NTT already makes investments through NTT Docomo Ventures, a subsidiary of its mobile division, NTT Docomo, and has formed three separate funds under the NTT Investment Partners banner which were equipped with a total of ¥45bn (\$400m).

Zeroth to partner SoftBank's Deepcore

Zeroth, a China-based accelerator backed by mobile game publisher Animoca Brands, has partnered Deepcore, telecoms conglomerate SoftBank's fund focused on artificial intelligence (AI), according to Deal Street Asia.

Through the strategic partnership, Zeroth and DeepCore will share information and work together to invest in AI technologies in Asia.

Formed by SoftBank in January this year, DeepCore

helps launch AI-focused companies in Japan and makes venture capital investments in seed and early-stage startups.

Zeroth's accelerator program provides funding and mentoring to machine learning and AI-focused startups. Australia-based mobile game publisher Animoca Brands has also agreed a A\$1.5m (\$1m) deal to buy a 67% stake in Venture Classic, Zeroth's operational company.

Schneider Electric recharges corporate VC vehicle

France-based energy management and automation technology producer Schneider Electric has launched a corporate venturing unit that will invest between €300m and €500m (\$340m to \$565m) in startups.

Schneider Electric Ventures will target energy efficiency and sustainability, in areas such as energy use and industrial management, and will invest directly in startups, dedicated strategic funds, incubation initiatives and partnerships with entrepreneurs.

The company had been making venture investments through another unit of the same name, which was formed in 2000 with €50m. This fund was effectively closed when it was folded into Aster, the VC partnership Schneider Electric created with power and automation group Alstom, in 2010.

SK helps tell \$266m fund tale

SK China, a local subsidiary of South Korea-based telecoms conglomerate SK Group, has put ₩300m (\$266m) into a fund created by Legend Capital, the VC firm formed by conglomerate Legend Holdings, China Money Network has reported.

The size of the fund has not been confirmed, though China Money Network indicated SK China had contributed half of the targeted capital. The fund will focus on early-stage companies in the IT and healthcare industries based in China and across Asia.

SK China runs a group of real estate, energy and rental car businesses in China. Its parent SK Group previously became a limited partner in a \$600m fund for Legend Capital, according to China Money Network, but it is unclear if this was the same vehicle.



NEWS

National Grid charges up \$250m investment arm

UK energy utility National Grid has launched corporate venturing unit National Grid Partners (NGP) with \$250m under the leadership of Lisa Lambert, an alumna of corporate venturing unit Intel Capital.

NGP will operate as National Grid's investment and innovation subsidiary, combining corporate venturing with innovation and business development activities. It is based in Silicon Valley, California, with offices elsewhere in the US as well as the UK. It will target investments in companies developing technologies that can support the transformation to an energy distribution network based more on renewable energy.

Lambert, also chief technology and innovation officer for National Grid, is heading the unit as senior vice-president. She was at semiconductor technology producer Intel for 19 years and was a managing director at Intel Capital by the time she left in 2016 to be a managing partner at venture capital firm Westly Group. She joined NGP in January this year.



Lambert

Health Velocity Capital closes fund at \$185m

US-based venture capital firm Health Velocity Capital has raised more than \$185m from limited partners including healthcare providers UPMC and Cigna for its first fund, Health Velocity Capital I. The firms were part of a network of investors the firm said included strategic investors and executives in the healthcare industry. Cigna participated

through corporate venturing subsidiary Cigna Ventures.

Health Velocity Capital is targeting healthcare software and services providers. Its three partners include Saurabh Bhansali, who previously led investments for Humana Health Ventures, health insurance provider Humana's corporate venturing unit.

Monashees mobilises CreditEase for \$150m fund

Brazil-based venture capital firm Monashees has closed its eighth fund, raising a total of \$150m from limited partners including online lending platform CreditEase.

Monashees VII's investors also included Singaporean state-owned investment firm Temasek, Brandywine Trust Group, S-Cubed Capital, IDG Capital, Horsley Bridge Partners, University of Minnesota, private investor Mike Krieger and 15 high-net-worth Brazilian groups and families.

Founded in 2005, Monashees invests in early-stage companies based in Latin America, targeting sectors such as healthcare, financial services, transportation and logistics. The close of its latest fund brings the total money raised by the firm to \$430m.

Corporates move into \$108m RET fund

US-based early-stage venture capital firm Real Estate Technology Ventures (RET Ventures) has closed its first fund at \$108m with commitments from real estate investment trusts Aimco, Boardwalk, Essex Property Trust, MidAmerica and UDR. Real estate investment holding companies Starwood Capital Group, Cortland and GID have also backed the fund.

RET Ventures will focus on real estate technology developers that can help the fund's investors manage their portfolios more easily. Startups will be able to tap into the expertise and networks of the limited partners to accelerate their growth and achieve market leadership.

The firm is led by John Helm, a former venture partner at VC firm DN Capital who had previously built and sold two real estate technology companies – AllApartments/SpringStreet and MyNewPlace.

ComfortDelGro composes terms for \$100m fund

Singapore-based land transportation services provider ComfortDelGro has launched \$100m corporate venture capital fund ComfortDelGro Capital Partners (CCP) to invest in technology startups that complement its activities.

Formed in 2003 through the merger of Comfort Group and DelGro Corporation, ComfortDelGro offers land transportation services including bus, taxi, rail, car rental and leasing as well as automotive engineering, driving centres, non-emergency patient transportation, insurance brokerage and advertising. The firm claims to have more than 43,000 buses, taxis and rental vehicles in its fleet and operates in China, the UK, Ireland, Australia, Vietnam and Malaysia.

CCP will invest in developers of mobility technologies and services at seed, series A and series B stage. ComfortDelGro will use the fund to develop and acquire mobility technology companies with the aim of branching into new areas.



NEWS

MassMutual aims \$50m fund at Southeast Asia

MassMutual Ventures, the strategic investment vehicle of US-headquartered insurance firm Massachusetts Mutual Life Insurance, has formed a \$50m fund to invest in Southeast Asia-based startups.

Singapore-based MassMutual Ventures Southeast Asia is expected to invest in 10 to 15 companies in the next three years, participating in series A and B rounds for developers of enterprise software, digital health, financial and insurance technology. In addition to investing, the subsidiary will also help existing MassMutual Ventures portfolio companies to enter the region. MassMutual Ventures now has \$250m under management.

The new unit will be co-led by managing directors Ryan Collins and Anvesh Ramineni and supervised by Doug Russell, a managing director at MassMutual Ventures. Collins was head of Asia for insurer Manulife's Loft incubator while Ramineni was head of investments for Singapore-based VC fund OpenSpace Ventures.

Qualcomm thinks up \$100m AI fund

Qualcomm Ventures, the corporate venturing arm of the mobile semiconductor producer, has launched the \$100m AI Fund to invest in artificial intelligence (AI) technology developers. The initiative fits into Qualcomm's

strategy of tapping into 5G, the next iteration of mobile communications networks that offers higher speeds than current connections. Qualcomm expects these speeds to drive adoption of AI capabilities on mobile devices.

Telus goes for Panache

Telecoms firm Telus's corporate venturing arm, Telus Ventures, is backing the first fund of Canada-based venture capital firm Panache Ventures, which has increased the fund's target from C\$40m to C\$50m (\$37.8m) after bringing in Telus.

The fund was launched in March following an initial C\$25m close that included commitments from fund of funds Alberta Enterprise Corporation and development capital providers Investissement Québec and Fonds de solidarité FTQ.

Telus Ventures invests in North America-based businesses with a focus on communications, digital health, the internet of things, artificial intelligence and digital security. Panache Ventures partner David Dufresne said the firm will work with Telus to identify opportunities in the mobile, telecoms, media, digital identity and cybersecurity sectors.

Significant Capital to stand out with \$36m

Significant Capital Ventures (SCV), a multi-university venture fund backed by five Australia-based universities and construction and property company Hindmarsh, has been launched officially with a target size of A\$50m (\$36m).

Australian National University (ANU), University of Canberra, Deakin University, University Technology of Sydney and University of Wollongong have all backed the fund, which was launched by Dan Tehan, the country's minister for education.

SCV began as a joint venture between ANU and Hindmarsh in 2016, when the Australian Capital Territory government provided \$50,000 to support establishment costs and the state-owned Canberra Innovation Development Fund supplied \$50,000 to support fundraising activities. University of Canberra also joined the fund in 2016, which had a target of A\$10m to A\$30m at the time.

Significant Capital Ventures will make seed-stage investments in applied technology spinouts – companies that develop new applications based on proven technology. The team will be led by chief executive Nick McNaughton, who is also the CEO of university venture fund manager ANU Connect Ventures.

Michelin rolls out CVC fund

France-based tyre manufacturer Michelin has turned its Michelin Ventures into a full-blown corporate venturing fund that will invest between €25m (\$28.5m) and €30m a year, according to Les Echos.

Michelin has not revealed a total fund size but said it could increase the amount it invests annually if opportunities present themselves.

Michelin Ventures is the result of a strategy that began with pilot experiments in 2011. In 2015, the corporate formally established Michelin Ventures but directed it to invest only in funds such as Ecomobility Ventures – established by train company SNCF, telecoms firm Orange and oil and gas company Total – over the next several years.

Michelin Ventures has backed nine funds and collaborates with some 30 funds internationally. Michelin Ventures is led by Matthieu van der Elst as chief executive. He has been with Michelin since 2008, starting as worldwide market intelligence manager and becoming Michelin Ventures' CEO three years ago.



Applied Ventures to invest in New York trip

Applied Ventures, the corporate venturing arm of semiconductor technology producer Applied Materials, has launched a \$30m co-investment initiative with Empire State Development, the economic development vehicle formed by the state of New York. The partnership will involve funding startups based in upstate New York, and will target sectors such as semiconductors and artificial intelligence as well as autonomous vehicles, life sciences, clean energy and advanced optics technology.

The scheme was launched in connection with the creation of a hub – Materials Engineering Technology Accelerator (Meta) on the campus of SUNY Polytechnic Institute in the city of Albany. Applied Materials will invest a total of \$600m on the SUNY campus while Empire State Development will provide \$250m of grant funding over five years to enable SUNY Research Foundation to buy and install equipment in a research and development facility.

Toyota Gosei assembles corporate venturing fund

Japan-based automotive component manufacturer Toyota Gosei is to launch a ¥3bn (\$26.3m) corporate venturing fund in January. Founded in 1949, Toyota Gosei produces rubber and plastic parts primarily for the automotive industry, though it also makes products such as air

conditioners and purifiers and LED lights. The unit intends to spend the capital allocation over two years and will invest in technologies complementing its parent's operations, including robotics, semiconductors, advanced materials and automotive components.

Talkdesk sets aside \$10m for Innovation Fund

US-based customer service software provider Talkdesk has launched corporate venturing vehicle Talkdesk Innovation Fund with \$10m.

Founded in 2011, Talkdesk supplies software for business call centres. It created the fund to advance the customer service industry by giving startups in the sector the resources needed to bring their technology to market more quickly.

The capital for Talkdesk Innovation Fund will come out of the \$100m the company raised in a series B round led by hedge fund Viking Global Investors at a \$1bn valuation. Venture capital firm DFJ also took part in the round, which increased TalkDesk's total funding to \$125m. Existing investors include Salesforce Ventures, the strategic investment arm of customer relationship management software producer Salesforce.

Avaloq banks on corporate venturing

Switzerland-based banking software provider Avaloq has launched corporate venturing subsidiary Avaloq Ventures to fund financial technology developers.

Founded in 1991, Avaloq provides digital and core banking software to banks and wealth managers including HSBC, Deutsche Bank, Barclays and Edmond de Rothschild. Avaloq Ventures will partner banks, wealth and asset managers and established fintech producers to provide funding.

The company said it would enable fintech startups to offer their products on Avaloq's software exchange and will continue to target M&A deals while funding companies through Avaloq Ventures. The unit will be led by CEO Minhó Roth, founding partner and former chief executive of wealth management business FiveT Capital, while Avaloq founder and chairman Francisco Fernandez will chair the fund.

Base10 brings in Banco Sabadell

InnoCells, the digital innovation subsidiary of banking group Banco Sabadell, has committed \$10m to the inaugural fund of Base10, a US-based venture capital firm focused on automation technologies, FinExtra has reported.

Base10 was founded in January 2017 and as of September this year had collected \$137m for its first fund to invest in seed and series A rounds through contributions of between \$500,000 and \$5m. The firm favours emerging artificial intelligence-powered technologies with the potential to secure mass market adoption. Banco Sabadell considers its involvement an opportunity to engage with the Silicon Valley ecosystem to drive its pursuit of fintech-orientated artificial intelligence applications.

InnoCells' operation focuses on starting and fostering new businesses, making strategic investments and cultivating partnerships with both startups and corporates. Base10 was co-founded by Adeyemi Ajao, former head of Workday Ventures, the corporate venturing arm of enterprise software publisher Workday, together with Thomas Nahigian, previously an investor at Coatue Management, Accel Partners and Summit Partners.



NEWS

IBM and Columbia launch blockchain accelerators ...

Technology group IBM and Columbia University have unveiled two eight-week accelerator programs aimed at spurring innovation in the blockchain and data transparency spaces, Innovation Enterprise Channels has reported.

A first program – the IBM Blockchain Accelerator – will target later-stage growth companies, while a second initiative – the Columbia Blockchain Launch Accelerator – will cater to pre-seed companies. The move builds on the launch of the Columbia-IBM Centre for Blockchain and Data Transparency in July to foster cross-disciplinary research in both areas among the academic, scientific, business and government communities.

... as do Bitfury and Plekhanov Russian University

Plekhanov Russian University of Economics has joined bitcoin mining infrastructure provider Bitfury to pilot a blockchain-focused startup accelerator, Cointelegraph has reported.

The accelerator will be backed by the Russian Ministry of Digital Development, Communications and Mass Media with the aim of aiding the modernisation of public institutions and large corporations. Plekhanov's role will include offering courses and other educational programs to train specialists in creating projects powered by digital technologies.

Sompo comes to Israel with investment plan

Japan-headquartered insurance firm Sompo has launched an Israel-based innovation hub to invest in local startups, Reuters has reported.

The unit will target investments in insurance technology developers as well as those working on mobility, digital health, blockchain, the internet-of-things, cyberse-

curity, and home, remote and elderly medical care.

Sompo will partner venture capital firm TransLink Capital for deals between \$1m and \$5m while committing the full amount for investments above that itself. It intends to back one to three companies in its first year while forging partnerships with up to 10 more.

Apaman builds corporate venturing initiative

Japan-based property manager Apaman has launched a corporate venturing vehicle of undisclosed size in partnership with venture capital firm Nippon Venture Capital, VentureTimes has reported. In addition to supplying funding, the scheme will provide access to co-working space through Apaman's Fabbit service as well as cloud services and strategic support for international growth.

Strategic Education devises seed fund

Strategic Education, the US-based owner of for-profit higher education services institutions Strayer University and Capella University, has launched seed-stage corporate venturing fund SEI Ventures.

The fund's size has not been revealed but it will focus on the educational technology sector, offering portfolio companies the opportunity to pilot their technologies across its institutions. It will be led by managing director Terry McDonough and will particularly seek companies that exploit artificial intelligence, improve non-instructional student experiences and help retain students.

Hypertherm cuts to corporate venturing

US-based industrial equipment and software producer Hypertherm has launched corporate venturing vehicle Hypertherm Ventures to connect with advanced manufacturing technology startups. Hypertherm provides industrial cutting equipment for use in large-scale work such as shipbuilding or manufacturing as well as robotics and computer-aided manufacturing software. It has not thus far been active in venture capital investing.

The new fund will back startups developing technology in areas such as industrial cutting, welding and thermal processing as well as robotics, automation, machine learning, augmented intelligence, additive manufacturing, 3D printing, nanotechnology and the industrial internet of things.

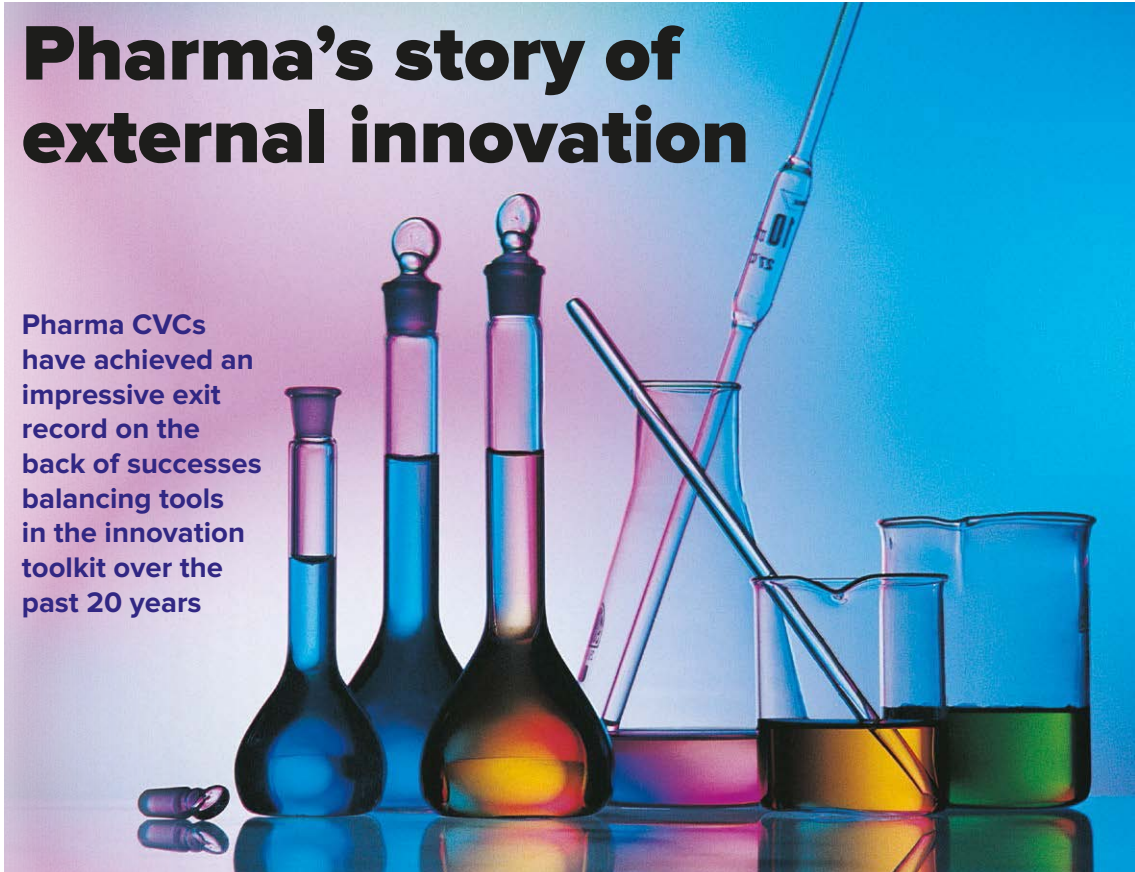
Hypertherm Ventures plans to form partnerships with universities as well as startups and entrepreneurs, and is offering access to its parent's experience in technology development, engineering, marketing, supply chain and distribution management.



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Pharma's story of external innovation

Pharma CVCs have achieved an impressive exit record on the back of successes balancing tools in the innovation toolkit over the past 20 years



Callum Cyrus, reporter

Medicine has a tradition of external innovation that predates much pharmaceutical CVC activity. It is perhaps best illustrated by the number of revenue-generating drugs with origins outside the vendor's own research and development operation, often building on the input of government-funded research and expertise from universities. Development in many cases started with a smaller developer bought by big pharma further down the line, with venture capital supporting the earliest stages of design.

Data compiled for Global Corporate Venturing shows that of the biggest revenue-generating drugs reported on an individual basis by the industry's 15 largest companies in 2017, almost half – 49.3% – are known to have been sourced from external channels.

Our study indicates external innovation is responsible for an even larger slice of reported revenues for those drugs, accounting for \$168.3bn of a total \$279.8bn, or 60.1%, of their annual turnover.

Grey areas

However, it is difficult to draw a conclusive picture, given the potential for overlap between the internal and external dynamics of innovation.

Collaborative programs between corporates, for instance, are counted as external in this dataset as they often include intellectual property (IP) from outside the company. Conversely, medicines partly based on expired patents – therapies only carry exclusivity for a limited number of years – have been tagged as internal projects, in light of the protected IP coming from within the firm.

Take two inhalable solutions sold by Teva Pharmaceutical Industries, Qvar and ProAir, which treat reversible obstructive airway disease and asthma respectively. Both formulations build on inventions by David Jack of GlaxoSmithKline's internal R&D team in the 1960s and 1970s. Jack's innovations have long since lost exclusivity.

Another handful of assets were difficult to classify because the external contribution is likely to have required vast internal R&D resources to convert into a clinical-grade product.

Top five drugs with origins in external innovations by revenue

As reported by the 15 biggest pharmas in 2017

MabThera/Rituxan (Roche)	\$7.4bn
Herceptin (Roche)	\$7.0bn
Remicade (J&J)	\$6.3bn
Prevnar13 (Pfizer)	\$5.6bn
Enbrel (Amgen)	\$5.4bn



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For the sake of argument, these grey areas have been included as internal projects. The nature of pharmaceutical discovery, with its multitude of potential compounds, high cost-burden and persistent risk of failure, means molecules first synthesised by external researchers may have fundamentally changed by the end of the development process.

One case worth contemplating is Pfizer's Xeljanz medication for moderate-to-severe rheumatoid arthritis. Xeljanz works by exploiting the Jak3 protein first discovered by John O'Shea of US government research agency National Institutes of Health (NIH) in the early 1990s, and NIH partnered Pfizer to conduct further research into the protein in 1996.

But Pfizer argues the drug is its own innovation, having poured more than \$1bn into internal R&D for the project by 2013. In its view, O'Shea's contribution was already available in the public domain, and the cooperation agreement failed to yield patentable IP.

Innovation is indispensable

It is clear, however, that external innovation has matured into an indispensable resource for the industry. Pharma corporates have always looked beyond internal R&D for ideas, but many external actors have greatly increased their role over time.

Drug development is now awash with venture capital, with the cumulative amount of VC poured into early-stage bio-pharmaceutical companies globally topping more than \$4bn during both the first and second quarter of 2018, according to Evaluate Group.

Many corporates now operate open innovation programs directly connecting internal expertise with third-party partners, and universities have also strengthened their hand with increasingly sophisticated tech transfer and collaboration departments.

Thomas Verhoeven, a president's fellow for pharmaceutical development and partnerships at Purdue University, who spent a total of 34 years as senior vice-president for R&D at Merck & Co and Eli Lilly, said: "Historically, the interaction between universities and corporates was based on establishing a relationship that enabled a firm to access talented recruits. Sponsored research projects were primarily with individual faculty members, rarely rising to a strategic interaction at an institutional level.

"In recent times, as research universities have organised themselves to conduct interdisciplinary research, pharmaceutical firms are realising the value of being able to tap into the strength of an entire university research ecosystem. So, we are beginning to see a shift toward institution-to-institution interaction with the type of sponsored research becoming more strategic, longer term and less tactical."

It is perhaps surprising then that the corporate venturing divisions of most major pharmaceutical companies date back only to the turn of the 21st century, though some may have previously made corporate investments and participated as an investor in independent VC funds.

JJDC, the corporate venturing division of Johnson & Johnson, has a longer history than most. It was launched in 1973 and is now under the Johnson & Johnson Innovation–JJDC banner.

GlaxoSmithKline was also ahead of the curve with the launch of its independent SR One venture capital fund in 1985, but most other active pharma CVC initiatives are at least a decade younger. Eli Lilly formed its Lilly Ventures division in 2002, for example, while Pfizer and Amgen followed suit two years later with Pfizer Ventures and Amgen Ventures respectively.

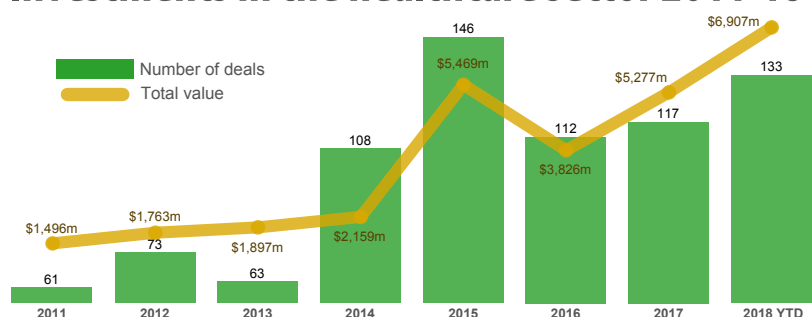
Taking the lead

And yet the momentum behind pharmaceutical CVC is now seemingly unstoppable. Total capital raised in pharma deals backed by healthcare corporates so far this year has not only surpassed 2017's total, but has also broken the previous record of \$5.5bn invested in 2015, according to GCV Analytics.

All the 15 largest pharmaceutical companies by revenue have now made corporate investments, and all but a few operate at least one pharma CVC fund or subsidiary

Speaking to Bloomberg last month, William Janeway, veteran investor and managing director of Warburg Pincus, observed that profit-led VCs had effectively built up biotech in the 1970s and 1980s on the back of government agency funding. Verhoeven added that VCs had enabled nascent biotech opportunities to be derisked and connected to the

Investments in the healthcare sector 2011-18



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Corporate venturing initiatives in the pharma sector			
Corporate	CVC initiatives	Year of establishment	Notes: a direct comparison is inadvisable given differences in fund structure
Johnson & Johnson	JJDC	1973 (though early-stage investments made since 1960s)	More than \$450m invested in 2018 so far
GlaxoSmithKline	SR One	1985	\$1.1bn invested since 1985
Novartis	Novartis Venture Funds	1996	\$850m under management as of 2011
Sanofi	Sanofi Ventures (formerly Sanofi-Genzyme BioVentures, Genzyme BioVentures)	2001 (Sanofi purchased Genzyme in 2011)	–
Roche	Roche Venture Fund	2002 (though early-stage investments made through collaborations since early 1990s)	\$530m as of 2013
Eli Lilly	Lilly Ventures, Lilly Asia Ventures	2002, 2008	\$200m reportedly under management as of 2013
Astra-Zeneca	MedImmune Ventures	2002	\$400m under management as of 2011
Pfizer	Pfizer Ventures	2004	Received \$600m of extra cash for mainly biotech investments in June 2018
Amgen	Amgen Ventures	2004	Initial commitment of \$100m
AbbVie	AbbVie Ventures	2013 (the year AbbVie split from Abbott Laboratories.)	–
Bayer	Leaps by Bayer	2015	–
Teva Pharmaceutical Industries	Sanara Ventures accelerator fund with Philips for mainly medtech and digital health	2015	\$25m as of 2015
Merck & Co	MRL Ventures Fund for biopharmaceuticals	–	\$250m
	Merck Global Health Innovation Fund for digital health	–	\$500m

industry, at a time when major firms were perhaps intimidated by a mismatch in risk compared with internal R&D projects. But pharma corporates are now leading the charge, reaping the benefits of an exceptional record over the past two decades.

Biotech-focused venture capital firm Atlas Ventures saw the number of its rounds featuring corporate investors soar from 5% in 2000 to almost 75% in deals backed by its 2013 fund. In 2016, trade body the Association of the British Pharmaceutical Industry found 60% of financing rounds for UK-based pharma companies featured CVC involvement.

Better still, the industry has a knack of picking winners. Atlas cited data from PricewaterhouseCoopers and US trade body the National Venture Capital Association showing that CVCs featured as equity holders in 60% and 40% of biotech M&As and IPOs respectively between 2001 and 2015, despite backing only 23% of total dealflow in the sector, outperforming the wider CVC average.

One theory advanced in a 2016 Wharton School at University of Pennsylvania study argues CVC-backed biotech companies achieve greater innovation in terms of scientific and patenting output thanks in part to the corporate's expertise, infrastructure and resources. Investment consortia with corporate involvement were also shown to be twice as good at turning around so-called "innovation laggards" into leaders within a four-year post-investment period.

The research was conducted by Gary Dushnitsky, a senior fellow at Wharton's Mack Institute for Innovation Management, and Elisa Alvarez-Garrido, assistant professor at University of South Carolina's department of international business. However, VCs continue to play an integral role in biotech development, notably by fulfilling support roles in embryonic biotech businesses that corporates may find difficult to provide.

Deal focus

Top-drawer pharmaceutical deals featuring corporates from May 2017 to April 2018 included a \$1.1bn round for Switzerland-based drug developer Roivant led by the SoftBank Vision Fund that featured investors including drug maker Daxx Pharmaceuticals. While the round is evidence of SoftBank and other non-healthcare corporate investors marking pharmaceuticals in a bid to build diverse portfolios, the supply of capital from healthcare firms in major deals has also been robust.

Pfizer and Gilead Sciences both took part in a \$300m series A round for immuno-oncology debutant Allogene Therapeutics in April 2018, for instance, a mere six months before securing an exit with Allogene's near-\$373m initial public offering.

Novo backed a \$270m round for rare disease therapy developer Harmony Biosciences in October 2017, while regener-



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ative medicine business Celularity secured \$250m from backers including Celgene, United Therapeutics and Sorrento Therapeutics in February this year.

Hippocrates, Greek antiquity's father of medicine, was famously quoted as saying his field reflected a love for humanity, and it is the same essential dynamic that pushes the industry to find answers. Drugs targeting diseases with unmet medical needs and novel approaches to drug development account for a substantial share of deals, and many feature more than one corporate investor from the healthcare segment.

One recent example is US-based RNA drug developer Ribometrix, which generated \$30m in a series A round last month featuring subsidiaries of drug makers Merck Group, AbbVie, Amgen and Mitsubishi Tanabe Pharma, as well as of genomics technology provider Illumina. The company's pipeline targets disease-causing RNA molecules rather than proteins in the hope of improving the treatment of a wide range of conditions.

Barbara Dalton, vice-president for venture capital and worldwide business development at Pfizer, said the collaborative approach contrasted with CVC investment in medical devices, where in general there was greater competition between corporates and fewer venturing groups.

She said: "If you are a device company looking for a strategic investor, you are probably only looking for one because you do not want to set up that competitive situation at board level, whereas in the therapeutic space you will find companies with three or four pharma corporate VCs round the table – it is not an issue there."

Thanks to trends such as the rise of digital health products, there is greater competition and overlap for healthcare venturing dollars than in previous years. However, pharmaceutical companies have consistently accounted for the most CVC-backed healthcare rounds since GCV Analytics began tracking data in 2011. The segment racked up 149 deals last year against 117 for medical devices and diagnostics, and 64 for healthcare IT and administration.

The blended approach

Pharma has also proven particularly adept at blending corporate venturing activity with other sources of innovation.

Given the price tag of drug development, in-house research will always play a crucial role for the industry, though the nature of that role is evolving. Corporate venturing's advantage lies in complementing R&D operations and business development, by introducing valuable ideas and contacts from outside the corporate's own structures.

Scott Brun, head of AbbVie's Ventures division and vice-president of the firm's corporate strategy office, said AbbVie was increasing activity in each part of the innovation dynamic – in CVC, R&D and M&A. He named two recent CVC investees, Alector and Morphic Therapeutic, as examples that led AbbVie to preclinical business development deals targeting neurodegenerative diseases and fibrosis-related conditions respectively.

Pfizer's Dalton said: "What I like to do is have corporate venture investments early in the process of funding and growing a new company, and at the right time bring them to the attention of my Pfizer business development colleagues for a transaction, and then make sure the companies we are starting or helping can get off the ground.

"We will have a partnership with the parent through a business development transaction at the right time. And that right time differs among the corporations. Some corporations will do deals before compounds have entered the clinic and others want to see phase 1 or 2 data before they partner them. So it depends on what they are looking for."

Pharma's venturing methods have changed over the past 15 years alongside changes in internal R&D, according to Mark Wilson, principal at Strategic Technology Bioconsulting, who co-authored a report on the subject alongside Tim Minshall, the Dr John Taylor professor of innovation at University of Cambridge.

Many pharma investors now participate in so-called hybrid CVC initiatives, which allow them to engage with VC funds that grant a degree of investment control or privileged access rights. Hybrid fund investment in early-stage pharma and biotech businesses was equal to approximately 25% of funding supplied through standard CVC operations in 2017, according to the report, up from below 15% in 2006.

Examples include Medicxi Ventures 1, a \$230m vehicle focused on Europe whose limited partners include Johnson & Johnson Innovation–JJDC and GlaxoSmithKline.

Hybrid strategies also help pharma corporates and biotech VCs pool their resources to the benefit of driving emerging therapies. For example, Atlas's ninth and 10th funds, backed by Novartis and Amgen, provide the corporates with a closer look at Atlas's startup formation activities.

Wilson said the emergence of hybrid CVC was the latest development in pharma's shifting approach to externalisation, which has moved from strategic alliances to option-based deals and then to biotech acquisitions aligned with specific



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preferences. He also noted pharma corporates often now aim to minimise expenditure until portfolio companies reach proof-of-concept stage.

Conclusion

Pharmaceutical companies are the largest contributor to CVC in the healthcare segment, itself consistently ranked as the second-largest CVC sector by GCV Analytics. The industry's approach to CVC is therefore complex, with companies adopting tactics for a myriad reasons.

This should be little surprise, not least because each firm's drug development strategy is fundamentally different. Some emphasise marketing medications in specific therapeutic areas, for instance, and companies may choose to prioritise either strategic or financial goals.

But pharma's impressive exit record is a vindication of its approach, to the point where corporate involvement has become a reliable predictor of innovative potential. Wider lessons could be drawn from the achievement, which stems in part from a collaborative environment in which corporates, VCs and other agents of external innovation feel comfortable working with each other. ♦

Interview: J&J's 45 years of corporate venturing

JJDC has more experience than any healthcare corporate venturing division, with a legacy that stretches back to 1973. Its prominence has continued into 2018, with approximately 40 new and follow-on investments and more than \$450m supplied globally, making it the leading healthcare CVC unit for disclosed investments over the past 12 months, according to deals database PitchBook.

The unit relies on a 13-person investment team spread throughout locations in New Jersey and Tel Aviv and the four Johnson & Johnson Innovation Centres in London, Boston, California and Shanghai. It has a portfolio consisting of more than 100 companies. To mark JJDC's 45th anniversary, GCV spoke to Asish Xavier and Renee Ryan, both vice-presidents for venture investments, who focus on biotech and medical devices respectively, and Stacy Feld, vice-president of consumer venture investments and external innovation.

Johnson & Johnson has accrued significant experience as a strategic investor compared with many of its peers. Do you believe Johnson & Johnson Innovation benefits from its reputation when engaging with potential portfolio companies, and if so how?



“There is now greater scope to create companies earlier with new technology or biology breakthroughs”

Asish Xavier

Xavier: From the point of view of JJDC, we are a value-added investor. In addition to the capital we provide, we bring J&J's resources to the deal. For instance, we can provide advice to biopharmaceutical companies on pre-clinical matters and clinical trial design and execution. On the medical device side, JJDC, via a business relationship, can provide marketing and distribution in markets where the portfolio company has no capabilities.

Feld: I would like to echo the specific point – as a value-added strategic investor we can provide the best of the financial rigour of a VC with the strategic value of a corporate. From a consumer health perspective, when we approach companies through strategic investment, they are often attracted to J&J for our brand equity and global expertise. Considering the scale of J&J, there very few companies that play right across the spectrum in that way, providing particular capabilities to each portfolio company and also access to our business partners from the sectors.

Have dynamics of external innovation in healthcare changed in recent times?

Feld: I would say the identity of investment partners is changing as consumer healthcare converges with the traditional healthcare system, offering new technologies and solutions to consumers and patients. We are increasingly competing and investing with tech VCs as well as corporate VCs from tech, retail and healthcare.



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From a consumer health perspective, there is also a greater focus on digital product and our portfolio broadly reflects that, going beyond physical assets such as branded consumer products, to include digital platforms and consumer devices that enable digital connectivity engagement. The nature of these changes in technology and healthcare solutions moving to new tech and capabilities can also help drive investment opportunities.

Ryan: The global nature of investment has changed innovation. While being stage and cheque-size agnostic are hallmarks of JJDC, it is fair to say we are also geographically agnostic. Much of our advantage is still focused on the US and Europe whereas we are still coming from behind in Asia, where medical devices are still being leapfrogged by biotech.

Xavier: From the biotech side following the recession, the most significant change is the role of CVCs in biotech investing, particularly in the US and Europe. Some 15% to 20% of capital for biotech companies comes from CVCs. We have also witnessed the longest-running IPO market since 2013, with more than 300 IPOs in the US market, providing a significant infusion of capital for the biotech sector.

There is now greater scope to create companies earlier with new technology or biology breakthroughs. Early-stage investing had dried up from 2008 to 2012 as capital deserted the sector during and after the recession. Also, the infusion of Chinese capital from VCs and corporations, mainly in the US but also somewhat in other markets, including Canada, Europe and Israel, has resulted in a new dynamic.

Feld: I would like to add from a consumer health perspective it seems we are at an earlier-stage of this cycle, where there is not yet a consistent level of acceptance [of CVC participation] as with biopharma, but there is still advantage from our sustained presence in the VC market along with continued growth in the consumer healthcare market.

How does J&J view the relationship between corporate venturing and the other main devices of innovation – in-house R&D and M&A deals?

Xavier: We see a broad continuum providing opportunity for J&J throughout the product development cycle, that is, providing access to external innovation at all stages – from university research, through our four J&J Innovation Centres and venture investing from JJDC – which gives us the ability to help companies mature and derisk their assets through to business development and M&A.

J&J has business development teams, including M&A within each of the three sectors, which generally take over from JJDC at milestones specific to the sector, for instance that may be where the product has proof of concept in humans for biotech, or market-readiness in Europe and start of pivotal trials in the US for medical devices. For consumer products, it may be once the business model has demonstrated early revenue visibility.

Ryan: Especially important is that we have a quarterly review where the M&A and internal R&D priorities are strategically layered in with the JJDC venture investments so that we have a comprehensive view on our innovation pipeline.

Feld: We have a similar process from a consumer perspective, with quarterly reviews, so that we consistently integrate perspectives including early-stage investment, consumer R&D, the innovation centres, external innovation and business development. Then we have the flexibility to pursue an investment when it fits the strategic points [of the wider company], and if it does not fit we have other innovation tools available [to form the right relationship].

What are the most promising trends in emerging healthcare applications?

Xavier: In my view there have been three trends on the biotech side. First, technologies invented in the 1990s are being translated into clinical products in areas such as gene therapy and RNAi, as well as oncology such as Car-T and TCR, and these technologies are driving the formation of many companies.

The second trend is data-centred artificial intelligence, which is improving our ability to find therapeutic targets. Rather than relying on trial and error, we can segment patients on the likelihood of treatments being appropriate for them. Last, there has been greater activity and a resurgence in areas previously neglected by VCs, such as non-alcoholic fatty liver disease and fibrotic lung, liver and kidney conditions.

Feld: On consumer health, the state of healthcare is changing as more solutions emerge focused on self care. There



“There is still advantage from our sustained presence in the VC market along with continued growth in the consumer healthcare market”

Stacy Feld



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has been an emergence of consumer devices from the professional channel, with many home-use consumer devices, as well as digital products. Over the past two years, healthcare companies have also modernised how they are bringing products to market, and we have developed a greater focus on business model innovation and diversifying our go-to-market strategies to drive greater consumer engagement.

Ryan: For J&J, most of our medical device business involves surgical devices and we see the future of surgery clearly in the realm of digital surgery. To that end, we created a collaboration with Google's Verily Life Sciences four and a half years ago, called Verb Surgical. The needs of a digital surgery platform require capabilities and talents much beyond the traditional biomedical engineering and leverage the tech capabilities in robotics, artificial intelligence and software.

One huge opportunity is access to essential surgery. There are 7 billion people in the world of which only 2 billion have access to surgery. Platforms such as Verb Surgical have to address not just the surgical procedures, but opportunities in surgeon training and engaging the broader community.



“There are 7 billion people in the world of which only 2 billion have access to surgery”

Renee Ryan

which are mainly strategic. In biopharma there are many different angles and capabilities complementing each other, but in medical devices there tends to be more wrangling between corporates to become a sole CVC investor in an investment round.

Feld: Consumer products are probably somewhere in the middle of the two. But what I would like to stress here is the wider strength of the company. JJDC can invest in areas that are relevant across J&J. For example, we led a financing in a smoking cessation digital health platform in Redwood City, California, called Carrot, which is a digital multidisciplinary platform designed to get smokers to become quitters and then sustain their cessation of the habit.

The platform is aligned with our consumer smoking cessation franchise, but it also ties in with J&J's enterprise focus on “world without disease” and specifically on preventing lung cancer within our Lung Cancer Initiative, in providing holistic solutions to the problem.

That enables not just interest from the consumer products sector, but also cross-sector involvement and interest from enterprises. That is the power of the JJDC model, and the motivation is being able to work with entrepreneurs so that there is a greater likelihood of their products or solutions reaching the market. While obviously securing a financial return is great, I personally get even more satisfaction when J&J helps a company achieve its mission and the product or solution reaches the market and touches patients and consumers. ♦

What are the main ways in which CVC investments in healthcare differ among subsegments?

Xavier: It is true that the nature of CVC involvement within the three sectors J&J covers is quite different. In biotech, the two oldest CVCs are JJDC, started in 1973, and then SR One, which was formed in the mid-1980s. But there has been a significant increase over the past 10 years, and now almost every pharma and big biotech company has a CVC arm.

There remains a big difference in biotech in the role of CVCs and traditional VCs. New company formation remains primarily in the domain of financial investors. What has become more common among CVCs in biotech is an increased acknowledgement of strategic motivation. More investments are about long-term strategy and finding assets for the development pipeline.

CVCs have also become more active investors. They are taking board seats more often but there are only a few active enough to be a lead in most of their deals. A large number do not have the capacity to lead compared with the biggest players.

Ryan: Biopharma has by comparison a more robust slate of CVCs. However, many of those are financial, whereas medical devices have a much shorter list of CVC investors



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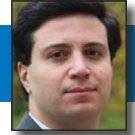
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COMMENT

The impact of strategic investment on ventures

Ali Farahanchi, vice-president, Danhua Capital



Established companies in technology-enabled industries such as software, telecoms, pharmaceuticals and semi-conductors have used corporate venture capital as a lever to access and screen technological advances, and to drive innovation outside the traditional firm boundaries.

Recent years have witnessed emergence of a new wave of corporate venturing funds that increasingly interact and compete with traditional venture capital firms in the entrepreneurial ecosystem.

This thesis examines entrepreneurs' rationale for raising capital from corporate investors. Through the analysis of an online survey conducted with startups based in the US and founded between 2010 and 2015, we identify that startups that operate in capital-intensive industries, such as life sciences and manufacturing, raise capital from corporate investors in order to establish strategic partnership with corporates, significantly more than do startups in capital-light industries such as enterprise and consumer software.

Second, through an empirical analysis of a panel of 8,190 startups founded in the US between 2000 and 2010, this thesis shows that corporate venture capital is more beneficial to startups that operate in capital-intensive industries. Using a bivariate probit model, this thesis shows that startups backed by corporate venture capital are more likely to be acquired or go public, and that the likelihood of an exit event increases as capital-intensity of the industry magnifies, as measured by the level of fixed assets on companies' balance sheets.

In addition, we provide empirical evidence that participation of corporate venture capital in a financing round helps a capital-intensive startup to raise further funding from reputable traditional venture capital firms.

Third, this thesis presents empirical evidence that establishing strategic collaboration between capital-intensive startups and corporate parents of venture capital firms, in forms of joint research, product development or commercialisation, is a main source of value for startups. Using data gathered on 130 corporate news announcements on strategic collaborations, this thesis shows that capital-intensive startups backed by corporate venture capital are significantly more likely to succeed when they establish strategic collaboration with corporate parents.

The final contribution of this thesis is a formal assessment of traditional venture capital firms' investment behaviour in the presence of corporate investors. We present a game-theoretic model and identify the circumstances under which traditional venture capital firms benefit financially from corporate investors participation in financing a capital-intensive startup.

By leveraging data gathered on 8,190 startups, we apply the game-theoretic model and Monte Carlo method to simulate financial returns for a traditional venture capital firm investing in a capital-intensive startup in the pharmaceutical industry.

From entrepreneurs' point of view, these conclusions are encouraging. A startup's capability to raise funding from corporate investors should be viewed positively by the employees and other investors, especially for startups operating in capitalintensive industries. Therefore, founders of capital-intensive startups and their original investors should seek to attract CVC investment.

Furthermore, startups should embrace CVC investment through establishing strong operational and knowledge links with corporate parents through the three types of collaboration – co-development, licensing and joint research – that are shown to be significantly beneficial for startups.

From the point of view of traditional VCs, however, CVC investment in their portfolio startups may have a diminishing or enhancing effect on their investment return. And since these VCs' sole investment objective is to maximise financial return, they should be cognisant of the conditions under which CVC investment might be harmful to their returns.

Specifically, as highlighted in the simulation results, CVC investment in industries where there is a low valuation multiple or there is a low investment to revenue ratio – typically capital-light industries – might diminish a traditional VC's return. It is important to note that early employees and founders of a startup may exhibit a similar preference, especially if they seek solely to maximise financial return rather than, for example, a boost to reputation or an enhanced likelihood of exit. ♦

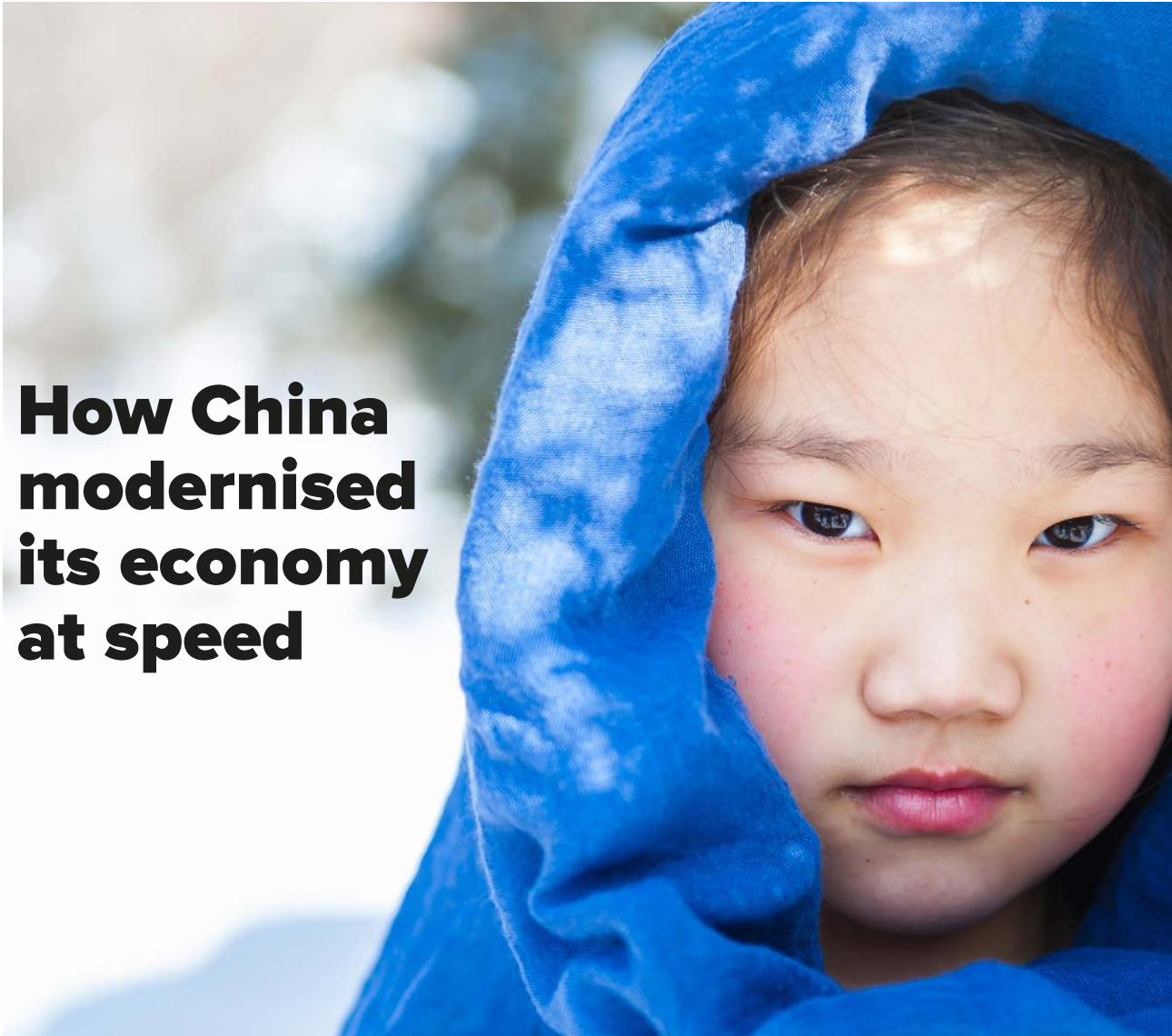
This is an edited version of an extract from Farahanchi's PhD paper at Massachusetts Institute of Technology.

A startup's capability to raise funding from corporate investors should be viewed positively

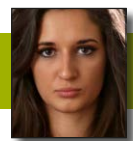


INNOVATIVE REGION

How China modernised its economy at speed



Alice Tchernookova, features editor



Recent figures have shown that the developing world, spearheaded by India and China, now represents 85% of the world's population and accounts for 60% of global GDP compared with 33% a few decades ago. In a recent article, the Sydney Morning Herald claimed that Chinese people were among the most positive and optimistic about the future, with a level of confidence bettered only by India, Indonesia and Iceland.

The Australian newspaper based this assumption on a number of facts. According to the Edelman Trust Barometer published earlier this year, 84% of the population trusts the authorities. Another study conducted by nonpartisan US fact-tank the Pew Research Centre a few years ago found that 66% of Chinese citizens expressed confidence in their government – the fifth-highest such expression globally at the time.

Perhaps the Chinese do have reasons to trust their authorities. According to World Bank data, between 1981 and 2013, the country's poverty headcount ratio – the percentage of people living on less than \$1.90 a day – fell from 88.3% to 1.9%, with the economy having grown by an average 9.5% year-on-year. Last year, a further 12.89 million people were lifted out of poverty, according to official figures. Earlier this year, the state announced it aimed to eradicate extreme poverty – currently involving 30.5 million people – across its population of 1.37 billion by 2020.

Meanwhile, China's GDP per capita has grown from \$158 some 40 years ago to an estimated \$8,800 now – a number that the government is looking to raise to \$30,000 by 2035. According to the International Monetary Fund, the Chinese economy is currently the second-largest worldwide, with a GDP of \$14bn, compared with \$20.4bn in the US. Since 2011, China's GDP has been growing an average 7% to 8% each year. →



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A direct result of China's economic growth over the past few years has been its growing commitment to the venture capital space. Having laid the first bricks of its venture market in the 1980s, the country has become one of the world's core VC markets. It recently overtook the US for the first time, with a total of \$30.9bn of VC funding compared with \$27.2bn in the US in the third quarter of 2018, according to Goldman Sachs.

Consultancy KPMG recently reported that VC investments in China had hit a record high of \$40bn last year, a 15% increase from 2016's \$35bn. Of the 10 largest funding rounds recorded in the fourth quarter of 2017 worldwide, half were Chinese, including three deals above \$1bn, the report added.

With an economic growth of unprecedented speed and intensity, has China entered a golden age for startup funding, as some economists have declared? This question can be explored through the lens of corporate, government and university venturing.

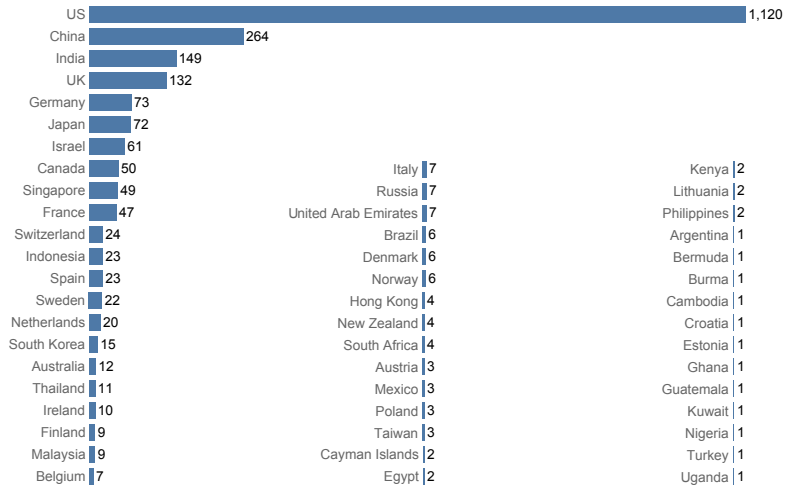
Corporate venturing

Over the past few years, China has been home to the fastest-growing corporate venture capital market. Between 2012 and 2015, its share of global CVC activity increased from 3.6% to a whopping 32.2%. Over the same period, that of the US fell from 80.8% to 52.2%.

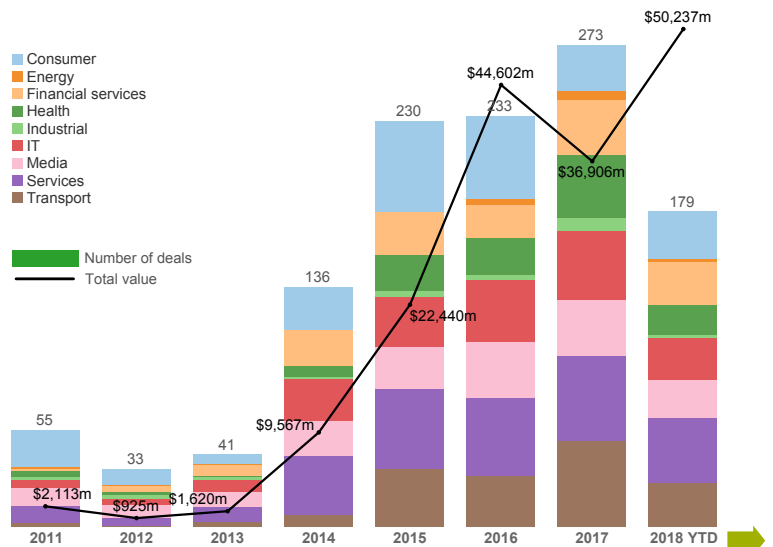
According to KPMG, in the fourth quarter of 2017, Chinese corporate participation in VC deals peaked at 32.3%, representing \$11.7bn and ranking far above the global average of 18.7%. Strong investment areas in 2017 included business-to-business enterprise services with around \$1.3bn in the fourth quarter alone, autotech, artificial intelligence (AI), augmented reality, blockchain and e-payment services. Last year, \$13 trillion of mobile payments were recorded in China, according to national news agency Xinhua.

Over the past three to four years in

Top countries by corporate-backed deal volume and value 2017

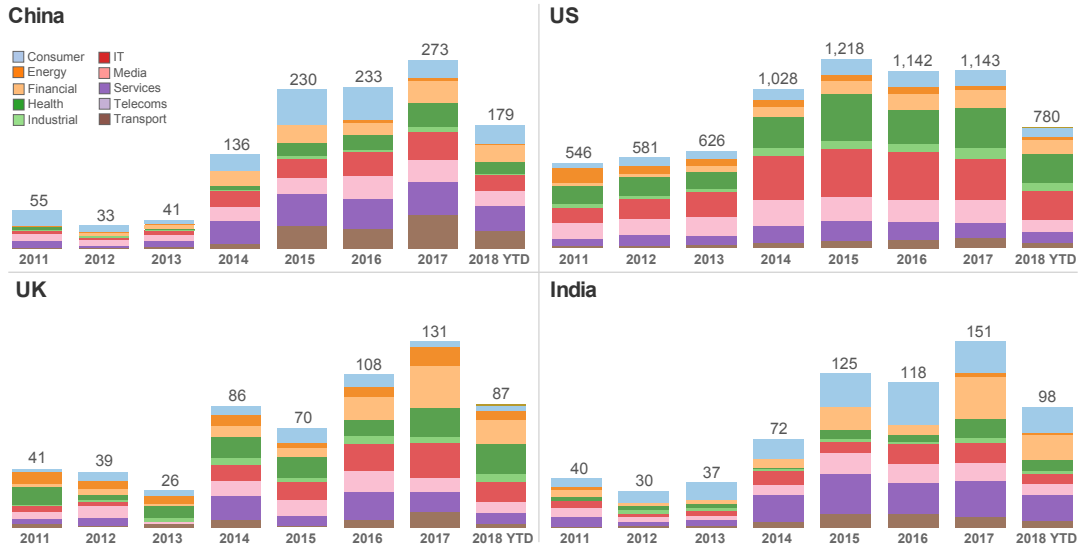


Deal volume and value in China 2011-18

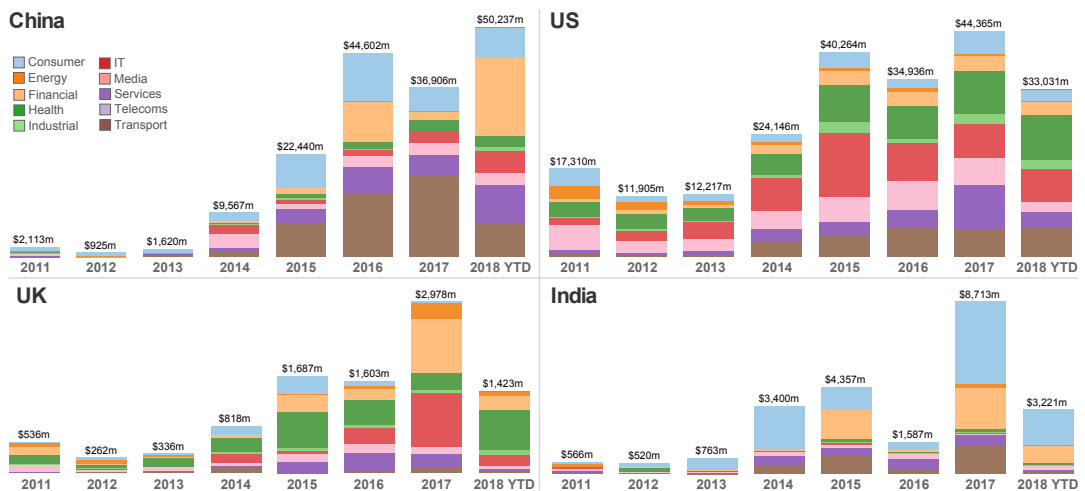


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Number of corporate-backed deals by region 2011-18



Value of corporate-backed deals by region 2011-18



particular, corporate funding has boomed, with deal numbers jumping from 136 to 230 between 2014 and 2015, and remaining above 200 since, according to GCV Analytics. A respective 233 and 273 deals were recorded in 2016 and 2017. In addition, around 180 deals have so far been recorded this year, paving the way for a potential record.

Last year China ranked second for both deal value and volume, with 264 transactions worth around \$37bn, still far behind US figures of 1,120 deals worth \$45.3bn.

This year has so far proven to be more favourable, with \$50.2bn of investments against \$33bn in the US. The latter is, however, still far ahead in deal numbers, with 780 transactions compared with 179 in China. Irene Chu, partner and head of technology for Hong Kong at KPMG China, said: "Chinese investors are focused on rapidly scaling and gaining market shares so that they can quickly dominate the market. This is why we are seeing bigger acquisitions – many driven by China's biggest tech giants, as they look to take out their competition in different areas."

A major deal closed earlier this year turned out to be a game-changer for the country's performance. Ant Financial, the online payment subsidiary of internet company Alibaba, raised a \$14bn series-C round in June that brought its valuation to \$150bn and made it the world's largest unicorn. It was the largest amount raised by a private company in a single round, and was backed by a consortium of foreign and local investors, including Singapore's sovereign wealth funds GIC and Temasek, Sequoia Capital China, Warburg Pincus, Canada Pension Plan Investment Board, Silver Lake and General Atlantic.



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Of the current top 20 internet companies worldwide, 11 are from North America and the remainder from China. The latter include three behemoths – Baidu, Alibaba and Tencent, commonly referred to as “Bat” – whose cumulated market value amounts to just over \$1 trillion – \$82bn, \$509bn and \$483bn respectively. Other Chinese companies on the list include Ant Financial, Xiaomi, whose market value stood at \$75bn in May 2018, Didi Chuxing with \$56bn, JD.com with \$55bn, and Meituan-Dianping and Toutiao with \$30bn each.

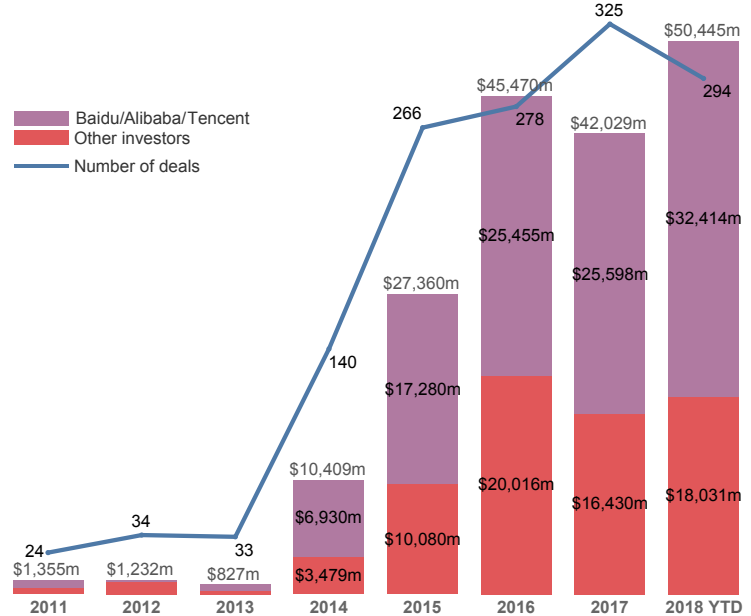
Two of these companies have also gathered six of the 10 largest funding rounds raised by China-based companies since 2011. The online local products and services platform Meituan-Dianping thus successively received \$3.3bn and \$4bn in funding, having recently made its \$4.2bn IPO with a market capitalisation of \$52bn. Meanwhile, Didi Chuxing, number-one peer of US ride-sharing app Uber, attracted successive funding rounds of \$3bn, \$4bn and \$5.5bn, and most recently \$7.3bn. Uber’s Chinese counterpart is now rumoured to be planning its IPO with a projected market cap of up to \$80bn.

An IPO surge seems to have hit the country. In June, electronics producer Xiaomi finalised its IPO with a valuation of \$54bn, short of its original \$100bn target; news content platform Toutiao could also be eyeing one with a targeted valuation of \$45bn, according to industry insiders.

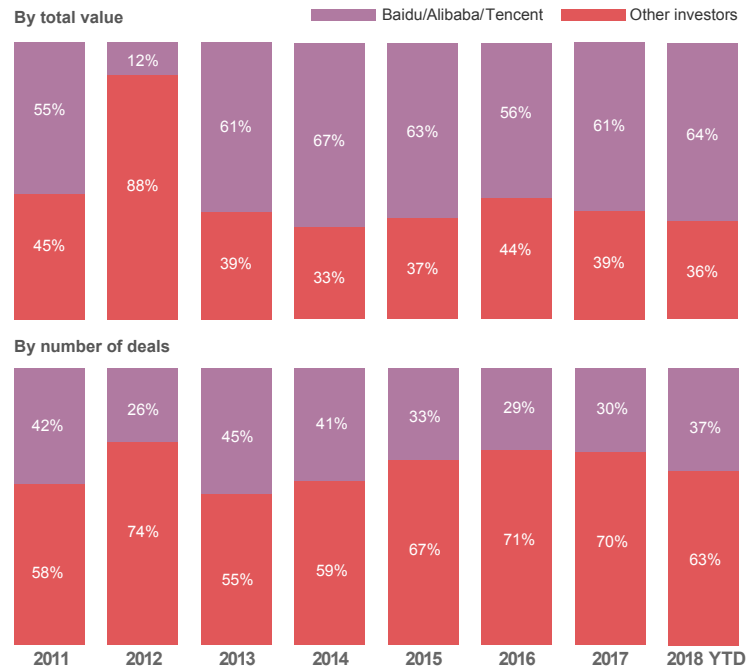
“As valuations continue to soar in the private market, more companies are looking to go public earlier than before,” Goldman Sachs managing director Heath Terry told Business Insider. He added: “While corporate venture capital has been a major driver of growth in venture as an asset class globally, nowhere has that been more evident than in Asia, where Alibaba, Baidu, JD.com and Tencent have followed the lead of SoftBank, creating massive ecosystems of venture investments under their umbrellas. Nearly every major private company in China now has at least one of those five companies as an investor, and the level of influence these ecosystems have in steering the development of new technologies and business models is unprecedented.”

According to GCV Analytics, investments made by the Bat companies in Chinese businesses have accounted for as much as 46% of the total amount raised so far this year – \$25.6bn of a total \$55.5bn. Their transactions also accounted for 29% of the 221 deals closed to date. Last year, Bat’s investments represented 18% in terms of deal numbers and 35% of value at \$15bn.

Deals by China-based corporate investors 2011-18



Percentage of deals by China-based corporate investors 2011-18



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In a recent article, Bloomberg listed Bat's common and individual investments in Chinese startups across a wide range of sectors. Altogether, the listed Bat-backed companies – which exclusively included businesses worth \$1bn or more – had a cumulated valuation of \$180bn. The five largest of these were Didi Chuxing, Meituan-Dianping, e-commerce platform Pinduoduo valued at \$21bn, food delivery company Ele.me worth \$9.5bn, and online insurance group Zhong An Insurance, valued at \$6.5bn.

While there are obvious benefits from such colossal investments, the fact that China's venture market, if not its economy as a whole, is so dependent on a handful of seemingly almighty private companies might have its drawbacks.

In a recent report, Bloomberg spoke of the struggle experienced by local startups in "escaping the shadows of Alibaba and Tencent", saying Bat-backed deals often felt like a "trap" to them. And while there are now more Chinese than US tech companies going public thanks to their support, this all comes at a price.

The report went on: "A review of IPO filings by Chinese companies [showed] they can give Alibaba and Tencent inordinate voting power through board seats and veto rights, come laden with conflicts of interest over hiring, M&A and other strategic decisions, and deepen the startups' dependence on traffic from the larger companies to life-and-death proportions."

For example, Tencent was recently granted more voting rights and more power over portfolio company Nio, a smart electric vehicle developer that floated with a \$6.4bn valuation.

According to Bloomberg, over the past two years, around a dozen Chinese companies – including Meituan-Dianping and Pinduoduo – have flagged the two behemoths as risk factors in their IPOs, having written in their filings that "failure to maintain our relationship with Tencent could materially and adversely affect our business". The power of Bat to decide which companies succeed or fail in China's consumer and corporate markets, Bloomberg concluded, had become "both outsized and unprecedented".

An industry expert who wished to remain anonymous commented: "Bat definitely have a critical driving force in the venture community, but their overbearing presence and influence can act as a double-edged sword. Entrepreneurs may often be afraid to start a new internet business in China, as they fear their actions and development might be limited, or that they will end up being invested or acquired by Bat anyway." The source also noted that China's venture landscape consisted of many other top-tier VCs that should not be forgotten or ignored.

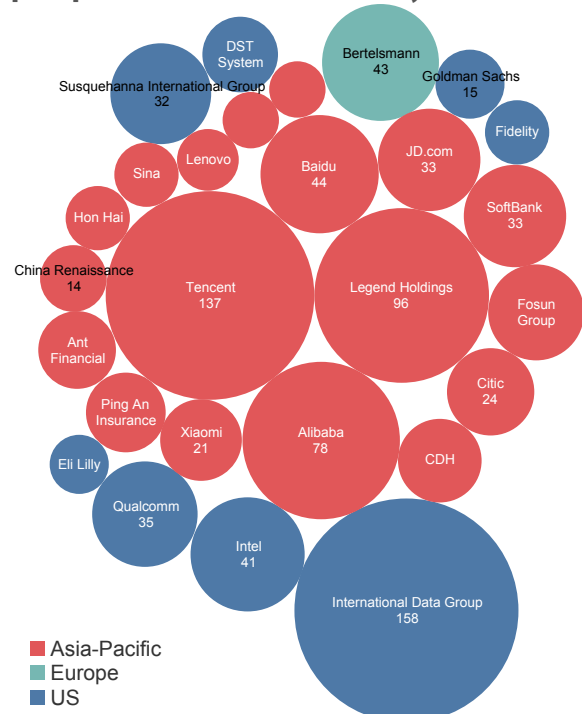
Among the top 10 corporate investors in the region since 2011, half are Chinese. These include Tencent with 137 deals, Chinese investment holding company Legend Holdings with 96, Alibaba with 78, Baidu with 44, and e-commerce platform JD.com with 33. Other top corporate investors in the region have been mostly US-based, including chip maker Intel Capital with 41 transactions, telecoms equipment maker Qualcomm (35) and Pennsylvania-based investment and trading services provider Susquehanna International Group (32). Japanese conglomerate SoftBank and German mass-media company Bertelsmann complete the list, with 33 and 43 deals respectively.

Chinese corporates moreover seem to be fairly in control of their domestic market. Of the top investors in the region since 2011, two thirds were Asian, only two of which – SoftBank and Taiwan-based precision industry group Hon Hai, better known as Foxconn – were non-Chinese. According to GCV Analytics, in 2016, 86.4% of investments in Chinese companies were backed by Chinese-only investors, while the US recorded 47.5% of domestic-only deals for the same period. In 2015, these figures amounted to 78.8% and 63.6% respectively.

Duncan Turner, general partner at New Jersey-based VC firm SOSV and managing director of HAX Accelerator, which focuses on Shenzhen and San Francisco-based hardware startups, said: "In many ways, China has already overtaken the US. I would say the biggest divide between both markets exists in the deep tech space, where China still lacks some of the experience and know-how needed to develop new technology in specialist areas such as semiconductors, for instance."

But even in that respect, he has started to notice some changes: "I feel consumer hardware in particular has got to a

Top corporate investors in China by deals 2011-18



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point where the 'Made in China, designed in China' has become a strong element," he said. "Chinese consumers used to be more focused on western products, but a number of strong national brands of the likes of Xiaomi have since emerged and are leading the way for others. From an emotional perspective, consumers are very brand-savvy here, and so they have a growing wish to purchase things that have been made and conceived here. China as a nation is booming, and there is now a lot of pride in being Chinese."

Turner said considerable investment in infrastructure was another factor. In 2002 a \$4.50bn road construction project was launched, supported by central and local government. Turner said: "China is equipped with a rail infrastructure and road network that surpass any others in the world, which gives it the ability to have huge control over its logistics and supply chains. This, combined with an expanding middle class and fast technological progress, may very well help China become the world's strongest economy."

Need for speed

As Jeffrey Li, co-managing partner at Tencent Investment and general manager of Tencent M&A once told GCV: "In China, speed in everything." Chibo Tang, managing director at Shanghai-based VC firm Gobi Partners, which manages the Alibaba Hong Kong Entrepreneurs Fund, agreed. "The environment in China is so competitive that it goes through peaks in values and big cycles much faster than anywhere else in the world," he said.

And as Chinese investors start to feel the limits of their domestic market, some of them are itching to explore new paths. Alvin Graylin, China regional president for Taiwan-based smartphone and virtual reality equipment maker HTC, and president of the Virtual Reality Venture Capital Alliance, said: "In the past, Chinese investors were more focused on the local market, but given its stage of maturity, they now need to expand beyond China to find additional growth potential and discover new content and solutions that they can bring into the country."

This trend, added Graylin, was likely to continue as the local investment environment became more fiercely competitive, making investment opportunities overseas increasingly attractive.

The Financial Times recently reported that between January and May 2018, Chinese VCs had, for instance, poured \$2.4bn of investment into Silicon Valley startups – nearly twice as much as the previous year. "I think all Chinese investors and startups, both new and established, are now looking at cross-border opportunities," said Gobi's Tang. "New companies are facing a saturated market where finding your own niche is increasingly hard, while longstanding businesses are thinking of ways to establish their footprint outside China."

This, according to Tang, had given birth to new trends and business models, as entrepreneurs were starting to think of how they could leverage China's strengths abroad, and how they could import the best foreign technology into the country. "China is already looking beyond its borders," Tang added, "and this is very much in line with the country's geopolitical agenda. As the government pushes the Belt and Road Initiative [see below], all the capital and support are going in the same direction – abroad."

Government

All corporate players are adamant – the role of the Chinese government in establishing and solidifying the country's ecosystem over the years has been crucial.

Aiming to reduce the scope of its power and move on from a centralised system in which it controls and owns everything, the state's first commitment to the venture space was the creation of a series of targeted science and technology programs. These were mostly overseen by the Ministry of Science and Technology, the National Natural Science Foundation or the Ministry of Finance.

The first – the Key Technologies R&D Program – was launched in 1982 and was implemented through four successive five-year plans, which are said to have largely contributed to the technical renovation and upgrading of the country's traditional

Top government investors in China 2014-18



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industries. The State High-Tech Development Plan shortly followed, with the intention of stimulating the development of advanced technologies. In 1998, the National Basic Research Program was created to support research in a number of scientific fields, and in 1986, the Spark Program was established to revitalise rural economy through science and technology. Spark reportedly contributed to the execution of 100,000 projects across 85% of China's rural areas.

But the most famous to date remains the Torch Program, largely considered to be responsible for kickstarting China's innovation and startup scene. Managed by the Ministry of Science and Technology, Torch was established in 1998 as a guidance program for developing new and high-tech industries in China. The initiative was also an attempt to increase China's exchanges with the outside world, encouraging industrial and commercial collaborations with foreign partners. Torch played a major part in enhancing China's reputation as a tech hub, having opened up new activity fields such as biotech, electronic information, mechanical-electrical technology and energy-saving technology.

Under the Torch initiative, the government also created innovation clusters in the form of science and technology industrial parks. The first, Zhong Guan Cun Science Park in Beijing, is often thought of as Silicon Valley's Chinese counterpart. By 2015, 53 parks had been set up, hosting a total of 60,000 companies and 8 million employees. According to official figures, three years ago, the parks contributed roughly 7% of the country's GDP and represented 50% of its total R&D expenditure. Earlier this year, the government announced plans to build a \$2.1bn AI-focused technology park in the suburban Beijing district of Mentougou, in keeping with the wider agenda to make China an AI world leader by 2030.

Torch also contributed to the creation of some 30 software parks, and oversees the activity of various entities such as technology business incubators, the seed-focused Innofund, and the Venture Guiding Fund, which is both a fund of funds and a co-investor alongside VCs.

All these initiatives helped China move away from a centralised and state-dependent economic model towards an increasingly open and market-orientated economy. GCV reported last year that while in 2005 private enterprises made up only 5% of the MSCI China stock index by weighted market capitalisation, in 2016, this proportion had risen to 48%, with non-state-owned enterprises (SOEs) now driving wealth creation and economic growth to a much greater extent.

Steve Blank, a Silicon Valley serial entrepreneur who ventured to Asia a few years ago, reported that by the mid-1990s, the founding of domestic VC firms had begun in China with the establishment of local government-financed venture capital firms, followed by university-backed VC firms.

He added: "The perception of venture capital gradually shifted from being a type of government funding to a commercial activity necessary to support the commercialisation of new technology. But it was not until 1998 that corporate-backed VC firms could be established, and that started a wave of VC funds backed by government, corporate and foreign capital."

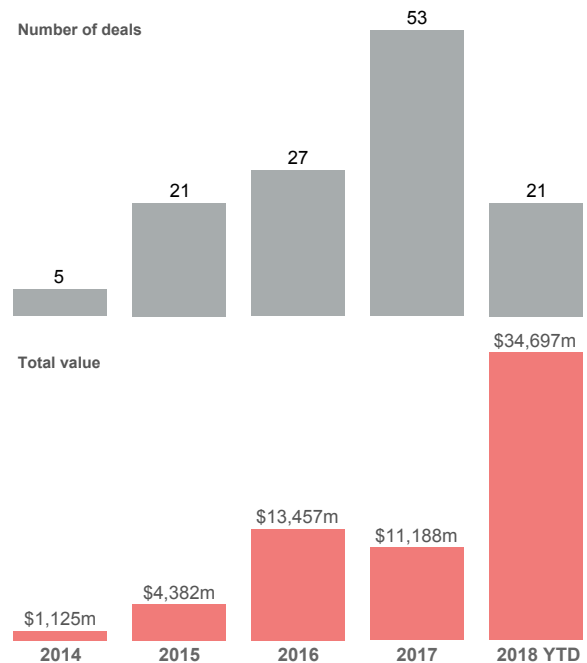
These days, some of the most significant government backers are, for instance, banking and financial services group China Development Bank, National SME Development Fund focusing on small and medium-sized enterprises (SMEs), sovereign wealth fund China Investment Corporation, life insurance group China Life Insurance, or investment holding company State Development and Investment Corporation.

SOSV's Turner said: "A lot of the growth of VC deployment in and out of China – which is faster than anywhere else in the world at the moment – is due to government efforts to encourage entrepreneurship and VC as a means to enable innovation. The series of five-year plans and programs they have been implementing act as great indicators of where the fertile ground is for innovation, and where entrepreneurs and investors alike should focus their efforts.

"For example, if you know that Industry 4.0 is a big national drive, you know that generous funding will likely go into that space both at provincial and state level. This type of stability really sets the ground for great innovation, as people are not taking bets on the marketplace, but on technology instead. It is a great way of diminishing the risk factor in the market."

Ever since taking office in 2013, President Xi Jinping has been pursuing his "China Dream" – a project aimed at rejuvenating the nation and strengthening its position as a world leader. One of his landmark policies has been the estab-

Government-backed deals in China 2014-18



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ishment of the Belt and Road Initiative (BRI), which seeks to expand maritime routes and land infrastructure networks connecting China with Asia, Africa and Europe to boost trade and economic growth in and between those regions.

The BRI, which reportedly oversees projects worth \$900bn, now involves 70 countries with a cumulated GDP of \$21 trillion and a total population of nearly 5 billion – more than half the world.

University venturing

University venturing activities in China began as early as the 1980s, with R&D centres and educational institutions providing the first sources of seed funding for spinoffs. A number of steps by the government contributed to this development. A recent example was the creation in 2011 of the China International Technology Transfer Centre – a government-managed platform in the Zhong Guan Cun Science Park devoted to the promotion of global tech transfers involving universities, research centres, science parks and innovation clusters, as well as public bodies and SMEs.

In 2006, China's former president, Hu Jintao, had already formulated the idea that the country should switch from a "resources-dependent" to an "innovation-driven" economy. The government then released an ambitious plan looking to expand research in a number of fields including biotech, IT and energy. Intending to establish the country as a world-leading science power by 2050, it set a target for annual R&D expenditures of RMB900bn (\$130bn or 2.5% of GDP, compared with 1.25% in 2004) by 2020.

Xu Guanhua, China's former minister of science and technology, declared at the time: "A big economy is not necessarily a powerful economy – China still lacks capability in innovation, particularly in those strategically important areas."

The state also planned a reformed National Technology Transfer System by 2025, whereby the national tech market would become more open and unified, and channels of tech transfer among its various players would be expanded.

With that official agenda having been laid out, Chinese university venturing activity has developed over the past few years. It currently exists in a number of forms. An example of these are the national technology transfer centres (NTTCs) – a Chinese version of the west's university tech transfer offices. Created in 2001, NTTCs are present in a number of institutions, including East China University of Science and Technology, Huazhong Science and Technology University, Shanghai Jiaotong University, Sichuan University, Tsinghua University, and Xi'an Jiaotong University.

Other institutions have adopted different approaches to venture. Hangzhou-based Zhejiang University created a science and technology development and transfer office in the 1980s. It has supported more than 3,000 projects to date, nurturing science and technology partnerships with the government, as well as with foreign and domestic firms.

Beijing University, Fudan University and Tianjin University have also been active in commercialising university-born technologies. Beijing University ranked first among Chinese universities for revenues generated by spinoffs for several years, while Fudan and Tianjin were respectively ranked fourth and fifth in terms of the number of patent applications in the early 2000s.

Other Chinese universities engage in VC through their science and technology parks. Tsinghua University Science Park, commonly known as Tuspark, is said to be the country's largest and one of the largest worldwide. With at least 30 branches across China and three in Hong Kong, Tuspark was established in 1994. Since 2004, it has been operating under the TusHoldings brand, responsible for the development, construction and management of all Tuspark facilities. Currently managing \$5bn of assets and 80 incubators, TusHoldings has helped set up 1,500 businesses to date and holds stakes in 300 private companies.

Through its investment arm Tuspark Ventures, the company also engages in early-stage high-tech funding. Launched in 2001, the VC arm now has \$150m of assets under management, having invested in 40 companies, mostly in the telcoms, biotech and cleantech sectors. Tuspark Ventures has raised 13 funds to date and is currently raising a new one targeting RMB100m (\$14m), according to a source. Each fund typically makes two to four commitments.

Yiqi Liu, investment manager at Tuspark Ventures, said: "Our organisation receives both university and government support and is also involved in industry clusters. This gives us huge advantages and increases our influence over the market." Reflecting on what investors at large could be doing better in China, he added: "It seems to me that investors have been a bit blind lately. They have the capital needed, but they do not quite find the right projects to support. The moral is that we need to have a more focused approach. As investors, especially at university level with the resources we have at disposal, we have a duty to capture and lead the trend."

In 2017, Tuspark launched a program to encourage cross-border collaboration. As a result, the Sino-Israeli and Sino-Italy science parks were created last year. A number of joint ventures were also established with various partners around the world, such as Tuspark Newcastle and Tuspark Cambridge – endowed with £200m (\$262m) – in the UK, and the \$5m InnoSpring seed fund in Silicon Valley.

The Chinese government has been operating a charm offensive with overseas universities in recent years, establishing joint ventures with partner institutions. New York University (NYU) and Shanghai's East China Normal University were the



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first to establish a Partnership in the form of the NYU Shanghai joint research university in 2012. North Carolina-based Duke University co-founded Duke Kunshan University with Wuhan University in the Jiangsu province city of Kunshan. In 2013, Australia's University of New South Wales and Shanghai Jiao Tong University launched the SJTU-UNSW Collaborative Research Fund focusing on biomedical science and engineering, architecture and design, energy and water, and social policy and social sciences. Earlier this year, the two institutions increased the fund's size for the third time in five years.

Following President Jinping's visit to the UK in 2015, a £5m UK-China tech transfer fund was also launched, aiming to support UK businesses and spinoffs suitable for international expansion into China. Oxford University's tech transfer office Oxford University Innovation – which had already established a footprint in the country with its Jinhui International Technology Transfer incubator in 2013 – was appointed as consultant to the fund.

All these initiatives incidentally fit within the plan laid out by the Ministry of Education in 2010, according to which China's education system as a whole was to be modernised and the country's elite universities' level raised to the standard of world-class institutions.

Bo Liu, venture investments principal at Johnson & Johnson Innovation–JJDC, which invests on behalf of healthcare company Johnson & Johnson, said: "I saw a major shift occur in China around 2013-14. There are three essential ingredients to a fully shaped venture ecosystem – entrepreneurial spirit, talented workforce and capital. I believe China now has all three, and these drivers are progressively shaping the economy and people's minds into the startup culture."

Conclusion

China has been striving over the past 40 years to grow into a strong, modern and innovative economy that is open to the world. Having understood what it takes to become the leading global power it strives to be, it has been relentless in its efforts to shape and implement measures that will help it hit its goal. And its pace of progression is impressive.

HTC's Graylin said: "China has been one of the fastest-growing markets globally and will continue to be so for the foreseeable future. Chinese investors will play an increasingly important role in the investment ecosystem globally, as rapid growth and high multiples progressively make global deals feel much more affordable. However, there has been some pressure from local governments to control capital outflow, which means there could be a balancing of the two forces over the coming years."

Meanwhile, Gobi Partners' Tang sees China slowly establishing itself as a key leader and frontrunner on the Asian continent. He said: "For the next 10 years, innovation in the region will be very much China-led. You already see that in sectors such as e-commerce, last-mile logistics or gaming. Southeast Asia is basically 10 years behind China in terms of development, meaning that the cycles that played out in China 10 or 15 years ago are likely now to repeat themselves in those countries. At the moment, we are therefore witnessing large rounds being led by those who once succeeded in China and are now looking to place their bets in these emerging ecosystems."

Commenting on President Xi Jinping's address at the 19th Communist Party Congress earlier this year, the Hong Kong-based Alibaba-owned newspaper South China Morning Post referred to China's "renewed efforts to transform itself from the factory floor of the world into a global innovation powerhouse". These efforts, it seems, have started to pay off. ♦

The Greater Bay Area: Hong Kong and Macau

Last year, the Chinese government announced its intention to roll out the Greater Bay Area (GBA) plan over the next five years, aiming to combine Hong Kong, Macau and the cities of Guangdong's Pearl River delta to create an integrated economic and business hub able to compete with the San Francisco Bay and the Greater Tokyo areas. As of 2017, the GBA had a total population of 67 million and a combined GDP of \$1.34 trillion – 12% of the Chinese economy.

Following GCV's second Asia Congress earlier this year, two industry experts shared their insights on how far the special administrative regions of Macau and Hong Kong have come in the venture space.

Hong Kong: China's gateway to the world

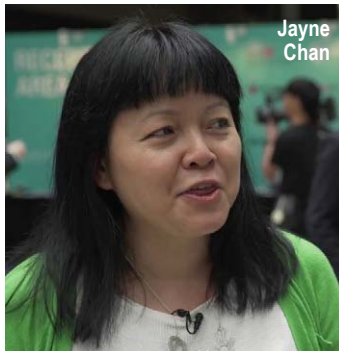
“Jayne Chan is head of StartmeupHK at InvestHK – the government department responsible for attracting and retaining foreign investment in Hong Kong. StartmeupHK is InvestHK's initiative aiming to help founders of innovative and scaleable startups from overseas set up or expand in the Hong Kong region.

For decades, Hong Kong has had a functional role for China, acting as a bridge linking it to the rest of the world. From a geographical point of view, it really is in the centre of Asia, attracting foreign and Chinese investors and entrepreneurs.

The local government has always been proactive in promoting innovation as a strong pillar of the region's economic development. In recent times especially, a range of policies, budget allocations and initiatives have been launched. A significant amount of funding has also gone towards building the infrastructure and spaces necessary for innovation to happen.



INNOVATIVE REGION



Jayne Chan

Hong Kong is also a great in-between place for international candidates willing to get into China. Accessing the Chinese market straight away can indeed cause a huge cultural shock – everything there is done very differently, with a different composition and a different way of doing business, and an extremely competitive environment. In Hong Kong, people have knowledge of both sides of the equation – that is why it makes a good buffer zone.

The region is also home to an international community. A survey we conduct every year regularly shows us that half of Hong Kong’s startup founders are from overseas. This brings a lot of international expertise to the region and has given birth to a savvy local audience that is used to dealing with people from all around the world. The level of inward and outward foreign direct investment in Hong Kong is incidentally one of the highest worldwide [\$104bn in 2017, according to the World Investment Report].

The bilateral exchanges with mainland China are still very much a cornerstone of the region’s economic development. Because of the business-friendly environment that Hong Kong offers, it makes sense for Chinese businesses to set up their offices here. For instance, we offer intellectual property protection, or free access to media that may not be available in China. Our corporate tax is fixed at 16.5% – one of the lowest in the developed world – and has recently been further reduced to 8.25% for the first \$2m of profit.

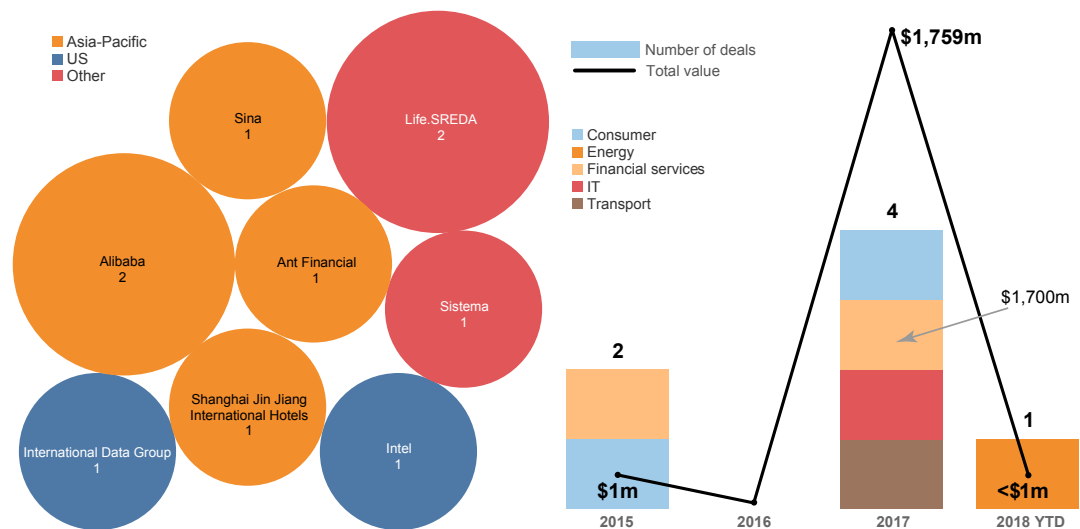
For foreign investors, the privileged relationship that Hong Kong enjoys not just with China but with the Asian continent at large offers a number of advantages too, including preferential tax treatment or free trade.

In spite of all this, the Hong Kong ecosystem can still be considered pretty nascent. Realistically, growth in the venture sector started three or four years ago here, when different clusters started coming together, progressively giving birth to an ecosystem. Because it is so young, it lacks some of the essential components that would make it fully-fledged. One of these components is the corporate venturing side.

Quite a few corporates have set up their headquarters here, but it seems that the focus, especially for local companies, is still very much on property and finance. And even though traditional conglomerates and family offices may have the kind of funds necessary to invest in early-stage technology, they tend to place their capital across a range of different sectors, as opposed to following a defined strategy.

To an extent, investments on behalf of corporates, family offices and conglomerates are already happening in Hong Kong, but getting them to engage into the ecosystem properly will be a hard-fought process.” ”

Top corporate investors in Hong Kong 2011-18 Deals in Hong Kong 2011-18



Macau: en route to a venture gamble?

A recent report from Macau’s Gaming Inspection and Coordination Bureau showed that the region’s gross gambling revenue had climbed by another 17% in August this year, hitting a mind-blowing M\$26.6bn (\$3.3bn) after 25 consecutive months of growth.

Earlier this year, the International Monetary Fund ranked the region’s GDP per capita second worldwide, at \$122,489 just behind Qatar’s \$128,702, adding that the city-state known as “the Las Vegas of the east” was likely to overtake its



INNOVATIVE REGION

Middle Eastern contender by 2020.

In a place where, in the words of Blair Zhang, founder and executive chairman of the Hong Kong branch of the Compass Innovation Alliance entrepreneur platform, “nothing is related to innovation, because money comes too easy”, what kind of future can be envisaged for venture?

Aidan Chuang, chief operating officer at Macau-based investment group Marlin Investment, gave his point of view.

“There are two key features to remember when one considers Macau as a potential venture market. One is that as a side-effect of the gambling industry, its small population of 630,000 enjoys one of the highest GDP per capita in the world. This means that in theory, there is enough capital to support a venture ecosystem here. Second is the fact that, similarly to Hong Kong, Macau benefits from a special political status, which gives it a certain amount of freedom and independence from mainland China and makes it a relatively international and open place. From these perspectives, I would say Macau has great potential for becoming a venture hotspot.

But of course, there are some challenges too. First and foremost, the overwhelming weight of the casino industry in the local economy [\$28bn or 70% of Macau's GDP in 2017] leaves little space for other sectors to develop. There are other industries, such as tourism – which is often gambling-related anyway – but the rest of the activity remains derisory. This also means that a large part of the workforce [around a fifth, according to recent estimates] is involved in that industry. In addition, casino staff tend to enjoy higher pay and stronger job security than in other sectors, which gives youngsters little incentive to try to engage in other riskier types of activity.

Finally, the small population size means human resources and access to talent are limited. This, coupled with a low level of knowledge-worker immigration, makes the creation of industry clusters very difficult. As a result, potential entrepreneurs are actually more likely to move to the nearby cities of Shenzhen or Hong Kong, where ecosystems already exist, than to stay here.

The reality is that Macau is still in the very early stages of shaping up a startup ecosystem. Especially when it comes to corporate venturing, I would say it is at toddler stage.

However, things are slowly beginning to move. The government has started laying some foundations, having, for example, launched the local incubator Parafuturo de Macau Investment and Development, which recently received a M\$12.6m investment from the state-owned Industrial Development and Marketing Fund. Inspired by the Belt and Road Initiative, the city-state is also looking to use its Portuguese heritage to promote cooperation between China and Portuguese-speaking countries. Local young people are starting to take an interest in entrepreneurship too, with initiatives such as the yearly Startup Weekend Macau [modelled on the Techstars startup weekends in the US].

I believe the key to Macau's success as a venture market will be to understand its strengths, and use them to its own advantage. For example, instead of the trending blockchain or artificial intelligence (AI) technologies, the focus should rather be on the strong sectors of tourism and gambling, trying for instance to introduce smart casino technology in the region. If Macau picks the right industries and the right direction for innovation, developing a venture activity here could become worthwhile and profitable.

Perhaps another thing we are still missing here, is the influence of some role models – some successful startup founders, or some Macau-born unicorns [companies worth at least \$1bn] that could inspire young people, and encourage them to go down the entrepreneurial path.”

Last year, Alibaba announced it had entered into a four-year strategic partnership with the government of Macau to support its transformation into a smart city, aiming to use cloud computing technologies to serve local residents and tourists. Six priority areas were fixed for the first phase of the partnership – cloud computing, smart transportation, smart tourism, smart healthcare, smart city governance and talent development.

The agreement marked Alibaba's first smart city foray into a market outside mainland China, and was set to build on the success of similar past ventures such as the City Brain AI project in the Chinese city of Hangzhou. The internet behemoth said it could consider a future collaboration with Hong Kong, where the government has already been experimenting with the smart city concept in the Kowloon East area for the past two years. ”

CONFERENCE REVIEW: VENTURE HOUSTON, TEXAS



Edison Fu and Kaloyan Andonov, reporters

Mayor Sylvester Turner gives his keynote speech

Houston mayor Sylvester Turner opened the two-day GCV Venture Houston conference last month, welcoming more than 200 participants to the city of Houston, Texas, the seventh largest economy in the US and 26th largest in the world. Dubbed the “global knowledge capital”, the city has a vibrant ecosystem for startups with more than 500 technology startups in consumer and business service, data analytics, software development, healthtech, spacetechnology and cleantech.

Turner said Houston was now the fourth-largest city in the US, one in 10 of whose residents were foreign-born, representing more than 145 languages. This diverse population contributed to an exciting framework, allowing the city to customise itself to cater to entrepreneurs and investors.

Barbara Burger, president of Chevron Technology Ventures (CTV), the 20-year-old strategic investment arm of oil and gas producer Chevron, spoke about the future of energy innovation. Having launched a \$100m future energy fund in June this year and being a Luminary member of the GCV Leadership Society, CTV is an active agent in the innovation ecosystem in Houston.

She said that although CTV’s parent Chevron is headquartered in California, it had more employees and contractors based in Houston than in any other place in the world. Burger said innovation in technology in the oil and gas industry required change, such as more digitised value chains and energy efficiency. As a result, CTV had a much greater interest in engaging with external innovation, particularly in the digital arena, and Chevron was increasingly leveraging from technologies developed by its innovation unit.

In today’s world, Burger emphasised: “Status quo is not acceptable – change is the new norm.”

James Mawson, editor-in-chief of Global Corporate Venturing, Global University Venturing and Global Government Venturing, led a discussion on universities as a driver of US venturing and innovation with Julie Goonewardene, chief innovation officer of the University of Texas (UT) System.

A doyenne in technology commercialisation and company formation, Goonewardene said she oversaw the university’s dealings with intellectual property and startups. UT System, with 14 universities and health science centres, linked key elements needed to start a company – money, people and ideas. She said: “At university, there are plenty of ideas, but we need to find ways to help our people with money, training and matching.” An example was UT Connects Talent, which brought together job-seeking students and entrepreneurial companies.

Like Turner, who highlighted diversity in the entrepreneurial realm, Goonewardene said Texas governor Greg Abbott also sought to make Texas the number-one US state for women-led startups. She said she had started her career as an IT entrepreneur and built a software company, so she was aware it could be more challenging for women to start a company, particularly funding, which was largely relationship-based. She thought it was imperative to help women raise



CONFERENCE REVIEW: VENTURE HOUSTON, TEXAS



Doron Benn-Meir and Erika Smith



Barbara Burger, Chevron

capital in a male-dominated field.

Goonewardene then explained the organisations associated with the university. University of Texas Investment Management (Utimco), the investment arm of the University of Texas, had a \$46bn endowment and invested solely for financial return. It allocated approximately \$2bn a year to private equity and large funds but also made direct investments. She said Utimco was well-run and successful.

UT Horizon Fund, on the other hand, had started in 2012 as a dual-purpose fund and was run by the UT System. It was designed to generate positive returns, but it also advanced commercialisation by collaborating with companies much earlier. Unlike many university-affiliated funds, the fund had crossed to the public market to support its portfolio companies and also conducted multiple rounds. The fund invested from \$100,000 to a few million per round.

Having co-invested with Microsoft's venture fund M12 and Intel Capital, the venturing subsidiary of the semiconductor and data technology provider, Goonewardene concluded that CVCs and universities should define what "early" meant, as the word often carried different connotations in mixed contexts.

The general session at Venture Houston then hosted a series of presentations focused on how CVC has driven cross-industry collaboration and technology uptake. The session featured speakers from CVC-backed enterprises and was moderated by GCV contributing editor Tom Whitehouse. These startups showed how they had developed technologies and solutions at the intersection of data and energy and had received corporate backing.

Steve Sliwa, CEO of Seeq, was introduced by Kemal Anbarci, managing executive at Chevron Technology Ventures (CTV), the corporate venturing arm of US-based oil and gas major Chevron. Anbarci noted that Seeq was CTV's 78th investment and an enterprise IT solution adopted by Chevron and implemented in just 10 days.

Sliwa's talk stressed the need for advanced analytics for process industries, ranging from oil and gas to food and beverage manufacturing. Sensors employed by those industries collected vast quantities of data, which necessitated proper visual analytics tools. Big data from industries did not work well with traditional time series or spreadsheet tools, so process engineers in charge of streamlining production and reducing costs were left behind. He said Seeq built tools enabling analysis and reporting which could be integrated with other tools enterprises may have. Sliwa also said Seeq had tripled its subscription revenue after Chevron's investment and significantly increased its customer base.

Brian Ballard, CEO of Upskill, a developer of a software for augmented reality devices used in manufacturing, was introduced by Kash Siddiqui, senior principal at Accenture Ventures. Ballard said Upskill's product was designed to help increase the skillsets of modern blue-collar industrial workers. The company believed augmented reality would bridge the gap between the physical and digital world in manufacturing. Ballard's presentation included a video on how Upskill's technology was used in the wire manufacturing process for Boeing aircraft.

Kevin Duffy, vice-president of business development at FogHorn, developer of an industrial internet-of-things (IoT) analytics application developer, was introduced by Lee Sessions, managing director at Intel Capital, venturing arm of US-based chip and semiconductor manufacturer Intel. Sessions said he co-invested in FogHorn with oil and gas major Saudi Aramco, US-based industrial product and software producer Honeywell, industrial conglomerates Robert Bosch and General Electric, among others. Duffy spoke mostly about "edge intelligence", after noting his company has raised around \$50m.

He said overwhelming amounts of data generated by industries had to be sent from oil rigs to headquarters via the cloud for analysis. He said the main idea behind edge computing was processing data locally. FogHorn worked cooperatively with all cloud services and applied machine learning. Duffy gave examples of how FogHorn's solution had been used for processes from early pump failure detection through wellhead performance monitoring to windfarm output forecasting.

CONFERENCE REVIEW: VENTURE HOUSTON, TEXAS



**Erika Smith's
healthcare panel**



**Julie
Goonewardene,
UTS**



**Kash
Sedequi,
Accenture
Ventures**

Dan Piette, CEO of Bluware, was introduced by Kirk Coburn, investment director of Shell Ventures, a corporate venturing arm of Anglo-Dutch oil and gas major Royal Dutch Shell. Piette said Bluware provided a data compression solution for the oil and gas industry. He said the way data were stored allowed them to be analysed via machine learning.

The following session was introduced and moderated by Neil Foster, partner at Baker Botts, a Texas law firm and a sponsor of Venture Houston. Advanced mobility solutions were presented by CVC-backed and emerging businesses.

Stephen Voller, CEO of Zap&Go, a UK-based graphene supercapacitors-based charger developer that provides fast charging for phones, tablets and electric vehicles, said the company's chargers were made using innovative nanocarbon materials and proprietary electrolytes that produced a fast and durable power module with cordless charging facilities.

Antonio Vitti, chief financial officer of Peloton Technology, a US-based automated car technology developer, said his company's aim was to improve freight transport. Heavy vehicles were linked in a tightly-knit formation through radar-based active braking systems and vehicle-to-vehicle communications to boost safety and reduce fuel costs. With most funding coming from strategic investors, the company raised \$65.31m in series B1 and B2 rounds led by Omnitracs in 2017 and other participants included BP Ventures, Intel Capital and others.

Boris Maslov, director at Russia-based cargo-carrying platform developer ARDN Technology, said his team had developed a novel flight control system for drones. More than 30 technical experts were involved in the development of the platform, performing tests and implementing prototype improvements.

Kaz Uchida, from Japan-based mineral resources and metal products provider Mitsubishi Corporation Metals Group's venturing unit, presented on behalf of the group's Israel-based portfolio company SoftWheel, which has developed a smart wheel automotive system. Established in 2011, the company's technology incorporated an adaptive in-wheel suspension system for wheelchairs, cycles and automotive industries.

After these presentations, the main stage hosted a panel discussion on healthcare, focused on living better and longer. The session was moderated by Erika Smith, CEO of ReNetX, a therapeutics developer for spinal cord injury, stroke recovery and Alzheimer's disease.

The panel included Thomas Luby, head of Johnson & Johnson JLABs, an incubation program of the pharmaceutical producer, Ferran Prat, senior vice-president of research administration and industry relations at the MD Anderson Cancer Centre, Koji Murota, president and CEO of Kyoto University Innovation Capital, the tech transfer office of Kyoto University, and Doron Benn-Meir, vice-principal of enterprise at the University of Melbourne and director of BioCurate.

The panel discussion initially focused on challenges in making university-generated intellectual property (IP) in life sciences. Panellists agreed that university innovation was discovery-oriented and deficient on market and commercial orientation. However, as Luby pointed out, the healthcare and pharmaceutical industry was looking to increase its minority holdings of externally generated medical innovation, so the opportunities were significant.

All panellists concurred that developments in regulatory environments concerning IP and university-driven innovation had had no significant impact in recent years.

Panellists also discussed new technologies with the potential to be revolutionary in healthcare. They said promising areas for a significant breakthrough were advances in therapeutics for neurodegenerative diseases in old age, the datafication of healthcare and life sciences, cancer treatments and precision medicine – the combination of genomics and traditional therapeutics.

Rosemarie Truman, founder and CEO of the Centre for Advancing Innovation, said research had shown that the US, the UK and the EU would lose all innovation leadership positions by 2029. She said they had already lost the lead in number

CONFERENCE REVIEW: VENTURE HOUSTON, TEXAS



Kaz Uchida, Mitsubishi Metals



Kemal Anbarci, Chevron



Lee Sessions, Intel

of patents and grants. While these economic actors had a negative or near-zero growth rate in producing quality patents for the past two decades, China, Singapore, Brazil, Israel and India had high-quality patents from 2005 to 2015.

Truman added that although the US spent a considerable amount in research expenditure relative to its GDP, R&D spending was not driving its GDP growth. However, she said hope lay ahead as venturing in startups contributed to more efficient patent usage and better patent effectiveness. She concluded that the centre's rigorous due diligence and capital-efficient management models served to accelerate startups for excellent investor returns.

Brian Richards, managing director at Ireland-headquartered professional services company Accenture, had a conversation with Russ Capper, executive director at Houston Exponential, a program that drives Houston's innovation economy development. Capper said Mayor Turner's Innovation and Technology Task Force, the Houston Technology Centre and the Greater Houston Partnership's Innovation Roundtable had joined forces to create the HX Venture Fund to strengthen Houston's innovation initiatives and convert the region into one of the top 10 startup ecosystems by 2022.

On the second day of the conference, its co-chairman Tom Whitehouse, contributing editor at Global Corporate Venturing gave an update on energy venturing. When low-carbon and cleantech bubbles burst in 2008, promises to solve environmental questions had been unkept. Few VCs and corporate VCs stuck with the field until things changed more recently. Now, the low and zero-carbon companies and their technologies were backed by traditional energy industries and they collaborated with each other rather than compete.

In the first session, Oleg Mikhailov, partner and managing director at management consultancy Boston Consulting Group, introduced and moderated a panel discussion on how robots worked with energy.

Nick Radford, chief technology officer at US-based engineering applications robotics systems developer Houston Mechatronics, said the company's robotics and mechatronics technology employed technologies directly from the laboratory and built integrated hardware and software systems with state-of-the-art engineering. These systems would improve electric motors and provide greener and more efficient solutions in automation, he said.

Julian Ware, general manager at Canada-based autonomous car technology developer Clearpath Robotics, said that with his company's technology, software-controlled vehicles worked with people to provide a better and smoother material transport operation.

Alexei Poluboyarinov, CEO of US-based autonomous mobile robots manufacturer SMP Robotics, said his company's autonomous mobile robots were powered by solar energy. Having already secured 10 patents, its focus was on commercialising robots in the energy sector, such as gas leak inspection robots.

Vaseem Khan, vice-president of global engineering at US-headquartered engineering, construction and installation provider McDermott, said his company worked mainly with the oil and gas industry, providing infrastructure and technology solutions. Khan helps push McDermott's efforts to digitise the energy industry.

In the second session, moderated again by Tom Whitehouse, venture-backed digital, IoT and big data businesses gave short presentations on their respective companies.

Gene Dolgin, vice-president of strategy at US-based weather prediction technology developer ClimaCell, said his company employed sensors from wireless and IoT networks, instead of conventional radar-based systems, to detect weather conditions in a specific environment at lower latitudes. Autonomous vehicles, drones and aviation industries were said to be the primary beneficiaries of this system. Airline operator JetBlue, apart from being an investor in its series A and B rounds, is also a customer.

Sanjay Bhatia, vice-president of finance at US-based DNA sequencing and data science services provider Biota, said the company's DNA sequencing and data science services offered production profiling, sweet-spot identification and

CONFERENCE REVIEW: VENTURE HOUSTON, TEXAS



Neil Foster speaks



Nicola
Broughton
and James
Wilkie

reservoir connectivity. Its technology offered an improved reservoir production and reduced environmental impact.

They concluded that the digitisation of energy had barely begun.

In the following session, Glenn Vonk, director of business development and alliances at the National Council of Entrepreneurial Tech Transfer (NCET2), introduced university startups involved in federally funded R&D.

Jeff Xu, founder, president and CEO of US-based solar-powered energy and wellness management systems developer Leaptran, gave a presentation on how the company's system utilised machine learning, visualisation software and customised hardware platform to enhance investment return and asset management.

John Griffin, CEO of zero-carbon low-cost electrical power solution provider Terracoh, described the company's carbon dioxide plume geothermal (CPG) technology, through which carbon dioxide is transformed to a geologic working fluid. Terracoh's systems allow negative emission power production and affordable energy storage, and convert underproductive elements into clean energy.

Arun Gupta, founder and CEO of US-based solar concentration platform developer Skyven Technologies, said the company utilised its "intelligent mirror array" technology to harness sunlight to create thermal energy.

Dave Goebel, CEO and founder at the University of Minnesota's spinoff Enverde, said his company generated energy using waste, including livestock manure, food manufacturing detritus and plastic garbage.

Stephane Meystre, CEO of US-based online healthcare platform developer Clinacuity, illustrated a system for de-identifying clinical notes in the electronic health records to facilitate confidentiality.

After the morning break, the main stage featured a fireside chat on corporate venture investments whose focus was on combining corporates around single-mission venturing strategies. The featured speakers in the conversation were Jeff Peters, principal at Autotech Ventures, and Guillermo Borda, managing partner at HX Venture Fund. Both Houston-based venture firms have several corporates among their limited partners (LPs). They target promising emerging enterprises in the advanced mobility space.

HX Venture Fund pools money from corporate investors in Houston and invests in VC firms outside the city and Texas to encourage them to invest in startups in Houston from the mobility space. This model, as Borda said, had already been successfully applied in Michigan.

Autotech Ventures, on the other hand, as Peters explained, was "becoming smarter by leveraging technical expertise from corporate LPs" while creating an ecosystem around transportation. Both speakers agreed that while there were challenges in bringing corporates together and generating positive synergies among them.

Valery Krivenko, chairman of Angara Industries, spoke of fusing smart chemistry with the industrial IoT. Angara Industries claims to be using data-powered smart chemistry to clean expensive industrial equipment. Sensors enable clients to carry out cleaning without shutting down an entire plant.

In the following session, Neil Foster, partner at Baker Botts, introduced and moderated the presentations by venture-backed and emerging businesses with cyber and cloud solutions.

David Drescher, CEO of US-based control system cybersecurity platform provider Mission Secure, said his company offered cyber-visibility and endpoint protection for operational technology. The platform was networked and could be managed by a non-IT professionals.

Jeff Faris, sales executive at US-based cybersecurity technology developer Synack, introduced cybersecurity platform



CONFERENCE REVIEW: VENTURE HOUSTON, TEXAS



Russ Capper and Brian Philips

Rosemarie Truman



Crowd Security Intelligence, which was crowdsourced and devised by a network of ethical hackers. The company aimed to help organisations fix security holes in their digital assets before criminal hackers could exploit them.

Ugur Tigli, chief technology officer at US-based cloud storage software developer Minio, talked about an open-source cloud system provided by the company for data storage to avoid unstructured data growth. Developers could build cloud storage-based applications compatible with major public and private clouds.

Paul Dietz, director of regional sales at US-based IT monitoring software developer ScienceLogic, said his company facilitated IT management for resources, services and applications. The company's platform allowed users to navigate public cloud migration and explore the interrelationships between hybrid IT assets.

The first afternoon session was introduced by Tom Whitehouse and moderated by Temple Fennell, co-founder and managing director at Clean Energy Ventures. It touched on the theme of low carbon and how venture-backed emerging businesses sought solutions. Fennell said his firm, a US-based angel investment fund, backed early-stage clean energy firms and provided management support and mentoring to portfolio companies.

Matt Stevenson, chief financial officer at Canada-based carbon capture technology developer Inventys, discussed the company's technology which focused on lowering the cost curve of carbon dioxide captures from industrial fuel gas streams with a rotary absorption machine.

Keith Guerrini, vice-president of business development at BP Ventures-backed commodities digitisation platform developer Xpansiv, showcased the company's platform which used big data and distributed ledger technology to help commodity producers discover the value behind operational data through visualisation and analytics.

Joe Zhou, CEO of US-based grid-scale energy storage systems developer Quidnet, said his company's mission was to produce a carbon-free electric grid. The system would store water under pressure for use in generating hydroelectricity.

Trevor Best, CEO of US-based plasmonic photocatalytic reactor developer Syzygy Plasmonics, said his company had developed a chemical reactor driven by light, aimed primarily at fuel cell vehicles.

Tim Latimer, CEO of US-based clean energy technology developer Fervo Energy, said his company generated power from enhanced geothermal systems. He said Fervo had raised funds from Breakthrough Energy Ventures, a US-based VC firm funding cleantech companies, and was partnering Schlumberger, a natural resource drilling services provider.

In the second afternoon session, Satish Rao, partner at US-based management consulting firm Clareo, introduced a fireside chat on new venturing approaches to startups.

Wal Van Lierop, managing partner at Canada-based VC firm Chrysalix Energy Venture Capital, said his firm focused on early-stage financing for the nuclear fusion, smart mining and solar steam generator sectors and invested strategically in robotics and automation companies. An example was portfolio company MineSense which had all the criteria – "a little bit of hardware, data analytics and a new business model".

Taylor Shin, director of ventures and growth at General Electric-backed oil services company Baker Hughes, said his company provided products and technology for drilling and production in the oil and gas industry which used digital solutions to reduce both environmental footprint and cost.

The final session of the program featured several strategy and technology-themed roundtable discussions introduced by Paul Morris, chief investment officer of the VC unit at the UK government's Department for International Trade. Participants debated themes related to term sheets, strategic technology deployment, water challenges and new corporate venturers in energy and mobility. ♦

CONFERENCE REVIEW: GCV SYNERGIZE, NEW YORK



Ken Gatz of Proseeder and Reese Schroeder of Tyson



David Horowitz of Touchdown



Scott Lenet of Touchdown

Articulating strategic value is the top challenge for CVCs

Tim Lafferty, chief operating officer, Global Corporate Venturing



In preparation for the Global Corporate Venturing Synergize conference in New York last month, Touchdown Ventures, the manager of more than a dozen corporate venturing programs, asked GCV Leadership Society members to rank their most important current issues.

This list was then used to prioritise the agenda of the conference and assemble case studies to address those challenges. At the top of that list was “articulating strategic value to senior executives at the corporation”.

BP’s measure of strategic value is cash generated by portfolio companies, as reported by the business units. Meghan Sharp explained that some of those, the so-called wildcats in “Horizon 3” that form around 10% of BP’s investments, could take as long as 10 years to become commercial and so may not yet generate cash, but that is accepted. Next year BP plans to double its venture investments to \$200m a year.

Reese Schroeder, head of food producer Tyson Foods’ venture unit and formerly head of Motorola Solutions Venture Capital, said his strategic measure was the level of collaboration between the business and the portfolio companies.

Ulrich Quay, head of BMW i Ventures, the venture unit of car maker BMW, believes in the value of telling success stories. And while BMW i Ventures does not ask for permission from business units to make investments, they are consulted. He said: “We don’t just throw things over the fence. If we did that, they wouldn’t buy in.”

The second and third most important challenges revealed by the survey were “executing commercial relationships with startups” and “adding value to portfolio companies”. Bharat Rajaram, head of ventures at insurance company Aflac, said Aflac has commercial relationships with six of the 11 companies in its portfolio, since investment started in early 2017.



CONFERENCE REVIEW: GCV SYNERGIZE, NEW YORK



Darcy Frisch of Hearst and Fenwick's Ian Goldstein



Mike Lohnert of Boeing



Ulrich Quay of BMW and Tracy Isacke of Silicon Valley Bank

Ian Goldstein of Fenwick and Raj Singh of JetBlue



Intel Capital, the corporate venturing unit of the semiconductor manufacturer, helps its portfolio companies by holding customer days where the firm introduces selected portfolio companies to Intel customers who face specific technology challenges.

The conference was opened by David Horowitz, co-founder and managing director of Touchdown Ventures, who set the scene with his opening remarks. His presentation included some findings from research Touchdown conducted in 2017 that indicates that US public companies with a venture capital practice grew their stock prices faster than their listing index.

Horowitz was followed by Darcy Frisch, co-chairwoman of GCV Synergize and a 19-year veteran of media company Hearst's venture unit, who has seen several economic cycles. In a fireside chat with Ian Goldstein, partner at law firm Fenwick & West, she explained that a downturn was the best time to invest as "the good will survive and valuations are lower".

Scott Lenet, a co-founder and president of Touchdown Ventures, summarised each session, including using the Japanese poetry format of haiku. For example, the following was written by him on the fly as part of his summary of Ulrich Quay's talk:

*It would be stupid
To neglect business units
During diligence*

GCV coordinated two events the day before GCV Synergize, both at the new offices of Fenwick & West in mid-town Manhattan. A Women in Venture lunch, hosted by Fenwick & West and supported by Silicon Valley Bank was followed by a meeting of the GCV Leadership Society which explored new ways to help the community. ♦

GOVERNMENT HOUSE

In-Q-Tel's expansion reflects geopolitical realities

James Mawson, editor-in-chief



In-Q-Tel, the strategic venture investment unit of the US intelligence services, has opened its first international offices and hired Peter Tague as executive vice-president from bank Citi. Tague will lead the international investments teams to be based in London, UK, and Sydney, Australia.

He was previously vice-chairman and co-head of global mergers and acquisitions at Citi and he follows a number of former investment bankers into the strategic venture industry in recent years, including Chris Bartlett, head of Verizon Ventures, Wendell Brooks, head of Intel Capital, and Vicente Vincent, head of Deutsche Telekom Capital Partners.

In-Q-Tel said in a statement: "Our core strength is our ability to identify and deliver insights and access to new commercial technologies on behalf of our government partners in the intelligence and national security communities. Innovation knows no boundaries, and a physical presence is a continuation of our efforts to obtain a better understanding of technology and market developments outside the US.

"These offices will take advantage of the world-class science and technology, and venture capital ecosystems available within each region to continue In-Q-Tel's national security mission for the US and its allies. These offices will support a partnership between US, UK and Australian intelligence and national security communities."

Separately, Andre Lanata has joined as head of the North Atlantic Treaty Organisation Allied Command Transformation unit to find startups to help the alliance pick up the pace of innovation. This month 10 startups and small companies gave the unit the third of a series of pitches. The latest in the series was looking for ways to defeat large clusters of airborne and land-based drones in a challenge won by Belgium-based ALX Systems.

Other western government agencies, such as the UK's GCHQ intelligence agency, have set up cyber-security accelerators, while VC firms, including C5 Capital and GovTech, have raised funds targeting government and security.

All these moves reflect the impact technology is having on existing military theatres – air, sea, land and space – as well the increased recognition of the emerging fifth – cyber – to disrupt and alter the balance of military power. In a rapidly-changing sector, taking lessons from strategic corporate investors and applying them to military fields makes sense.

US concerns about China's military-industrial complex and Russia's disruption and expansionist methods mean it is no coincidence that the UK and Australia were chosen for In-Q-Tel's new bases.

A new book – *Unrivaled*, by Michael Beckley, a political scientist at Tufts and a fellow at the Kennedy School – is sanguine that the US's "unipolarity is not guaranteed to endure but present trends strongly suggest it will last for many decades".

But the book ignores the challenge even a unipolar power will have in tackling multiple crises. Victory is rarely seen in a dramatic battle or denial of core services, such as the electrical grid, but in incremental pushes to limit freedom of movement and power projection into others' perceived areas of control, whether that is parts of central Asia and eastern Europe, the horn of Africa or the 3.5 million square kilometres of the South China Sea.

Ultimately, while In-Q-Tel can help with tactical disruption, the battle is likely to be won or lost before any shots are fired or viruses sent. As Jeffrey Sachs and Robert Kagan argue in their new books – respectively *A New Foreign Policy* and *The Jungle Grows Back* – avoiding isolationism – US exceptionalism or being first – is sensible. There is a reason after two world wars that some of the finest politicians in the US chose to build a liberal order of nation-states bound by treaties and international institutions, favouring democracy, capitalism and the rule of law.

If In-Q-Tel's move abroad indicates a desire for more of "a partnership between the US, UK, and Australia" then so much the better. ♦



UNIVERSITY CORNER

It's not about the money

Lessons from the GUV Summit in Houston, Texas, this month

Thierry Heles, editor



University venture fund leaders and tech transfer professionals from all over the world gathered in Houston, Texas, earlier this month for the GUV Summit, run in parallel with the Venture Houston conference held by our sister publication Global Corporate Venturing – with many interesting crossover panels over the two-day event.

Houston mayor Sylvester Turner opened the conference – singing the praises of a city that has thrived thanks to large numbers of highly-skilled immigrants and an ecosystem that has grown beyond its traditional focus on oil and gas – before Julie Goonewardene, chief innovation officer of University of Texas System joined editor-in-chief James Mawson on stage for a fireside chat.

Goonewardene holds several other positions at the university, such as managing director of university venture investor UT Horizon Fund, leading her to recall one of her early mentors saying: “One of the rewards for good work is more work.”

The UT Horizon Fund was designed to generate financial return but importantly, Goonewardene said, its mission was also to advance commercialisation – a theme that recurred throughout the summit. She noted that, particularly in regard to healthcare spinouts: “You do not just save the patient, you save the family, their kids – you save everyone. It is critical for a public university to do this kind of work. We are servants of the public.”

The fund typically invests from \$100,000 to several million dollars, with the opportunity to provide follow-on funding. Goonewardene said she was proud of the fund's efficiency, with a process to decline deals within four weeks or commit capital within eight to 12 weeks. The fund has celebrated a handful of exits, both flotations and acquisitions.

With more than 200 people in the room, many of them corporates, Goonewardene took the opportunity to call on corporate venture capitalists to define what they mean by “early stage” when they are passing on investments. To academics, she said, “early means they have an idea and will conduct an experiment, or they need to reduce the manufacturing costs from a prototype”, making it difficult to find common ground with corporates. “We need a common definition of ‘early,’” Goonewardene concluded.

The main stage then turned its attention to the corporate world, led by Tom Whitehouse, senior adviser, energy and mobility, for Global Corporate Venturing and chief executive of consultancy Leif Capital, before welcoming more university discussions later in the day, beginning with one that took on the challenges of the healthcare sector.

The panel discussion focused specifically on living better and longer lives and was moderated by Erika Smith, CEO of



Julie Goonewardene talks to GUV editor-in-chief James Mawson



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Led by Erika Smith, far right, Koji Murota, Ferran Prat, Doron Ben-Meir and Thomas Luby discuss healthcare

ReNetX, a therapeutics developer for spinal cord injury, stroke recovery and Alzheimer's disease.

The panel included Ferran Prat, senior vice-president of research administration and industry relations at the MD Anderson Cancer Centre; Koji Murota, president and CEO of university venture fund Kyoto University Innovation Capital; Doron Ben-Meir, vice-principal of enterprise at University of Melbourne and director of BioCurate; and Thomas Luby of JLABs, an incubation program of pharmaceutical firm Johnson & Johnson.

The discussion focused initially on challenges in developing university-generated intellectual property (IP) in the life sciences realm. Panellists agreed that innovation in university was discovery-oriented and deficient on market and commercial orientation.

However, as Luby pointed out, the healthcare and, in particular, the pharmaceutical industry was looking to increase its minority holdings of externally generated medical innovation, so the opportunities were significant. This also led to the observation that institutional VCs had lost out on the sector – by the time they were willing to invest, spinouts had nothing to gain from them as corporates had already provided cash and, importantly, expertise.

All panellists agreed that developments in regulatory environments concerning IP and university-driven innovation had exerted no significant impact in recent years.

The panel also discussed new technologies with the potential to be game-changers in healthcare, citing areas such as therapeutics for neurodegenerative diseases in old age, precision medicine, cancer cures and datafication of healthcare.

Rosemarie Truman, founder and CEO of the Centre for Advancing Innovation, a consultancy specialising in tech transfer, concluded the first day's university sessions with a keynote speech on the innovation arms race – warning that the west was losing out to its peers in the east.



Rosemarie Truman's keynote address brings the first day to a close

She said she had found declining quality and efficiency in patent filing in both the US and the EU, with China set to surpass the US in R&D spending and GDP growth by 2035.

The gala dinner featured not one but two awards ceremonies. After Whitehouse named US-based big data analytics developer Maana as GCV's inaugural Energy-tech Investment of the Year, GUV editor Thierry Heles took the stage to reveal the top 25 leaders on the GUV Powerlist 2018, an industry-first ranking of university venture fund leaders.

Jim Wilkinson, chief financial officer of Oxford Sciences Innovation (OSI), won first place, with the award collected by his colleague Matt Perkins, chief executive of tech transfer office Oxford University Innovation (OUI), which works closely with the fund, on Wilkinson's behalf (see more Powerlist pictures overleaf).

The second day was kicked off by Karin Immergluck, who became head of Stanford University's office of technology licensing five months ago. Immergluck, previously with University of California San Francisco, summed up her initial impression, declaring: "It has been a wild ride."

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Matt Perkins gives a thank you speech on behalf of Jim Wilkinson, Inset

Immergluck provided an overview of the Stanford ecosystem, explaining how the university supported entrepreneurs through dozens of initiatives, including several that are internationally renowned, such as accelerator StartX.

She said: "There can never be enough entrepreneurship education and training. Students have different needs than faculty."

A total of 40,000 active companies could trace their origin to Stanford, she said, and between them they had generated \$2.7 trillion in annual world revenues. Arguably the most famous company to emerge from the institution to date was internet company Google, which gained the support of Immergluck's predecessor Katharine Ku when co-founders Larry Page and Sergey Brin were unable to convince anyone else of their idea.

It was no surprise, Immergluck noted, that 55% of students chose Stanford for its entrepreneurial brand.

Matt Perkins followed with his keynote speech on what makes Oxford unique as a university and a city. Picking up on the idea that university venturing really is not about capital, he said: "OUI is not there to make money for the university, that is not our remit. It is about creating impact."

Nevertheless, OSI with its \$800m firing power had been a real boon for the ecosystem.

"Oxford does not change very quickly, but it has survived for 900 years," Perkins continued, revealing that OUI had significantly increased its spinout rate and was set to generate another 10 companies a year on top of its current average of 20 thanks to a new social sciences program launched a few months ago led by

Mark Mann. The increasing number of spinouts has led to an interesting challenge, as Perkins noted they were struggling to find office space in the small city.

Perkins also observed a key difference from Immergluck's approach: "I was surprised to hear Karin say their mission is to exit as quickly as possible. At Oxford, it is: hold on to shares until all hell freezes over. But we are starting to sell some."

Admitting a certain admiration for Oxford's historic rival Cambridge University, Perkins concluded: "Oxford has a tradition of excellence. We are not scared of competition, we enjoy it."

Koji Murota then returned to the stage to provide an overview of KU-iCap, a university venture fund born out of a Japanese government initiative in 2013 to allow public institutions to invest in their own spinouts.

Murota cited the example of stem cell research firm iPSC as a success story for the university, with its technology having an impact on a wide range of healthcare sectors such as cancer treatments and, through spinout Cuorips, on heart disease.

He drew particular attention to the GUV: Fusion conference earlier this year, where a meeting with a delegate from industrial conglomerate General Electric led to an investment in medical diagnostics developer Drawbridge Health.

And while it is not always about the money, Murota noted that when the time came for KU-iCap's second fund he would avoid government funding as that came with a demand for a certain degree of control. Instead, Murota said, he hoped to raise capital from the private sector.

Money was no issue for the next speaker, Alastair Hick, senior director of Monash Innovation, the tech transfer arm of Monash University, who after a 24-hour flight was facing a different problem – the vast distance between his home ground and the US meant nobody knew where Monash was. That was despite the fact that Melbourne was a city of 5 million people with more than a third of citizens born overseas. He said Monash was Australia's largest university, with 80,000 students.

Australia, which had not suffered a recession since the 1990s – a global record in modern history, Hick noted – had suffered from a global dip in investments following the 2008 financial crisis but had recovered to go from A\$200m in venture capital available in 2014 to nearly A\$1.4bn today.

There was, Hick said, another problem he had been facing – Australia's continuously changing administrations. During the seven years he had lived in the country, there had been six prime ministers – though one "was a repeat" – making it difficult to establish consistent policy.

That had not stopped Australia from punching above its weight, he said. And that was only set to improve, with A\$900m in specific funds targeting spinouts in the country and international interest from parties such as UK-based commercial-



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2

The GUV Powerlist awards

Presented by editor Thierry Heles

Kristen Leute collects the Powerlist Top 25 award on behalf of Marc Singer



Tom Vanhoutte



3

Julie Goonewardene

Tony Armstrong



4



5

Peter Devine

Christine Gulbranson



8

Koji Murota

James Wilkie



14



6



19

Jonas Sandwall collects the award on behalf of Linnéa Lindau



UNIVERSITY CORNER

sation firm IP Group, which recently expanded into the country.

Heles then welcomed Christine Gulbranson, senior vice-president and chief innovation officer of University of California, and Tony Armstrong, president and CEO of university fund manager Indiana University Research and Technology Corp on stage together with Nancy Saucier, director of new venture development at University of Massachusetts Lowell.

The panel, which took an interactive approach and had an open discussion with the audience, focused on the challenges of creating and funding spinouts and identified a range of common issues faced by tech transfer people when trying to sell their mission to other university departments, such as trying to raise money from alumni for a fund rather than for a new building or scholarships.

Gulbranson also noted that the university leadership encouraged her to find new money to avoid competing for philanthropic donations for new chairs or research. Armstrong quipped: "If you ask for money you get advice, if you ask for advice you might get money, so I have been asking for advice".

The morning's proceedings concluded with two "unpanels" – a concept originally developed by Global Corporate Venturing that involves a series of roundtable discussions around specific topics.

The first was hosted by Mawson and focused on proof of concept from ideation to funding and IP licensing to spinouts, discussing the trials and successes of commercialisation, and featured delegates such as Matt Perkins.

The second was hosted by Heles and looked at setting up an in-house university venture fund, balance-sheet investing and attracting external venture investors. It featured delegates such as Peter Devine, chief executive of multi-university venture fund Uniseed.

In the afternoon, Hick returned to the stage alongside Helena Wisniewski, vice-provost for research and graduate studies at University of Alaska Anchorage, and Christine Burke, director of commercialisation and technology transfer at University of Texas, San Antonio, for a panel discussion hosted by Mawson about nurturing an ecosystem through state and federal grant funding.

Hick reiterated his frustration that "the constant turnover of administrations is a real challenge to us" and when approaching politicians the usual response was more of a keen interest in generating jobs and getting re-elected than offering support in building an ecosystem.

Wisniewski, who previously worked for US intelligence agency CIA, noted that while there were many different grant programs on offer in the US, there were also less obvious routes, such as approaching the agency's investment affiliate, In-Q-Tel. But while "you need the money", she said, "you really need people excited about the ecosystem and buying into it".

Hick agreed that "building an ecosystem means having all your stakeholders and collaborators in place. You need to know what you want to do and how you want to do it, you cannot wait for someone with a pot of money to come in".

Burke added that "academics know how to apply for grants", so money was never the issue there either. She challenged Truman's view from the previous day, saying that completing patents was not necessarily a measure of success. Some patents turn out not to be worth pursuing further, she said.

Heles then welcomed back Saucier and Ben-Meir to the stage, together with Tom Vanhoutte, a partner at Imec's investment fund Imec.xpand, and Brad Burke, managing director of the Rice Alliance for Technology and Entrepreneurship at Rice University.

The panel discussed the "brave new world" of deep tech funding, with Vanhoutte observing that his mission was about cash. He said that his remit was to pour in "stupid amounts of money at a very early stage" to help get spinouts with complex technologies off the ground – investing \$500,000 in a semiconductor spinout would not be enough, he said.

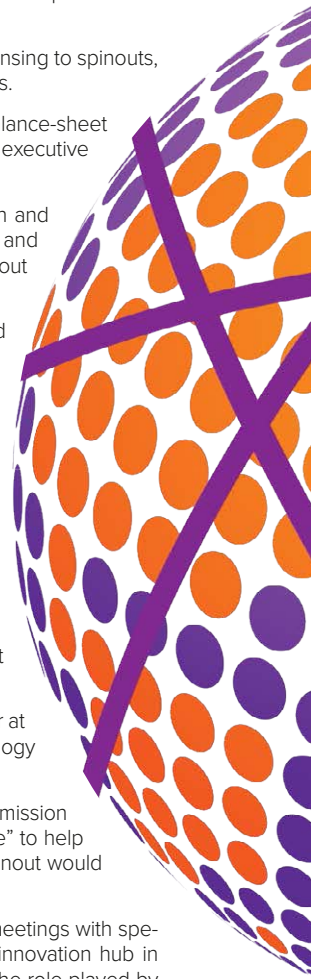
Burke, who joined the conference from Rice's own event, explained that his university held regular meetings with specific groups of investors, the previous day focusing on healthcare. He also discussed a 14.5-acre innovation hub in midtown Houston, where Rice was investing \$100m, taking inspiration from Chicago's 1871 hub and the role played by the Pritzker family in that ecosystem.

Ben-Meir described a new initiative set up specifically to support biopharmaceutical spinouts, a project that would serve as a testbed for future funding models adjusted to sectors that also required significant resources. He also advocated buying in a team to avoid repeating mistakes, admitting that it cost a lot but that it was unavoidable if you wanted the right talent in place.

He also noted, however, that it was not about the money – if you had a good deal, he said, investors would come. If there was no money to be found, the problem was that the business was not worthwhile.

Ria Ancheta-Adrias, director of operations of startup development organisation NCET2, led the last full panel of the day, with Eric Breese, investment manager of chemicals company Evonik's Venture Capital division, David Zimmerman, director of technology commercialisation at Stevens Institute of Technology and Glenn Vonk, director of business development and alliances at NCET2.

“Building an ecosystem means having all your stakeholders and collaborators in place”



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“I am at a public institution – I cannot put money into a private company”

The panel discussed creating, developing and funding spinouts for corporate strategic needs of business units. Zimmerman noted that it really depended on the type of technology to figure out when a spinout may be ready for a corporate, while Breese added that for Evonik it was a question of how they can protect a certain technology. “We will not give you unlimited funds for patents,” he said, but Evonik would support spinouts with guidance on legal documents to safeguard their product.

Breese however lamented that the equity market had heated up over the past several years, leading to seed rounds now fetching closer to \$4m than \$1m, and series A rounds approaching \$15m to \$20m. That meant, he said, that “often we have to walk away because we cannot stomach those valuations”.

Peter Devine followed the panel with a keynote speech about Uniseed, founded 18 years ago. It was launched originally as a proof-of-concept vehicle, before switching to a university venture fund with the second fund. The original launch came with significant challenges – shortly after it was established, the dot-com bubble burst, and it had limited seed-stage funds to invest in spinouts and follow-on rounds were often at a flat valuation.

Devine commented: “I embrace the idea of holding on to shares, like Matt Perkins said. Why would I sell? They are going to be worth so much more.” That may have come as a surprise after the challenges faced by the first fund, but things had changed dramatically since then for Uniseed.

The global financial crisis of 2008 set Uniseed back in a spectacular fashion – a spinout with a fully underwritten prospectus abandoned its initial public offering and collapsed. There was also the acquisition of limited partner Westscheme by fellow pension scheme AustralianSuper, leading them to reduce the number of new investments between 2011 and 2015.

But then Uniseed celebrated three blockbuster exits in 2014 and 2015 – drug developer Fibrotech was acquired by biopharmaceutical firm Shire for \$75m, pharmaceutical firm Novartis bought Spinifex, which was working on a treatment for neuropathic pain, for \$200m, and pharmaceutical firm Dr Reddy’s Laboratories purchased head lice treatment developer Hatchtech for \$10m.

The deals had come with promised milestone payments, but Fibrotech was dropped by Shire after its merger with peer Baxalta – Uniseed had negotiated back the licence and put the research into a new spinout, Certa Therapeutics, with a A\$25m round earlier this year. Hatchtech’s potential milestone payments had also faced delays due to regulatory issues encountered by Dr Reddy’s.

“Get as much money as you can upfront,” Devine advised the audience.

Despite the setbacks, the exits meant money had started pouring back into the ecosystem – including from pension funds – as investors realised there was a profitable business opportunity. Uniseed now had several active funds under management, including a co-investment vehicle backed entirely by private money.

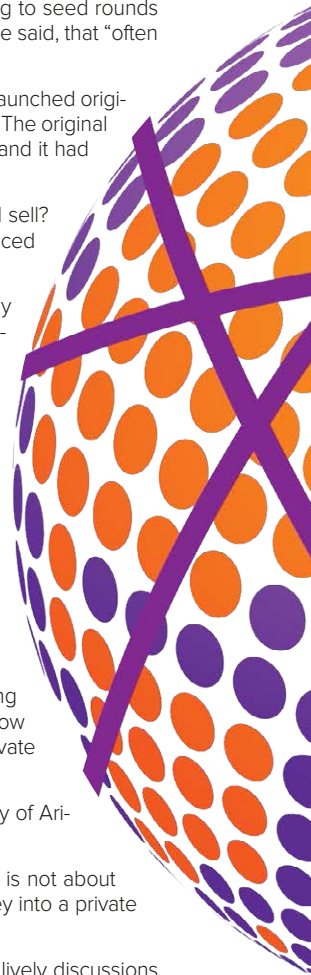
Doug Hockstad, assistant vice-president of Tech Launch Arizona, the tech transfer office of University of Arizona, then finished the conference with a fireside chat with Tony Stanco, founder of NCET2.

Hockstad’s message at the end summed up many of the discussions on stage and in the foyer – it is not about the money. In fact, he said: “Many of us cannot invest. I am at a public institution – I cannot put money into a private company.”

Thanking the audience and speakers, Mawson concluded the first GUV Summit in the US – though lively discussions continued in the evening over drinks. The international line-up of delegates had revealed one important truth apart from the fact that the sector was not about money – everyone in university venturing is facing the same issues, wherever in the world they are, even though the details might differ.

Global University Venturing looks forward to continuing taking part in that discussion on its website, in the magazine and at future events, including the GUV: Fusion conference in May next year. ♦

Additional reporting by Kaloyan Andonov, reporter



The Global University Venturing Powerlist 2018

More than 100 people who are changing
the face of university venturing



Global University Venturing

Download the GUV Powerlist

<https://globaluniversityventuring.com/product/guv-powerlist-2018/>

MONTHLY ANALYSIS

This is our data snapshot based on last month's investment activity. The charts and tables have been generated by our data platform GCV Analytics.

Deals grow slightly in November

Kaloyan Andonov, reporter, GCV Analytics



The number of corporate-backed rounds reported in November was 231, up slightly from the 228 deals tracked in the same month last year. Investment value also increased significantly to \$19.72bn – up 105% from \$9.61bn in November 2017.

However, compared with other months of this year, November fared less well than the third quarter. Despite that, November follows the overall upward trend for corporate-backed deals throughout much of this year, with record numbers for most months.

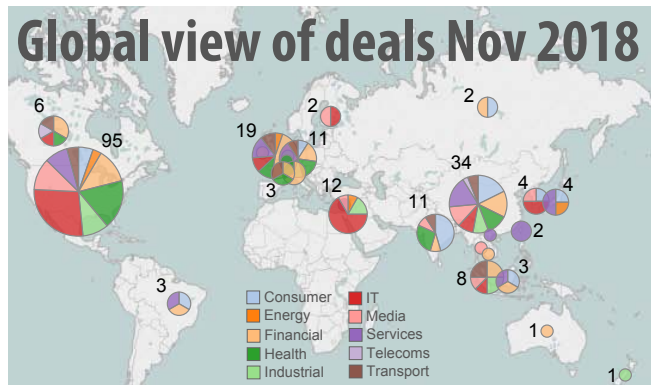
Most corporate-backed deals, as usual, involved the US with 95 rounds, China was second with 34, the UK third with 19 and India fourth with 11.

The leading corporate investors by number of deals were telecoms group SoftBank, semiconductor manufacturer Intel, e-commerce firm Alibaba and diversified conglomerate Alphabet. In terms of involvement in the largest deals, SoftBank topped this ranking as well, along with Alibaba and its financial services affiliate Ant Financial.

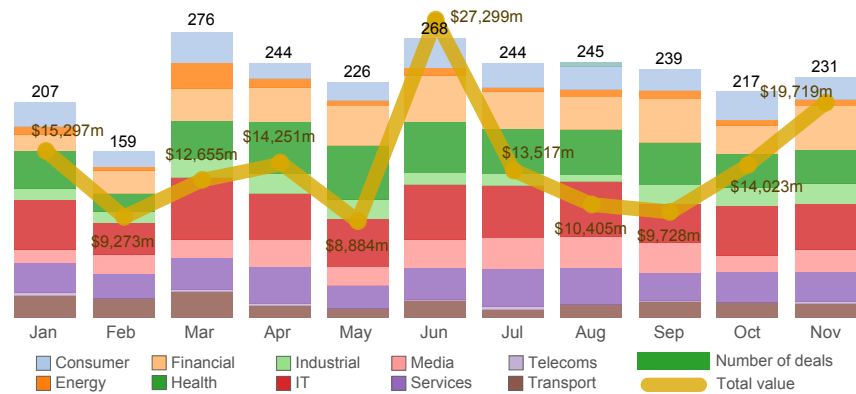
GCV Analytics reported 29 corporate-backed funding initiatives in November, including VC funds, new venturing units, incubators, accelerators and others. This is a slight increase compared with October, when there were 23 such initiatives. The estimated capital raised last month amounted to \$4.21bn, considerably lower than the impressive \$46.91bn in October – \$45bn of which committed to the second SoftBank Vision Fund.

Deals

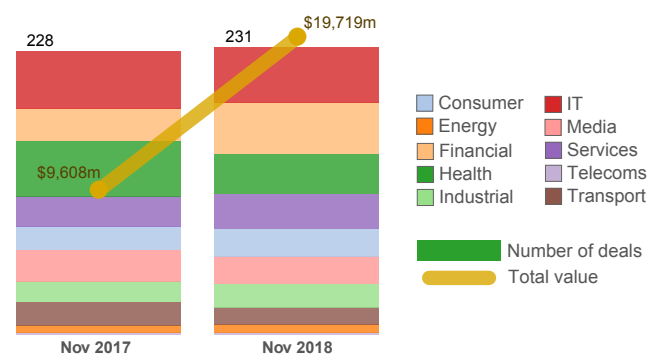
Emerging businesses from the IT, financial, health, services and consumer sectors



Deals by month 2018



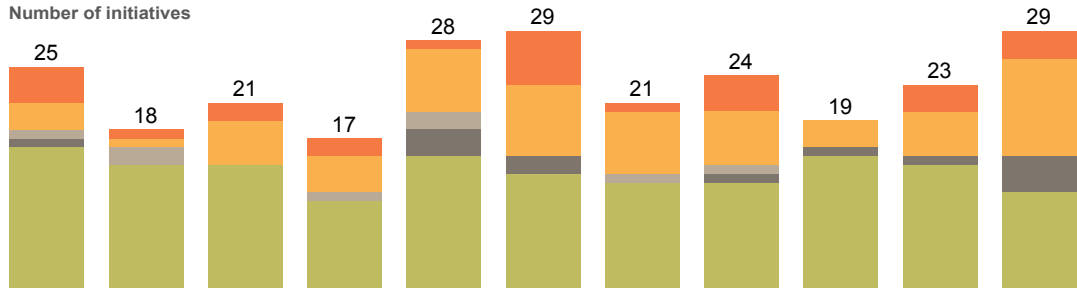
Deals Nov 2017 vs Nov 2018



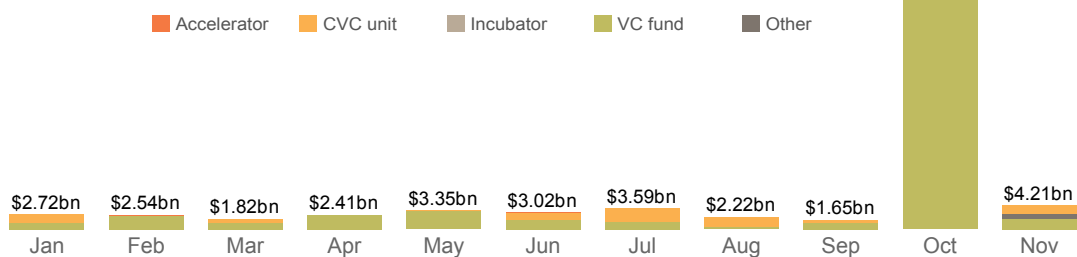
MONTHLY ANALYSIS

Funding initiatives 2018

Number of initiatives



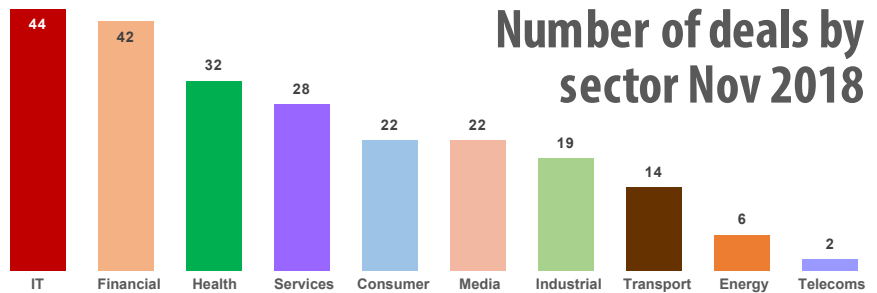
Amount raised



Accelerator CVC unit Incubator VC fund Other

raised the largest number of deals during November. The most active corporate venturers came from the financial services, IT, media, and consumer sectors, as shown on the heatmap. Five of the top 10 deals were above \$1bn and, notably, SoftBank was involved in all of them.

Number of deals by sector Nov 2018



Deals heatmap Nov 2018

	Financial services	IT	Media	Consumer	Health	Industrial	Telecoms	Transport	Services
North America	40	24	12	8	18	10	8	8	3
Asia	23	15	8	14	3	9	7		7
Europe	20	1	7	3	5	2	1	4	
Middle East	2	6	1			4		2	2
South America	1	1	1	1					
Eastern Europe		1		1					
Australia / NZ	1								

Ele.me and Koubei, the recently merged local services subsidiaries of group Alibaba, raised \$4bn at a \$30bn valuation from investors including SoftBank. The latter provided funding through the SoftBank Vision Fund, joining Alibaba

and its affiliate Ant Financial as well as private equity group Primavera Capital. The capital was provided to support the merger of Ele.me, a portfolio company Alibaba fully acquired at a \$9.5bn valuation, and Koubei, an Alibaba spinoff that had secured \$1.1bn from investors. The merged company will provide mobile users with access to a wide range of local services including retail, food delivery, travel and accommodation. Food delivery and restaurant listings specialist Ele.me claims to serve more than 167 million users and both companies claim to have jointly linked more than 3.5 million merchants.

The SoftBank Vision Fund agreed to invest another \$3bn in US-based workspace provider WeWork, which will receive the first \$1.5bn in January and the other half in April. The financing will be supplied in the form of warrants that give the Vision Fund the opportunity to buy WeWork stock. Reportedly, the exact price will depend on whether WeWork raises at



MONTHLY ANALYSIS

Top 10 investments Nov 2018

Company	Location	Sector	Round	Size	Investors
Ele.me-Koubei	China	Consumer	–	\$4bn	Alibaba Ant Financial Primavera Capital SoftBank
WeWork	US	Services	Stake purchase	\$3.4bn	SoftBank
Coupang	South Korea	Consumer	Stake purchase	\$2000m	SoftBank
View	US	Industrial	E and beyond	\$1.1bn	SoftBank
Tokopedia	Indonesia	Consumer	E and beyond	\$1bn	SoftBank undisclosed investors
iFood	Brazil	Consumer	–	\$500m	Innova Movile Naspers
Getty Images	US	Media	Stake purchase	\$500m	Koch Industries
Hellobike	China	Transport	E and beyond	\$400m	Primavera Capital SoftBank
Zume	US	Consumer	–	\$375m	SoftBank
XinChao	China	Media	E and beyond	\$302m	Baidu

least \$1bn in funding or goes public by September, but will value the company at a minimum of \$42bn. Founded in 2010, WeWork oversees a network of flexible workspaces in more than 30 countries across five continents which are leased from landlords and rented to businesses or individuals by the desk or office. It is also branching out into managing housing, leisure and educational spaces.

The Vision Fund invested \$2bn in South Korea-based e-commerce platform Coupang, at a valuation reported to be \$9bn. Coupang operates an online marketplace that lists more than 120 million products for sale, 4 million of which are available for one-day delivery through Rocket, its end-to-end fulfilment system, which delivers about a million parcels a day. The company has more than doubled its revenue in the past two years and expects to record a total of \$5bn in sales in 2018, though its losses have reportedly risen significantly since 2014.

The Vision Fund provided \$1.1bn for US-based smart glass producer View, increasing its overall debt and equity financing to more than \$1.8bn. The cash will support an increase in View's manufacturing capabilities as well as research and development. View has created Dynamic Glass, which can automatically tint or lighten depending on the level of light, helping to reduce heating and lighting costs.

Indonesia-based e-commerce marketplace Tokopedia raised \$1bn from investors, including SoftBank, at a valuation of about \$7bn. Founded in 2009, Tokopedia operates an e-commerce platform on which users can set up an online store. The company offers items from more than 4 million merchants and has more than 80 million monthly active users.

Mobile commerce platform Movile and media and e-commerce group Naspers participated in a \$500m round for Brazil-based online food delivery platform iFood. Movile invested as iFood's majority owner, having held a 60% stake following a round in 2015, while Naspers is one of Movile's largest investors. Founded in 2011, iFood runs an online platform for ordering food from a network of more than 50,000 restaurants. The company claims to have delivered 10.8 million orders in Brazil in October, averaging 390,000 a day.

US-based professional media content provider Getty Images secured \$500m from conglomerate Koch Industries' corporate venturing arm Koch Equity Development. The company was majority-owned by private equity firm Carlyle Group until earlier this year, when the Getty family repurchased control in a deal which reportedly valued Getty Images at below \$3bn, including debt. Founded in 1995, Getty Images operates an online platform for media, business and creatives to purchase photography, video and music.

SoftBank agreed to invest in China-based bicycle rental service Hellobike at a \$2bn valuation, in a round expected to reach \$400m. Private equity firm Primavera Capital also participated. The round followed a report in the South China Morning Post stating that China-based bicycle-sharing platform Ofo had proposed a merger with Hellobike. Founded in 2016, Hellobike operates an app-based bicycle-sharing service with more than 200 million registered users. It is reported to be the third most popular such service in China, behind Ofo and Mobike.

The SoftBank Vision Fund invested \$375m in US-based food delivery services provider Zume at a \$1.5bn pre-money valuation. Zume's lead product is Zume Pizza, a delivery service designed to be sustainable, using fresh additive-free ingredients and a scalable end-to-end system intended to cut the time and distance involved in sourcing ingredients. The company uses technologies such as robotics and artificial intelligence to automate part of the preparation process, and it owns a patent for trucks capable of preparing pizzas on the move.

Internet group Baidu led a RMB2.1bn (\$302m) round for China-based elevator advertising service XinChao in connection with a partnership agreement between the companies. XinChao agreed to join Baidu's advertising network, Baidu Juping, and it intends to leverage the corporate's artificial intelligence technology to make its advertising terminals more intelligent. Founded in 2007, XinChao operates LED advertising screens in more than 700,000 elevators across China.

Exits

In November, GCV Analytics tracked 18 exits with corporate venturers participating as either acquirers or exiting investors. The transactions included six initial public offerings and 12 acquisitions.

The number of exits was lower than October, when there were 29. Total estimated exited capital amounted to \$3.55bn, down 53% from the \$7.56bn estimated the previous month.



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Enterprise software supplier BlackBerry agreed to acquire US-based cybersecurity technology provider Cylance, which had been backed by hardware manufacturer Dell and banks Citi and Capital One. Their respective venturing subsidiaries, Dell Ventures, Citi Ventures and Capital One Ventures all exited. The deal consisted of \$1.4bn in cash and the assumption of unvested employee incentive awards. Cylance produces predictive endpoint cybersecurity products that use artificial intelligence to combat malware and fileless attacks, detecting and responding to threats. Its technology will be used to enhance BlackBerry Spark, BlackBerry's connected enterprise communications platform.

US-based software developer for architects Autodesk agreed to the \$875m acquisition of PlanGrid, a US-based construction software developer. PlanGrid counts cloud services provider Box and Alphabet among its previous backers. Established in 2011, PlanGrid has a collaboration platform allowing general contractors, subcontractors, architects and owners to work together on projects in real time. The company claims its platform is used in more than a million projects in 90 countries. Autodesk intends to integrate PlanGrid into its building information modelling software, Revit, and construction management platform Bim 360.

Enterprise software provider OpenText agreed to acquire US-based application and data management software developer Liaison Technologies for about \$310m, allowing corporates including pharmaceutical firm Merck & Co to exit. Founded in 2001, Liaison produces software that helps a base of more than 4,000 enterprise customers integrate their business applications and manage data. The company's Alloy platform includes a cloud-based monitoring and visualisation tool for business and transaction activity and a data mapping and translation system that Merck uses in its clinical trials.

Babytree, a China-based social parenting media and e-commerce platform backed by Alibaba, industrial conglomerate Fosun and online education provider TAL Education, raised \$217m in its Hong Kong IPO. The company priced its shares at HK\$6.80 (\$0.90), settling at the bottom

of a range that had HK\$8.80 at the other end. Babytree had hoped to secure up to \$1bn at a valuation of \$3bn to \$5bn, but its valuation dipped to \$1.5bn, down from \$2.2bn earlier. Babytree has created an online community where parents can share their experiences, seek advice and find information such as a vaccination checklist and dietary guides for mothers. It also operates an e-commerce platform and video-sharing app WeTime.

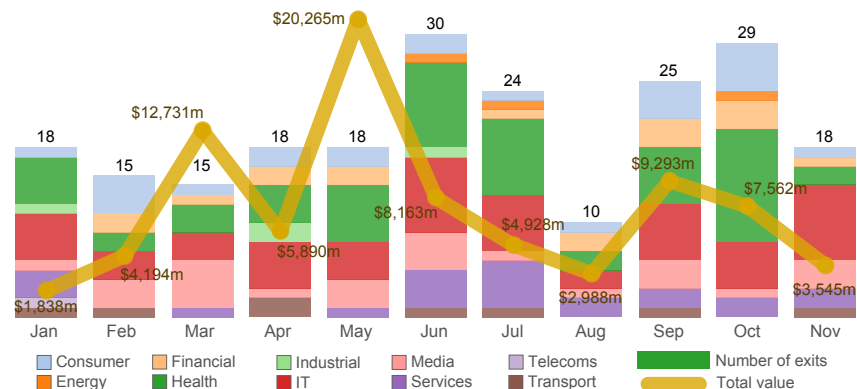
Media group Bloomberg exited US-based work management software developer Sapho in a \$200m acquisition by virtualisation software provider Citrix Systems. Founded in 2014, Sapho has created software platform Sapho Employee Experience Portal that provides employees with a range of third-party micro-applications intended to help them work more efficiently. The company's micro-app platform is set to be absorbed into Citrix's corporate IT management service, Citrix Workspace.

Tongcheng-eLong, a China-based online travel agency backed by internet company Tencent, online travel agency Ctrip and conglomerate Dalian Wanda, raised \$180m in an IPO on the Hong Kong Stock Exchange. The company issued about 143 million shares at HK\$9.80 each, near the bottom of the IPO's HK\$9.75 to HK\$12.65 range. Reports had suggested it was targeting \$1bn, but that goal was reduced to \$233m. Tongcheng-eLong was created through the merger of LY.com, an online travel services provider also known as Tongcheng Network, and online travel agency eLong. The company's online platform allows consumers to book hotel accommodation and travel.

Industrial conglomerate Robert Bosch and telecoms firm KPN exited Netherlands-based network security software developer SecurityMatters, which was acquired by internet-of-things security technology provider Forescout Technologies for about \$113m. Founded in 2009, SecurityMatters has built a cybersecurity platform that focuses on operational technology networks such as those used to run industrial or control systems. The software gives customers security for their devices, and the ability to monitor their networks and detect threats and anomalies.

Twist Bioscience, a US-based DNA synthesis technology developer backed by pharmaceutical companies Illumina, WuXi PharmaTech, Kangmei and Institut Mérieux, went public in a \$70m IPO. The company issued 5 million shares on the Nasdaq Global Select Market at \$14 each, the foot of the IPO's \$14 to \$16 range, valuing it at \$381m. Twist has created a DNA synthesis platform that enables users to produce synthetic DNA on a silicon chip and is using the technology to develop products such as synthetic genes, sample preparation tools and antibody libraries that can be used in drug discovery.

Exits by month 2018



MONTHLY ANALYSIS

Top 10 exits Nov 2018						
Company	Location	Sector	Type	Acquirer	Size	Exiting investors
Cylance	US	IT	Acquisition	Blackberry	\$1.4bn	Blackstone Capital One Citi Dell Draper Fisher Jurvetson Draper Nexus Fairhaven Capital Insight Venture Partners Khosla Ventures KKR TenEleven Ventures Thomvest Ventures undisclosed investors
Plangrid	US	Services	Acquisition	Autodesk	\$875m	Alphabet Box Founders Fund Sequoia Capital Tenaya Capital Y Combinator
Liaison Technologies	US	IT	Acquisition	OpenText	\$310m	Accenture Forté Ventures Merck & Co UPS Verdane Capital
BabyTree	China	Media	IPO	–	\$217m	Alibaba Chenshan Capital China Merchants Wealth Fosun Group Matrix Partners Tal Education Group undisclosed investors
Sapho	US	IT	Acquisition	Citrix	\$200m	Alsop Louie Partners AME Cloud Ventures Bloomberg Caffeinated Capital Felicis Ventures Morado Ventures SoftTech VC undisclosed investors
Tongcheng-eLong	China	Services	IPO	–	\$180m	Ctrip.com Dalian Wanda Group Tencent
SecurityMatters	Netherlands	IT	Acquisition	ForeScout Technologies	\$113m	Emerald Technology Ventures AG KPN Phoenix Contact Robert Bosch
Twist Bioscience	US	Health	IPO	–	\$70m	3W Partners Arch Venture Partners Bay City Capital Bay City Capital GF Xinde Life Science Investment Fund Biomatics Capital Cormorant Asset Management Ditch Plains Capital Management FIS Foresite Capital Illumina Institut Mérieux Kangmei Group NFT Investment Paladin Capital Reinet Fund Tao Venture Capital Partners Wuxi PharmaTech private investor
Amimon	Israel	IT	Acquisition	Vitec	\$55m	Amiti Ventures Argonaut Private Equity Cedar Fund Evergreen Venture Partners Hantech Motorola Solutions Stata Venture Partners Walden Israel Venture Capital
Vapotherm	US	Health	IPO	–	\$54m	3X5 Partners Adage Capital Management Arnerich Massena & Associates Crestline Investors Cross Creek Advisors General Electric Gilde Healthcare Integral Capital Partners Kaiser Permanente Morgenthaler Ventures Perceptive Advisors Questmark Partners

Amimon, an Israel-based chipmaker backed by communications technology provider Motorola and manufacturing services firm Hantech, was acquired by video and photography products producer Vitec for \$55m. Founded in 2004, Amimon designs and develops wireless video transmission chipsets primarily used for professional filmmaking and high-end productions. Vitec has already integrated Amimon into its creative solutions division and is working with the company to design and manufacture new products for adjacent markets.

Vapotherm, a US-based respiratory distress treatment provider backed by healthcare consortium Kaiser Permanente, closed its IPO at \$64.4m after the underwriters took up the overallotment option. The company raised an initial \$56m when it floated on the New York Stock Exchange, pricing its shares at the bottom of the offering's \$14 to \$16 range. Joint book-running managers BofA Merrill Lynch and William Blair, lead manager Canaccord Genuity and co-manager BTIG bought an additional \$8.4m of shares two days later. The share price subsequently rose to over \$17. Vapotherm's Precision Flow system uses heated, humidified and oxygenated air to treat respiratory distress. ♦

Note: Monthly data can fluctuate as additional data are reported after GCV goes to press



Turning Raw Data into Meaningful Insights



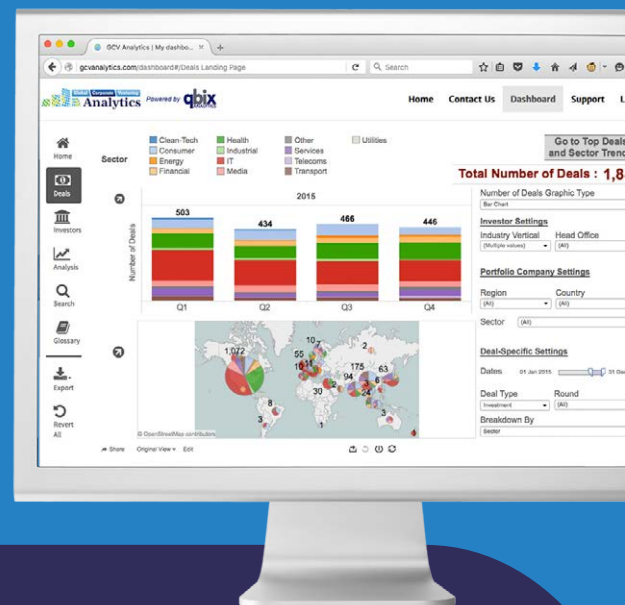
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