China university start-ups: Campus creativity

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From DJI to Ele.me, numerous successful start-ups have emerged from universities in Greater China. VC investors recognize the talent, but they are sometimes wary of the structures

One otherwise lazy weekend morning, several main roads at Hong Kong University of Science & Technology (HKUST) are blocked off so a self-driving car can do test runs. Meanwhile, the indoor swimming pool is being used for experiments involving underwater robots. Even on campus, start-ups never sleep.

HKUST lists 75 companies on its website that began life as student projects. The most famous is DJI, which is responsible for nearly three-quarters of the world's mass-market consumer drones and was valued at $16 billion in its most recent funding round in 2018. The stabilized flight control system originated in the dorm room of founder Frank Wang.

Zexiang Li was the professor of electronic and computer engineering who oversaw Wang's final-year project, which ultimately became DJI, and served as co-founder of the company. He has since promoted other start-ups, among them robot developers Quotient Kinetic Machine and Narwal Robotics, and electric boat motor manufacturer ePropulsion.

HKUST is not exceptional. Universities across Greater China are a cradle for start-ups, much like educational institutions globally, from the US to India to Japan.

Artificial intelligence (AI) giant SenseTime and diagnostic testing player Cirina – acquired by US-based Grail – came out of the Chinese University of Hong Kong (CUHK); listed electric scooter maker Ninebot was conceived at Beijing's Beihang University; Tsinghua University was the breeding ground for AI chip maker Deephi Technology, which was acquired by US-based Xilinx; and food delivery platform Ele.me emerged at Shanghai Jiao Tong University.

"About one-third of our portfolio companies are sourced from universities," says Wayne Shiong, a partner at China Growth Capital, an early-stage venture capital firm. "If you are investing in the science and technology space, you can't make it without connecting these schools. Tomorrow I will be at Tsinghua all morning, discussing three projects. We do deep dives into the professors' laboratories."

Young, gifted and tech

This enthusiasm is tempered by a widely expressed concern that immature founders create immature start-ups. Students lack the life experience and social skills – not to mention business acumen and management capabilities – to scale and commercialize a company. Bolstering the leadership team with wise old heads is one solution but parachuting in talent can get messy.

It is better, perhaps, to leverage the existing mentor-mentee relationship between professor and student. But even this approach has it pros and cons.

Song Yao, co-founder of Deephi and who recently launched See Fund with a mandate to back university start-ups, specifically advises students to go into business with teachers rather than on their own. He dismisses the notion of student entrepreneurs, noting that the success rate is very low due to bookishness, a lack of resources, and inexperience.

At least when working alongside professors, “they have a certain core technology as an entry barrier,” Yao says. “And then in the proces of running the business, it is easier to cultivate and preserve a mentality that allows everyone to learn and grow.”

The counterargument is that the professor becomes a part-time founder, juggling faculty and start-up responsibilities. Yipin Ng, co-founder and managing partner of Yunqi Partners, contrasts the more mature US system, where decision-making is often more collegial and there is a deep pool of professional management talent to draw upon, with China’s founder-led culture. The founder represents th company’s soul and its ultimate authority.

Having a professor as part-time leader but major shareholder seldom leads to success, Ng maintains. Other investors endorse this view with Shiong proposing a more balanced hypothetical ownership structure: the founder – a professor or student who is responsible for the core technology – gets 30%, with 50% split between a commercial team of three or four, and 20% to be allocated to future management team members.

Provided the economics are properly aligned, Shiong is not opposed to part-time founders in science-based start-ups, noting that keeping one foot in research can be helpful. “If you’re dealing with an industrial or an engineering concept, it’s best to quit university and be ‘all in’ with the business. But if it's a research-driven concept, you might be able to combine the two elements effectively.”

A case in point is medical devices manufacturer Hygea Medical Technology, which recently raised a RMB500 million ($77 million) Series C round. Founded in 2010, the company is best-known for the Kangbo Knife that uses alternating blasts of cryogenic freezing and high-intensity heating to kill tumors.

The device was developed by Jing Liu, a professor at Tsinghua’s school of medicine, while Qianfu Huang, an economics and management student at the same university, led the commercialization. Huang, though still a student, was already selling medical devices. He immediately recognized the potential of the Kangbo Knife and established Hygea.

Three years later, Liu – who had continued working at Tsinghua – completed a new iteration of the device and carried out the first clinical trial. It won fast-track approval and for sale in China in 2017 and is now used in nearly 100 top-tier hospitals.

A 10-year span from university research project to commercialized product isn’t uncommon. This doesn’t fit the investment horizon of most VCs. China Growth Capital found out the hard way as one of Hygea’s Series A backers, but it still led the Series C, a rare departure from its early-stage remit. The belief is that a more mature Hygea will hit an inflection point.

Tsinghua’s talent seam

Fortunately, these do happen, depending on the industry and the nature of macro tailwinds. Jie Yuan, a professor at HKUST, launched a semiconductor chip design start-up last year. He soon attracted funding from the university and Hong Kong-based Alibaba Entrepreneurs Fund. A first chip has been sent for fabrication with sales expected to start in three months.

“I was an electronic engineering undergraduate at Tsinghua University, sharing a dorm room with five others,” Yuan tells AVCJ. Five of us have formed start-ups in the past three years in fields ranging from software to hardware to sonar systems, with bases in Silicon Valley, Beijing, Chengdu and Hong Kong. China’s hard-tech development era has started, making it a great time for Tsinghua graduates to launch technology businesses.”

Tsinghua’s electronic engineering department hosted a project demo day in April that attracted dozens of investors, including Sequoia Capital and Gaorong Capital. During the event, Yao officially launched See Fund and declared he would focus on backing start-ups coming out of the department.

Wang Xin, an executive director at Gaorong and a Tsinghua electronic engineering graduate, helped organize the event. He also serves as general secretary of the department’s alumni organization. Xin is confident in the caliber of Tsinghua’s entrepreneurs, noting that he looks for start-ups with key strengths rather expect to find readymade all-rounders.

“The strong points must be strong enough because the commercialization capability is naturally weaker. If the core-tech is advanced enough and the team has accumulated enough relevant expertise and the potential industry scenario has a high ceiling – in other words, the company is solving an important problem – it’s okay if the solution has not yet landed,” he says.

“Campus start-ups in the angel stage cannot be mature in all aspects. We can help make up for some of the weak links.”

Xin runs the alumni society in part as an opportunity to give back to his alma mater. But no investor can ignore the benefits of a strong alumni network. It is estimated that Tsinghua’s electronic engineering department controls about half of China’s semiconductor industry, having produced the chairman of Tsinghua Unigroup and the founders of Will Semiconductor, GigaDevice, Galaxycore, Enflame, and Maxscend Technologies.

Other alumni include first-generation entrepreneurs behind several US semiconductor start-ups who then migrated to the private equity world. Summitview Capital’s Ping Wu, Northern Light Venture Capital’s Feng Deng and Oriza Hua’s Datong Chen – who also looks after the China National Integrated Circuit Industry Investment Fund (Big Fund) – fit this profile.

“Every investor digs hard in their alumni circle and related ecosystem. When we say digging for projects in school, it’s more about finding relevant people rather than investing in start-ups launched by students,” explains Guang Yang, founder of Glory Ventures. “When you find these people, you can even cook a deal by yourself. To be honest, the end of China’s mobile internet era also meant the end of the era of grassroots entrepreneurship.”

Avoiding incubators?

For the same reason, many venture capital firms are not interested in university incubator programs, especially when they offer little more to start-ups than physical space. The reality is that high-pedigree founders can attract VC support easily enough that paying for lab space is the least of their worries, Yang adds.

The key to a successful incubator is a truly differentiated value-add proposition. Tencent Holdings or Amazon, for example, might offer free cloud resources, access to their customers, or even the prospect of becoming customers of a start-up themselves. Others create ecosystems around successful start-ups or founders. Li, the HKUST professor who co-founded DJI, did this with industrial automation incubator Xbot Park.

“When you make a robot, you need to know where to find your components. Through DJI and other start-ups, we’ve become very familiar with the entire Greater Bay Area supply chain and we intend to share that knowledge with new start-ups,” Li told a TV show.

Xbot Park claims more than 200 supply chain partners, ranging from suppliers of raw materials and key components to operators of testing and manufacturing facilities. It is estimated the iteration speed for robot products in the Greater Bay Area is 5x that of Silicon Valley, yet one-fifth of the cost. There is also an in-house VC, the Xbot Park Fund, which is backed by the likes of Sequoia and Hill House Capital.

Start-up incubators and funding schemes at Hong Kong universities

University	Program
Hong Kong University of Science & Technology	HKUST Entrepreneurship Program Incubation Program (in Shenzhen) GD, HK & Macao Youth Entrepreneur Hub (in Nansha, Guangzhou) HKUST Entrepreneurship Fund HKUST-Sino $1 million Entrepreneurship Competition
University of Hong Kong	iDendron Seed Program Technology Startup Support Scheme for Universities (TSSSU) HKU
Chinese University of Hong Kong	Pre-Incubation Center Center for Entrepreneurship InnoPort TSSSU CUHK
City University of Hong Kong	Tech 300 TSSSU CityU
Hong Kong Bapstist University	Seed Incubator HKBU Business Entrepreneurship Support & Training (BEST) TSSSU HKBU
Hong Kong Polytechnic University	HKSTPC-PolyU Tech Incubation Fund (TIF) PolyU Tech Launchpad Fund (TLF) PolyU Micro Fund Scheme

* Government operated
Source: University disclosures

Tianmiao Wang, a professor at Beihang, is in a similar position as a mentor to entrepreneurs and an advisor to Y&R Capital and ZhenFund. He invests in or incubates robotics start-ups. In addition to Ninebot, Wang has backed medical robot manufacturers Tinavi Medical Technologies and Remebot and car networking data systems provider Bochuangliandong.

See Fund’s Yao adds: “Those of us, so-called successful entrepreneurs have become well-recognized benchmarks. We are a key connection node in the network of entrepreneurship and investments. Students and alumni who want to start a business and are looking for advice reach out to me. That’s an advantage for See Fund, which gets to support them.”

Filling the pipeline

Nevertheless, City University of Hong Kong is pressing ahead with an entrepreneurship program intended to expand research commercialization efforts and place them in a formal structure, while offering VCs a more concentrated pipeline than tips from professors and cold calls from students. Its HK Tech 300 project launched in March with a budget of HK$500 million ($64 million) and a goal to establish 300 start-ups over the next three years.

Participants are enrolled in an eight-week, all-expenses-paid training phase during which they get pointers on developing business plans and pitching investors. They can also apply for up to HK$100,000 in seed funding. This is followed – for some – by an incubation phase focused on business model validation. Teams get angel funding of up to HK$1 million each.

Once the start-ups are ready to launch, external funding of up to HK$10 million kicks in. This is awarded based on recommendations made by the program to organizations such as the Technology Start-up Support Scheme for Universities (TSSSU), the government's Innovation & Technology Fund, and incubation schemes run by Hong Kong Science & Technology Parks Corporation (HKSTP).

"We want to be enabling, so it's about getting as many people through the program as possible and have them absorb something from that journey. If they become very successful, that's a bonus," says Tricia Chong, director of knowledge transfer at CityU, "Maybe they won't become successful in the program itself but in their next project, partly because of the experience they had in the program. To us that would be a success."

Such positioning is not universally popular. Kevin Au, a professor and director of the Center for Entrepreneurship at CUHK, claims there are too many people and too much money trying to help student-founded start-ups in the territory.

"When getting money becomes too easy, students incapable of or unsuited to entrepreneurship might be drawn to apply. Some young people don't really want to run a business. It's just, 'I make a PowerPoint, make a presentation, and then it's HK$500,000.' This promotes grant-preneurship instead of entrepreneurship. It is a problem," says Au.

While CityU has sought to drum up VC support from the likes of Mindworks Ventures, Qiming Venture Partners, and Alibaba Entrepreneurs Fund, other universities stand accused of obstructing external investors. According to one early-stage investor, Xiamen University refused to allow his team on campus to negotiate with the student founder of a start-up. The student was also warned to cease engagement or face expulsion.

Other sources tell AVCJ that at some Chinese universities, including Peking University, professors fear launching start-ups in case it harms their academic prospects. Such activity goes underground. A similar thing happened at certain universities in Taiwan when an outright ban was imposed on campus start-ups, says Norman Chang, co-founder of Rookie fund, a student-run and student-focused investor.

Meanwhile, once a start-up reaches a certain size or transitions from a project into a full-fledged business, it might have to move off-campus. This is the case in Hong Kong where universities, as public institutions, must restrict themselves to the very early stages.

Money and maturity

There are still economic returns. Seed funding under HK Tech 300 is much like a grant, but thereafter the university will take equity stakes in start-ups it backs. These would be subject to a cap of 15-20%, though there is little expectation of getting anywhere near that level.

Moreover, CityU and other institutions often lock down intellectual property pertaining to research in case there is future value and charges for access. HKUST gets a 3% stake in a start-up founded by a faculty member or student, plus whatever fees accrue from requiring them to license out the patents.

"Schools may consider such an approach very open by licensing patents to start-ups, but it throws up a few questions," says Chang of Rookie Fund. "What if a VC invests in a university start-up only to discover the company doesn't own its core technology, it is only allowed to use it? In the future, if there is a dispute between university and start-up, that could mean big trouble."

Tsinghua is a pioneer among Chinese institutions in this area. In 2015, it revised internal IP transfer rules to clarify that a professor who creates a business based on his or her scientific research can get a share of the patent. A third party decides what this means for start-up ownership. For example, if university-related patents make up half the company's value, a professor with a 70% patent share would end up with a 35% equity stake.

Industry participants can think of no other mainstream university in the country with such clear stipulations on patent rights. Deephi was in the first batch of start-ups created after the regulatory clarification, according to Yao.

Properly enforced rules are integral to one or more Chinese institutions emulating Stanford University as a hotbed of entrepreneurial activity.

Tsinghua is generally regarded as best-positioned to do this, but Hong Kong has also accumulated professors and research teams who are global leaders in their fields. CUHK's Au contends that Hong Kong could become the equivalent to Boston, given its emergence as a IPO hub for pre-revenue biotech companies.

"Hong Kong is also like London or New York in that it is a metropolis with solid commercial and industrial foundations. Our unicorns such as WeLab, GoGoVan, Airwallex, and Klook come from relatively established industries – financial services, logistics, and travel," he adds. "Shenzhen is more like Silicon Valley because there are many disruptive businesses."

At the same time, drawing comparisons is premature and it fails to appreciate the range of other factors – from policy to geography – that influence the development of technology hubs. And, as demonstrated, individual universities have some impact on how easily start-ups emerge on campus.

Asked what piece of advice he would give would-be student entrepreneurs, Gaorong's Xin simply says: be bold. "If you see an opportunity, chase it. If Deephi was founded a year later, it would be a totally different story," he observes. "Speed is a start-up's single biggest advantage. It's important to keep your product one step ahead of the competition."