

Venture Capital in China's Commercial Space Sector

Introduction

The commercial space sector is one of the most promising and rapidly growing, so it is no wonder the sector has caught the eye of venture capitalists around the globe. Its main products are launch systems and vehicles as well as satellites, and though natural customers are governments and their space and defense arms, non-government customers such as telecommunications companies are also involved. Currently, Morgan Stanley has the global space sector valued at around \$350 billion, but by 2040 they expect that to more than triple to \$1.1 trillion.¹ The opportunities space provides are as expansive as it is, from space travel to asteroid mining to global broadband and certainly military use.

While the expectations for the space sector can be lofty and even just conjecture, the possibilities are starting to come into focus. Currently, a key priority is bringing launch prices down to make products affordable and accessible on a grand scale. Whereas in the US three billionaires - Elon Musk, Jeff Bezos, and Richard Branson - have taken the lead² spearheading commercial space, in China the sector is more democratized at the moment as dozens of new startups battle it out for industry leadership. The Chinese government has looked to the innovative ecosystem and public-private partnerships of the US as a model, spurring its own policy of civil-military fusion and creating a series of challenges and uncertainties for venture capital investment.

Regulatory Overview

One of the major motivations for the Chinese government to open commercial space to private activity is to leverage private capital. In a September 2019 Report prepared for the U.S. Institute

¹ "Space: Investing in the Final Frontier." *Morgan Stanley*, Research. July 24, 2020.

² "Where Big Business Is Making a Giant Leap into Space." *Knowledge@Wharton*, Leadership. June 4, 2019.

for Defense Analyses, *Evaluation of China's Commercial Space Sector*, Liu et. al suggest 'there is a perception within the Chinese government that jumpstarting a commercial space sector may bring disruptive new technologies and efficiencies to state-owned enterprises, and potentially reduce China's reliance on space-related systems and technologies from other countries.'³ Since 2014, a number of policy documents have been published encouraging private capital and international investment in the previously protected sector of space.

Several of China's top private VC firms have invested in space startups. According to FutureAerospace's *Commercial Space Investment Race report*, 161 rounds of investment in China's commercial space sector have taken place between 2015 and July 2019. Investment has come from 218 different companies, with an average of 135 operations in the space sector per investment firm. Deville notes the presence of several very active VC private tech-oriented VC companies - Matrix Capital China, Shunwei Capital and Shenzhen Capital - with strong experience in growing and scaling. While the top 18 investors appear to be private venture capital, Deville suggests the remaining 200 investors are state-sponsored, one-shot investors.⁴ Here, we highlight four potential issues for venture capital in China's commercial space sector.

Four Potential Issues

a) Poor Capital Allocation and Crowding Out Effects of Government-backed VC

Most government investment and support for commercial space companies in China has come from provincial and local government-owned VC firms. Beijing E-Town, the VC firm of the city of Beijing, has invested in several commercial space companies with headquarters in the city. As well as financial investment, provincial governments are active in providing land subsidies to companies to build manufacturing facilities.⁵ While VC fundraising activities are focused in

³ Liu, Irina, et al. *Evaluation of China's Commercial Space Sector*. Institute for Defense Analyses. 2019 at iii

⁴ Deville, Jean. "Who's investing in China's NewSpace?" *The China Aerospace Blog*. August 17 2019

⁵ Liu et al. 2019 at 36.

Beijing (in 2018, of 34 rounds of fundraising, 28 were done in Beijing, 82% of total investments), the commercial location of China's space startups may be shifting.⁶ In particular, Guangzhou appears to be growing in importance for commercial space activities centred around the new Wenchang Spacecraft Launch Site on Hainan Island.⁷

In 2017, China Aerospace Science and Technology Corporation (CASC) and several Chinese banks established a 150 billion RMB (\$22 billion) Guochuang Investment Guidance Fund primarily to support SOEs and SOE subsidiaries.⁸ In August 2020, LandSpace's \$173m Series B funding was jointly led by 'Sequoia Capital China, Country Garden Venture Capital, Matrix Partners China and Cornerstone Capital with additional investment from the *National SME Development Fund* and others.'⁹ At the same time Lin explores a number of historic problems with government guidance funds. Observing the Shanghai Angel Investment Guidance Fund, Lin notes, 'the manager is not selected from the private sector but statutorily appointed and works alongside a steering committee comprising the deputy mayor of Shanghai and other government bureaucrats without experience in venture capital investments or liability for decisions.' Such an arrangement is unlike an ordinary venture capital limited partnership model where a professional venture capital firm 'serves as the general partner and is subject to various legal and contractual constraints (e.g. unlimited liability for the debts of the fund, fiduciary duties of the general partner and the limited partners' derivative action mechanism).'¹⁰

With no effective mechanisms to constrain the behaviour of the fund manager, a key issue for government guided funds in China's nascent commercial space sector is the risk of crowding out

⁶ Deville, Jean. "FutureAerospace's China Commercial Space Investment Report 2018: Highlights, China Aerospace Blog, January 26 2019

⁷ Liu et. al 2019 at 30

⁸ Ziyi, Tang and Xiaoli, Xue. "Four Things to Know About China's \$670 Billion Government Guidance Funds", Caixing Global, February 25 2020 note as of the end of June 2019, there were 1,686 funds with a total value of 4.7 trillion yuan (\$670 billion).

⁹ Jones, Andrew. "China's LandSpace raises \$175 million for Zhuque-2 launch vehicles", Spacenews, Sept 9 2020,

¹⁰ Lin, L., 2015. Re-Engineering a Venture Capital Market: The Case of China. *SSRN Electronic Journal*, at 19.

or discouraging private capital, or misallocating capital through poor due diligence or local political influence directing investment to certain companies to the detriment of others with higher growth potential and capital needs. Liu et. al note ‘a Jilin province-backed VC firm, Jisheng Asset Management Company, investing in a new launch company with no proven technology where a motivation for the investment may have been an effort to bring more high technology jobs to the province.’¹¹

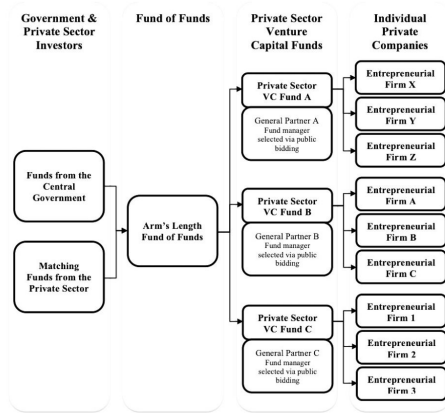


Figure 1. A ‘Fund of Funds’ Approach, adapted from Lin (2015)

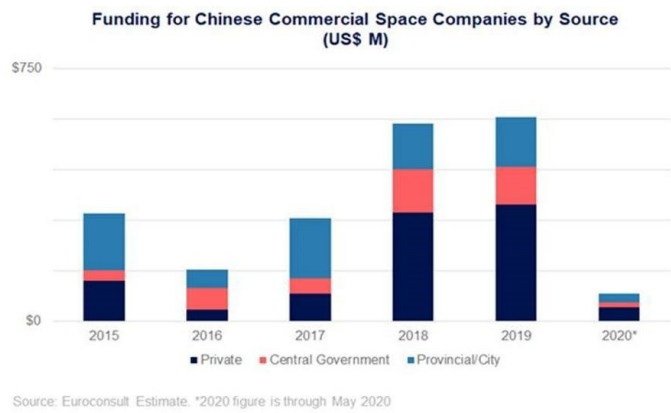


Figure 2. Funding for Chinese commercial space companies by source (Euroconsult, 2020)

A key institutional innovation that may drive private venture capital in China’s commercial space sector relates to how government guidance funds utilise a fund of funds approach to capital allocation whereby matching funds are required to be raised from the private sector, a consolidated fund makes investments in a number of other funds and each of these funds will invest into a portfolio of companies. By doing so, ‘the consolidated fund enjoys broader exposure to the industry and diversification of the risks associated with a single investment.’¹² Liu et. al note that many investments in Chinese space companies have been made by holding companies and funds-of-funds and the extent to which a fund of funds approach applied to the August 2020 rounds of LandSpace and iSpace might illuminate how seriously this institutional

¹¹ Liu et. al., 2019 at 85

¹² Lin, L., 2015 at 22

innovation of private and public venture capital financing to China's commercial space sector is being taken.

The emergence in recent years of provincial leaders in China with close ties to the government aerospace sector and the Politburo suggests aerospace investments from government guidance funds will continue to be steered to state owned enterprises rather than commercial space start-ups, exacerbating the difficulty space startups experience in obtaining loans from domestic banks with close, safe ties to SOEs.¹³ That said, as space companies like LandSpace and iSpace raise frequent rounds of funding, the signal to investors that milestones are being met will also likely be observed by provincial governors who may seek to provide greater financial support and connections with China's banks.

b) Market Challenges

Whereas the new civil-military fusion policy has been a boon for the domestic space sector, it poses some challenges to foreign capital and trade in the space sector, particularly with advanced Western nations home to the most sophisticated capital centers that are perpetually skeptical of China's intentions. Specifically, the coziness of China's "dual-use" commercial space sector with the military via CASC and GGFs subjects these nominally private companies to the vicissitudes of geopolitics. Sensitive to the incidental funding of its rival military, the current US Administration has banned US investment in Chinese military-affiliated companies, a potential dragnet that already includes CASC and the China Academy of Launch Vehicle Technology.¹⁴ As the climate remains hawkish on Chinese dual-use firms, Chinese space start-ups may need to focus more on domestic and emerging-market (BRI countries) capital.¹⁵

¹³ Mai, Jun "Why China's aerospace experts have become Xi Jinping's new political elite", South China Morning Post, 04 May 2017.

¹⁴ "Addressing the Threat from Securities Investments That Finance Communist Chinese Military Companies." EO 13959, 85 FR 73185. November 12, 2020. The impact of this EO is debatable, as it more so reflects rather than spurs divestment from these companies, and it includes the possibility of government-granted licenses as a loophole.

¹⁵ Liu et al. at vi.

Space sector supply chains are also at risk due to military ties. For example, the aforementioned start-up LandSpace had signed a contract with Danish nanosatellite company GomSpace in 2017 to cooperate on LandSpace's LS-1 rocket launch. Of course, LandSpace was also dependent on "spin-off" technology from CASC which, wary of LandSpace's new foreign partnership and the possibility of IP leakage, terminated the transfer of some critical technology to LandSpace and tanked the deal.¹⁶ In another instance, in 2018 the US-based firm Global IP, which had a \$200 million aerospace contract with Boeing, was exposed in the *Wall Street Journal* for being a front for Chinese government money, funneled from the Ministry of Finance through a company called China Orient, then routed offshore through Hong Kong and the British Virgin Islands.¹⁷ The exposé was the death knell for the deal as a web of US export laws function to prevent such a sale of technology to the Chinese government. As such, both domestic and international technology and equipment transfers are subject to export-import restrictions and fears of IP theft.

Looking at the space sector more broadly, it appears in the wake of Document 60 a flurry of start-ups was established (Appendix 1) - though these entrepreneurs tend to cite the success of SpaceX as a more immediate inspiration than regulatory changes¹⁸ - to the point of oversaturation. At this point, there are nearly 80 space launch startups,¹⁹ which has spurred fears of a capital winter²⁰ for many of these firms. Of these nearly 80 startups, there has been concern that Document 60 and military priorities, which only opened up the launch and remote sensing sectors to private capital, were prejudicing other, more profitable sectors.²¹ As of the Liu et al.

¹⁶ Solem, Erika. "The Emergence of China's Commercial Space Companies and Start-Ups." *China Aerospace Studies Institute*. September 2020. 1-21, 9.

¹⁷ Spegele, Brian and O'Keeffe, Kate. "China Maneuvers to Snag Top Secret Boeing Satellite Technology." *The Wall Street Journal*. December 4, 2018. For details of the deal ending, see Spegele, Brian and O'Keeffe, Kate. "Boeing Backs Out of Global IP Satellite Order Financed by China." *The Wall Street Journal*. December 6, 2018.

¹⁸ Liu et al. at 89.

¹⁹ *Id.* at 27.

²⁰ Liu et al. at 37.

²¹ *Id.* at 14.

study there were 21 launch startups and 19 remote sensing startups, but the most prolific area was satellite manufacturing with 29 startups.²² The Chinese government has since encouraged greater investment in the latter,²³ but it also faces a clear oversaturation problem that will be solved through a combination of fierce competition and performance-based allocation of capital.

Expectations are that the launch sector will be culled in the coming years, with prominent companies like LandSpace, iSpace, and Expace leading the concentration of the sector.²⁴ Too many firms were initially gung-ho in their approach, pursuing ambitious vertical integration plans without first establishing a record of success - now, the focus is on performance and a pragmatic supply chain.²⁵ And there have been struggles - recently, LandSpace failed to reach orbit in October 2018 with its Zhuque-1 rocket in China's first private orbital launch attempt,²⁶ OneSpace failed similarly in March 2019 before iSpace finally succeeded in July 2019.²⁷ That being said, these firms continue to hold fruitful funding rounds while new entrants are dying off.

Given state backing, some Chinese space startups are able to offer products at a steep discount, such as Expace's Kuaizhou-11 launch system - financed via the SOE China Aerospace Science and Industry Corporation (CASIC) - which sells for only a fifth of the market rate.²⁸ Such predatory pricing could be critical to gaining a greater chunk of global market share, especially given the high price point of American products which currently occupy a majority of the market. It is a similar developmental strategy that China followed with its military-adjacent drone manufacturer DJI, which rode cheap prices into a dominant market share position.²⁹

²² *Id.* at 45.

²³ See, e.g., "Industry Catalogue Encouraging Foreign Investment" (鼓励外商投资产业目录). July 30, 2019.

²⁴ Liu et al. at 55.

²⁵ *Id.* at 39.

²⁶ Jones, Andrew. "LandSpace Fails to Reach Orbit with Milestone Private Chinese Launch." *Space News*. October 27, 2018.

²⁷ Jones, Andrew. "Chinese iSpace Achieves Orbit with Historic Private Sector Launch." *Space News*. July 25, 2019.

²⁸ Cooley, Thomas et al. "State of the Space Industrial Base: Threats, Challenges and Actions." *The Air Force Research Laboratory, Defense Innovation Unit*. May 30, 2019. 1-21, 11.

²⁹ Bateman, Joshua. "China Drone Maker DJI: Alone atop the Unmanned Skies." *CNBC*. September 1, 2017.

Additionally, the domestic Chinese market and a chunk of BRI countries provide some elbow room for Chinese space startups to find their footing away from the US, which is more averse to these markets due to aforementioned security concerns. So, while these firms face challenges in China's "brand image" problem and its associated supply chain risks, as well as a newfound emphasis on performance metrics, low prices and relatively untapped markets leave plenty of room for growth.

c) Uncertainty in Exit

Perhaps one of the biggest question marks going forward is the exit strategy for venture capital in China's commercial space sector, and in fact this is not limited to China. There is yet to be an IPO for a space launch vehicle startup anywhere.³⁰ That does not mean there are no options, though. In 2009, the Shenzhen Stock Exchange launched ChiNext, a NASDAQ-esque exchange for high-tech and innovative companies, and in 2018 Xi Jinping himself championed the Shanghai Stock Exchange's launch of the Science and Technology Innovation Board (STAR market) which serves a similar purpose as ChiNext. That being said, only one Chinese commercial space startup - PIESAT, a small satellite startup³¹ - has successfully completed an IPO on one of these exchanges. Of course, the commercial space sector itself is nascent, and many of those interviewed in the Liu et al. study expressed a desire to exit via IPO,³² but the journey will be longer than Chinese venture capitalists, who tend to operate on a 3+1 year timeline,³³ have preferred. For such a time, labor, and resource-intensive industry, the VC timeline will need to stretch out closer to the American 8+ year approach,³⁴ with some players

³⁰ Liu et al. at 62.

³¹ Platonov, Ivan. "To the STARS: PIESAT Prices Its IPO at CNY 17.25 per Share." *Equal Ocean*. July 12, 2019.

³² Liu et al. at 36.

³³ *Id.* at 33.

³⁴ Huang, Zhaojun and Tian, Xuan. "China's Venture Capital Market" in *The Handbook on China's Financial System*. PBCSF-NIFR Research Paper. November 24, 2020. 1-66, 21.

claiming exits in the space industry could occur in “10 years, 20 years or maybe never.”³⁵ It is a uniquely long-term game, but that does not mean it is not profitable.

Additionally, should Chinese firms follow in their American counterparts' footsteps in terms of exits, private equity and M&A will play a larger role than usual. In 2019, eleven US space startups were acquired, trending up from eight in 2018.³⁶ One notable distinction between the Chinese and American investor environments, however, is that in China VC, PE, and even many startups themselves tend to link back to the morass of government capital and “guidance funds,” whether at the central, provincial, or subsidiary level. Whereas in the US PE funds are considering consolidating smaller and diverse space startups into larger, more integrated businesses, a similar process in China could be guided by a stronger governmental hand under the developmental plan of civil-military fusion. As such, the Chinese government may be much more intimately involved in any VC exit strategy than we would see from its US counterpart.

d) Replicating the SpaceX Venture Capital model too quickly

Further research on China's top private VC firms in commercial space might show how venture capitalists are navigating Provincial and Central Government relations. How China's space startups, private venture capital, Provincial and Central Government learn and adapt from observing the U.S venture capital - space industry complex is also key. SpaceX raised \$1.9 billion in funding in August 2020, bringing its total raised to \$5.4 billion.³⁷ The comparison by size with the funding rounds of China's iSpace and LandSpace in August is stark and may suggest that the replicability of the SpaceX venture capital model will require more than simply capital but a mature legal and financial landscape of contract enforcement, IP rights and a

³⁵ Werner, Debra. “The Space Sector Is Finally Finding Its Way to the Exits.” *Space News*. August 12, 2020 (quoting Max Polyakov, founder and CEO of Earth Observing System).

³⁶ *Ibid.*

³⁷ van Romburgh, M., 2020. *SpaceX Valuation Rockets Higher With New \$1.9B Funding Boost*. Crunchbase News

stability of rules. Commercial space-specific regulations and policies such as the June 2019 *Notice on Promoting the Orderly Launch of Commercial Vehicles*, suggest the regulatory space is forthcoming.³⁸ An area for future study will also be the effect of the coronavirus pandemic on new competition for seed funding with biotechnology and other health-related technology sectors.³⁹

There is also however a danger of overreach in too many directions at once. In *Engineering a Venture Capital Market: The Case of China*, Lin suggests that ‘replicating the American experience in the creation of a venture capital market brings up Ronald Gilson’s “simultaneity problem” where three central inputs must be simultaneously available: (1) entrepreneurs, (2) providers of capital with the appetite for high-risk, high-return investments, and (3) specialized financial intermediaries which serve as the nexus of a set of sophisticated contracts.’⁴⁰ A key issue for venture capital in China’s commercial space sector will be how China’s legal system evolves to effectively enforce the various contracts covering the entire venture capital cycle, ranging from fundraising, to the venture capital fund’s investment in a portfolio company, and as earlier explored, to the exit by which the VC fund’s investment is realised.⁴¹

Conclusion

Looking ahead, there is tremendous growth potential for the Chinese commercial space sector, but the four challenges above are the key obstacles to realizing this potential. The improvement of due diligence and maturation of China’s unique public-private VC landscape, reliability of supply chains, demonstration of proven and lucrative exit avenues, and - perhaps above all - patience are the near-term goals for this dynamic industry as it launches into the future.

³⁸ Liu et. al at 15

³⁹ See e.g. Curcio, Blaine. China’s Space Industry in the Time of COVID-19, June 01 2020. Note the dropoff in funding for Chinese commercial space companies in 2020 in Figure 2

⁴⁰ Lin, L., 2015 at 1

⁴¹ Id. at 44.

Appendix

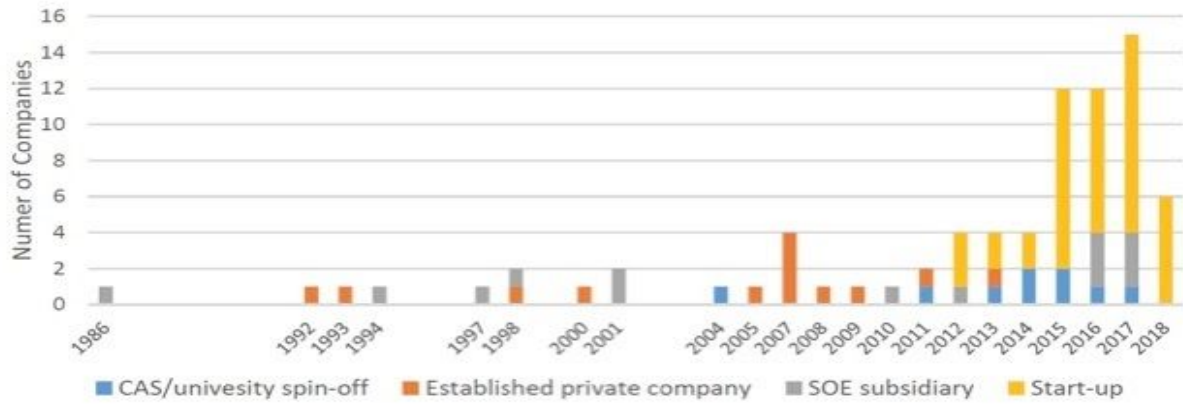


Figure 3. Date and Type of Commercial Space Sector Startups, from Lin et al. at 40.