CHAPTER 3

# SOVEREIGN WEALTH FUNDS AND INNOVATION INVESTING IN AN ERA OF MOUNTING UNCERTAINTY

**Jerome Engel**, University of California, Berkeley
**Victoria Barbary**, International Forum of Sovereign Wealth Funds
**Hamid Hamirani**, Ministry of Finance Oman
**Kathryn Saklatvala**, bfinance[1]

Sovereign wealth funds (SWFs) have become a major factor in technology and innovation investing globally. They have emerged as important sources of capital to traditional venture capital firms and increasingly, as direct investors. SWFs differ from many other investors in their character, risk tolerance, priorities, and time horizons. Understanding their characteristics and behaviors is increasingly important for all participants in the technology and innovation investing marketplace.

Over the past decade, a rapidly evolving investment climate has required SWFs to change with the times. Some major SWFs have become sophisticated long-term technology investors as they have reacted to the impact of disruptive technologies and business models. These disruptive factors have been compounded by the uncertain investment climate and emerging geopolitical trends, such as increasing nationalism and trade wars.

How are SWFs evolving? Increasingly these investors are looking to:

- Identify disruptive ideas or technologies—particularly in growing, proven technology sub-sectors, such as enterprise software and services.
- Allocate capital for investment in companies at earlier stages of capital formation.
- Use their investing capacity to enhance domestic economic competitiveness and well-being. This is being accomplished by investing globally in opportunities for technology transfer and business models extension, and increasingly in direct investing in domestic opportunities.
- Expand adoption of co-investment strategies, often side by side with venture capital funds.
- Consider investing in evergreen-style funds to better align with SWF long-term time horizons.
- Seek more active and constructive investor roles given current concerns over valuations, governance, and initial public offerings.
- Move towards attractive sectors with significant public policy, foreign policy, public safety, national defense, and security implications.
- Develop their internal human capital and management structures to manage the complicated financial landscape.

The rapid pace of change in the technology and innovation sector, exemplified by recent political, environmental, and global health challenges, assures that SWFs will need to continue to evolve to respond responsibly and proactively to these important challenges and opportunities.

## Innovation investing strategy and tactics

The State of Alaska is known for its soaring mountain ranges and glaciers, grizzly bears, salmon, and perhaps its huge reserves of crude oil. Cutting-edge biotechnology is unlikely to be on your list of Alaskan features. But, since 2013, the Alaska Permanent Fund Corporation (APFC), the state's sovereign wealth fund,[2] has seeded innovative life-science companies with hundreds of millions of dollars, often alongside venture capital specialists ARCH Venture Partners: Codiak Biosciences (based at the Massachusetts Institute of Technology), San Francisco-based Denali Therapeutics, and Juno Therapeutics, headquartered in Seattle. Despite their diverse locations, their names reveal their Alaskan roots.

APFC is one of many sovereign wealth funds that has been allocating a greater part of their portfolios to stakes in early-stage and unlisted innovative technology companies. Although Alaska's sovereign wealth fund was a relatively early entrant to the sector, by 2016, this trend could not go unnoticed. This was the year when SoftBank established its now beleaguered Vision Fund with the backing of major Middle Eastern government investors. It was also the year when Saudi Arabia's Public Investment Fund made a headline-grabbing US$3.5 billion investment in another rather ill-fated company, ride-sharing app Uber.

Since then, sovereign wealth funds have shown a continued appetite for unlisted high-tech companies both in the United States of America (U.S.) and Asia. This has been an active choice for sovereign wealth funds that invest capital abroad with a multi-decade return horizon and view the lack of liquidity as an opportunity to earn higher returns. Their patient capital is also a competitive advantage for the early-stage firms in which they invest as, unlike venture capital firms and private equity companies, they don't have to exit investments to provide liquidity for their stakeholders on a fixed deadline, typically no longer than 10 years.

Equally, for these early entrants, sovereign wealth funds are attractive co-investors. Many new technology companies[3] with capital-light business models have chosen to defer achieving profitability for the sake of fueling growth. Time to liquidity for early-stage investors has always presented a challenge. But in today's global economy, where winner-takes-all companies such as Google and Amazon have become a model, tech companies that appear fixed-capital light become vast consumers of liquid financial capital to support customer acquisition. The fickle initial public offering (IPO) market may not be receptive when investor patience is in short supply. Consequently, investors often rely on a sale to a commercial buyer or another private equity fund to exit ("pass-the-parcel") or choose to hold onto these companies for a longer period. On the New York Stock Exchange, 2019 was meant to be a bumper year for IPOs, but Uber and its competitor Lyft debuted in the first half to limited investor appetite over concerns about the companies' prolific losses. During 2019, some of the fastest growing and most highly valued start-ups in the world, including Pinterest, Slack, and SmileDirectClub, failed to excite investors due to their failure to generate profits. Other much-vaunted IPOs, including WeWork's parent company and talent agency behemoth Endeavor, failed to list at all. The story was much the same in Hong Kong, China, which despite being the leading destination for IPOs in 2019,[4] saw a drop of 7% in overall value of IPOs and 28% in volume overall from 2018, even accounting for the US$11.3 billion debut of China e-commerce giant Alibaba.[5] Indeed, globally IPO activity fell by 20% to 1,242, and capital raised fell 8% to US$206.1 billion, according to law firm Baker McKenzie.[6]

But in a climate of resurgent nationalism and trade wars, politicians are becoming more cautious about foreign direct investment (FDI), particularly in those sectors that they perceive to have greater strategic sensitivity. Concerns about sovereign wealth fund investments do not have to be sparked by SWF behavior. In 2006 and 2007, it was the Dubai Ports World controversy that pushed FDI up the U.S. political agenda and catapulted the newly named category of sovereign wealth funds into public consciousness. In 2019 and 2020, the most high-profile case of this type of reaction has been the ban on China's leading telecom firm, Huawei, being involved in the construction of 5G networks in several countries, including the United States, Australia, and New Zealand. For investors like SWFs that acquire assets overseas and are linked to governments, it is a balancing act to be able to invest without getting caught up in political disputes.

But while there are emerging challenges for sovereign wealth funds investing abroad, over the past half-decade, a new trend has been the formation of SWFs specifically to invest in their domestic economies—to foster economic development and diversification and to improve the lives of their citizens. Governments from all over the world, for example, France, Ireland, Turkey, Kazakhstan, Morocco, Oman, and Singapore have established such institutions. Additionally, many sovereign wealth funds that have a traditional mandate for overseas investment are increasingly being encouraged by their owners to look at more investment opportunities in the local economy—or use their international investing to encourage technology transfer or business model extension into the local economy. Internet-based services are increasingly pervasive in modern life across the planet, and, as a result, innovation is not just relevant in a narrow range of science-based activities, high-tech activities, or manufacturing. SWFs investing at home, therefore, have greater opportunities to invest in companies with innovative products that can potentially be a potent force of change in all parts of society, including service industries, creative industries, and the public sector.

We are only at the beginning of this trend. While domestic investments are still a small proportion of the whole, they have grown in number year-over-year since 2015. Nevertheless, these investments come with their own challenges: avoiding conflicts of interest and unsound, politically motivated investments, and preventing crowding out private capital.

In this article, we will describe these two trends and explain how and why SWF investment behavior in the unlisted technology space has changed over the past half-decade.

## The innovation investment boom: harnessing the power of Silicon Valley...and China

Before 2015, SWFs had been increasing their investment activity in unlisted technology businesses employing a combination of fund investments, such as private equity or venture capital, and direct equity holdings, such as co-investments, standalone stakes, and club deals.[7]

Of course, SWFs were far from alone for increasing their exposure to technology and other types of illiquid assets, including infrastructure, direct lending, and private equity.

Pension funds and endowments have similarly been drawn by three key attractions:[8] perceived higher return potential, diversification from traditional return streams towards idiosyncratic growth drivers, and insight into how today's major technological developments will affect the investor's wider portfolio. Sovereign wealth funds had similar advantages, including being perceived as financially stable and able to act as patient capital. They also had unique advantages, for example, helping their domestic political and business networks support the growth ambitions of investee companies, as the China Investment Corporation (CIC) has done with its CIC Capital unit.[9]

Recently, however, there have been some significant shifts to the underlying dynamics of the market. Capital inflows to the unlisted technology and innovation investment arena have increased from new "non-traditional" participants—investors that do not focus exclusively on venture capital investments, including corporations, private equity firms, mutual funds, family offices, and SWFs. These non-traditional investors contributed to nearly 3,000 U.S. venture capital deals in 2018, influencing deal valuations and structures in transactions totaling over US$100 billion (81.5% of the U.S. total deal value).[10] These investors often invest at the later stages of the venture capital cycle and have thereby contributed to the spike in the number of *unicorns*—portfolio companies with valuations of greater than US$1 billion. In the face of this disruption, it is, perhaps, important to note that certain SWFs are emerging as sophisticated technology investors. As a result, the overall picture of how SWFs allocate capital in this space requires deeper analysis. Although it is almost impossible to track the changing patterns of SWF technology investment activity conducted through private equity and venture capital funds, we can examine direct deals in considerable detail, thanks to the research undertaken by the International Forum of Sovereign Wealth Funds.[11] This data can provide a window on recent SWF innovation and technology investment trends.

SWF technology investments are primarily focused on the U.S. and Asia, with the European Union (EU) remaining somewhat less attractive as a destination. This reflects a broader theme, as opposed to an SWF-specific concern: the current distribution by home region of the value of technology companies reveals the big gap that exists between the EU (5%), the U.S. (65%) and China (35%).[12] A recent report to the European Commission by the Expert Group on Regulatory Obstacles to Financial Innovation attributed this laggard status to lack of regulatory harmonization across EU states, although it cited other factors, including the structure of the venture capital ecosystem and an unconducive tax framework.[13]

## A shifting focus from consumers to intellectual property

In the mid-2010s, SWFs direct investment focused on consumer services with high-tech elements, such as e-commerce and consumer technology, as illustrated in Figure 3.1. Over the last five years, however, SWF investment in e-commerce has slowed from its 2016 peak of 17 equity investments with a total value of US$6 billion to 7 investments in 2019 valued at US$185 million. E-commerce, particularly in emerging markets, has become less attractive to sovereign wealth funds.

The slowdown has been the result of several factors. Some SWFs felt overexposed to the Chinese economy and had already chosen their regional champions. The e-commerce sector has largely consolidated with a few global champions impeding new entrants, such as Amazon in the U.S. and Europe and Alibaba in China. The only regional market with more competition is India, where, in 2018, U.S. retail giant Walmart acquired 77% of Indian e-commerce company Flipkart, whose original backers included Singapore's GIC and the Qatar Investment Authority, among others.

With these more accessible sectors becoming of less interest to SWFs, they are now thinking more systematically and pragmatically about disruptive innovation. Rather than trying to find the platform that could create the next transformational technology ecosystem, they are looking to invest in a disruptive idea or technology that several potentially winning companies might be developing. The strategy allows active monitoring, making a judgment on which will be the strongest opportunities, and consolidating their investments as the markets and products develop.

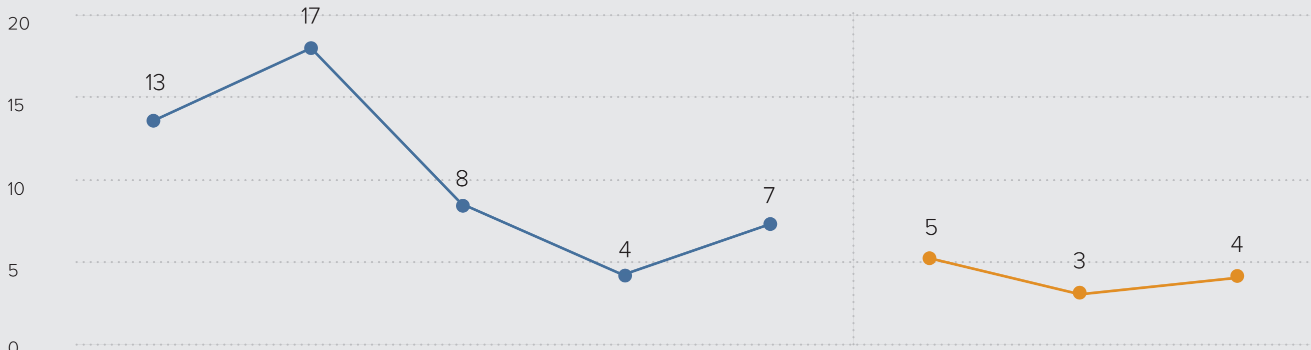
As illustrated in Figure 3.2, SWFs often identify these businesses in growing subsectors, such as enterprise software and services—advanced, practical technologies that solve problems and create opportunities for customers. Such companies are often more reliant on their intellectual property for success and benefit from scale and network effects as they become established. Consequently, they are potentially less vulnerable to competition and remain highly capital efficient, while requiring relatively large capital investment to support initial customer acquisition and global expansion. This makes them a good fit for long-term investors willing to put additional capital to work in successive rounds. In 2018 and 2019, these niches attracted 10% of all SWF direct investments. A notable example of this is Singapore's Temasek Holdings' US$250 million acquisition of Israeli cybersecurity services provider Sygnia. Saudi Arabia's Public Investment Fund continues to produce the most high-profile deals, such as its US$400 million commitment to the Series D round for augmented reality giant Magic Leap, which had previously attracted investments from Temasek.

APFC is not the only SWF interested in life sciences. Healthcare technology is another sector where activity has risen in the past half-decade, as shown in Figure 3.3. In this industry, SWFs are focusing on a few highly disruptive niches, such as biotechnology, and avoiding overly competitive sectors or those with significant regulatory risk, such as pharmaceuticals or medical equipment and supplies. Biotechnology is attracting huge interest, partly because investors have realized the commercial opportunities arising from developments in innovative FDA-approved gene editing technologies.

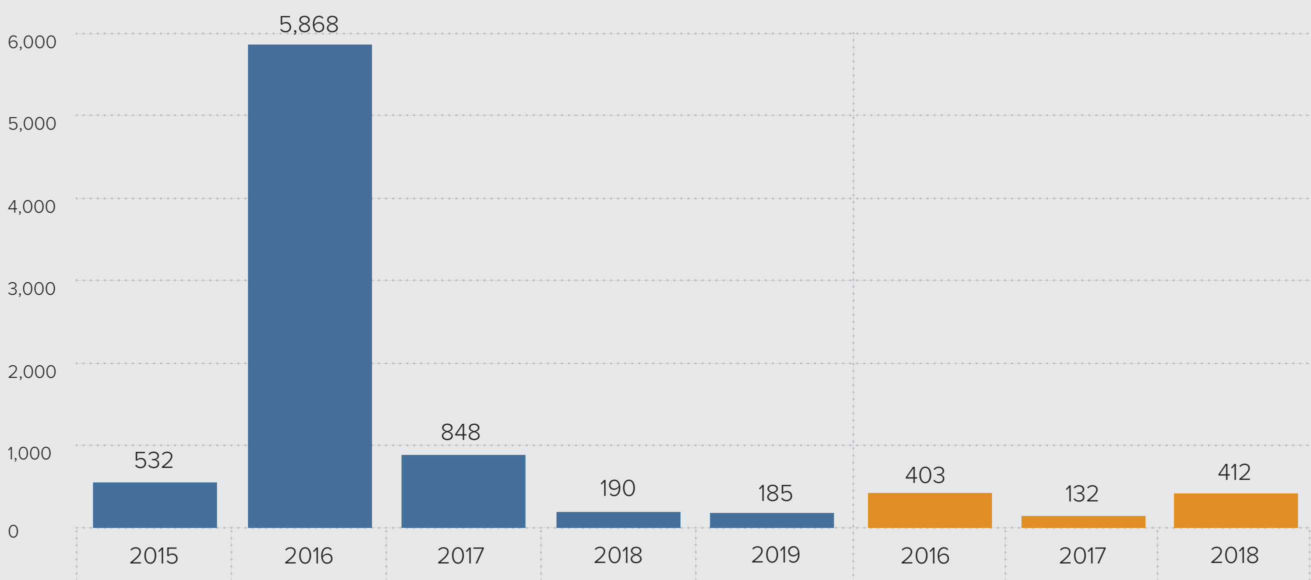
SWF investment in companies developing cutting-edge biotechnology has recently been brought into sharp relief by the coronavirus pandemic. Vir Biotechnology—backed by three

FIGURE 3.1

## SWF direct investments in e-commerce and consumer services




▲ Number of deals



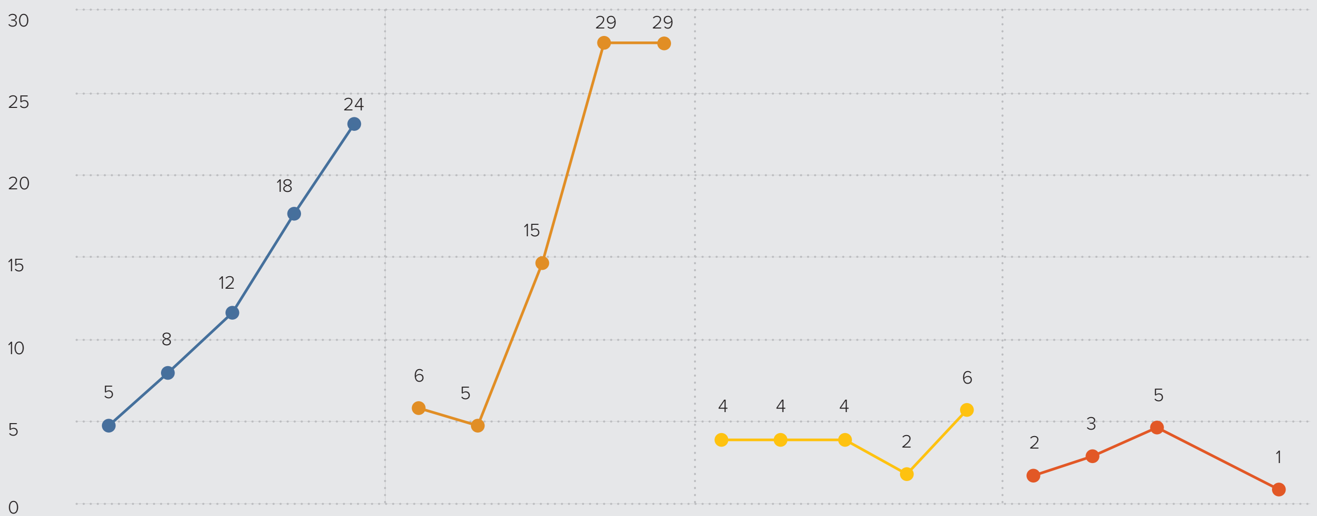

▲ Equity, US$ million

■ E-commerce ■ Consumer services

Source: International Forum of Sovereign Wealth Funds (IFSWF) Database, 2020.
Note: IFSWF's data to 31 December 2019, is provisional as of 31 January 2020. There may, therefore, be discrepancies between the figures used here and those in future publications using this data. The data collection methodology is accessible at https://ifswfreview.org/2018/about-our-data

FIGURE 3.2

## SWF direct investments in technology sectors

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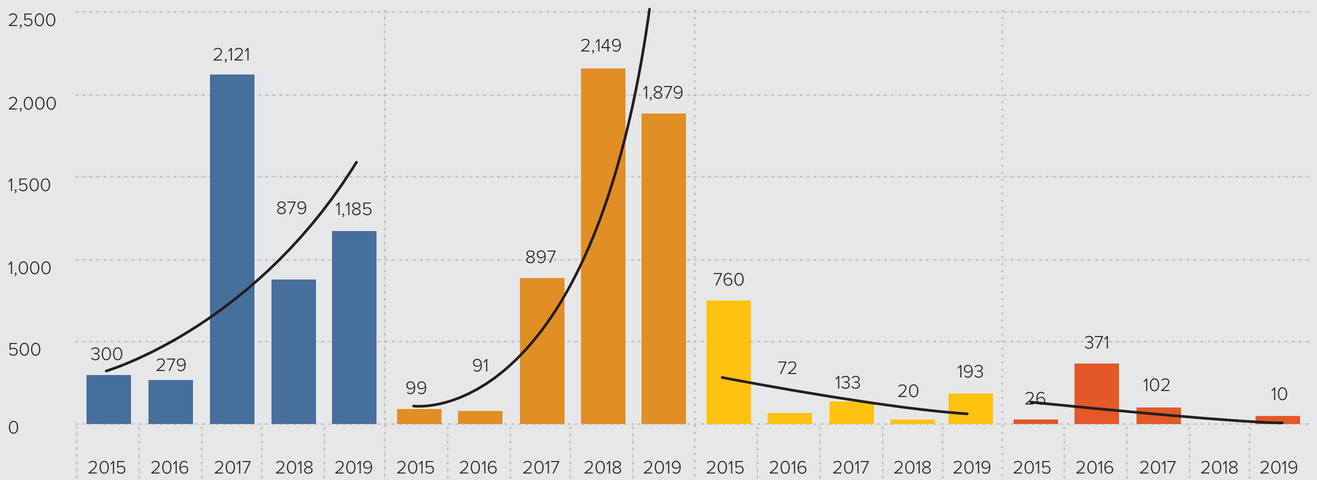


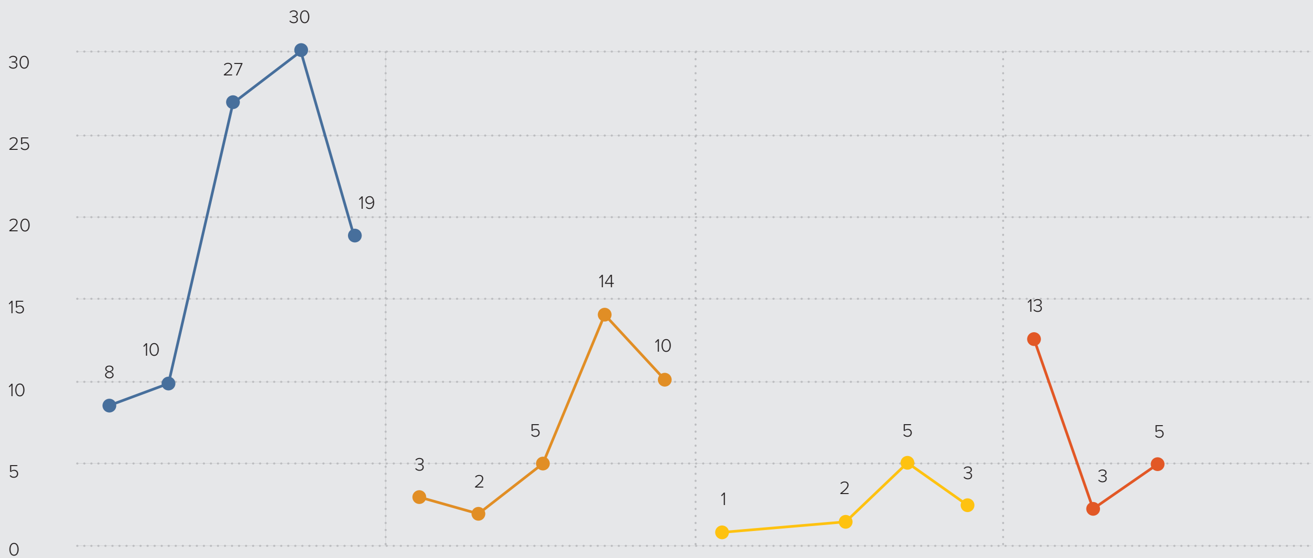

▲ Equity, US$ million

■ Internet ■ Software & services ■ Hardware ■ Mobile & telecom

Source: IFSWF Database, 2020.
Note: SWFs made no direct investments in mobile & telecom companies in 2018.

FIGURE 3.3

## SWF direct investments in healthcare

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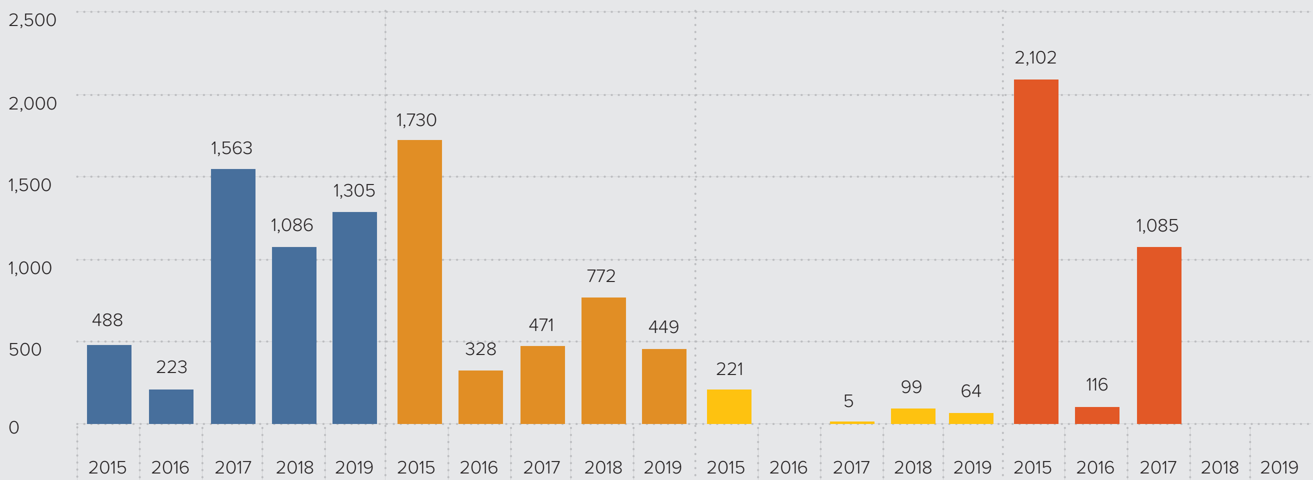



▲ Equity, US$ million

■ Biotechnology ■ Healthcare providers ■ Medical equipment ■ Pharmaceuticals

Source: IFSWF Database, 2020.
Note: In 2016, SWFs made no direct investments in medical equipment. In 2018 and 2019, they made no direct investments in pharmaceutical companies.

SWFs (Abu Dhabi Investment Authority, APFC, and Temasek)—announced in January 2020 that it was working on a vaccine to help neutralize the outbreak and announced a partnership with Alnylam Pharmaceuticals to develop and commercialize RNA interference (RNAi) therapeutics targeting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease (COVID-19).[14] As a result, the stock of this previously obscure NASDAQ-listed start-up initially surged from US$16 to US$75, as stock markets responded to fears of a global outbreak. Even amid the market rout of March 2020, the company's share price remained robust (Figure 3.4).

## Earlier stages

In a low-return environment, more institutional investors are looking to increase their returns by allocating to private equity and venture capital. Consequently, private equity and venture capital firms have a record amount of uncommitted capital, or "dry powder", to put to work. With competition rising in the buyout and mid-market spaces, experienced SWFs are developing the skills to allocate capital for direct investment in companies at earlier stages of capital raising. As illustrated in Figure 3.5, in 2018, SWFs completed 29 transactions at growth-capital stage (series C, D), up from 19 the previous year, and doubled their commitments at early stage (A, B, B+), with 20 deals versus 11 in 2017.

Although early-stage and growth companies are becoming more interesting to SWFs, this doesn't preclude investments in later-stage or pre-IPO companies in cases where they see value; in 2019, for example, SWFs invested in 18 late rounds of capital raising (from Series E to H), up from 3 only two years before.

## Collaboration, co-investment, and lead financing

SWF approaches to sourcing these direct deals vary. An increasingly common strategy is for SWFs to co-invest with their venture capital managers—an approach also adopted by other institutional investors. However, some SWFs can, and do, lead transaction financing at early- or growth-stage, with or without venture capital or private equity firms. In 2019, SWFs led a total of 27 funding rounds—7 early stage, 12 growth, and 8 late stage—representing an increase of more than 100% versus the previous year (Figure 3.6).

Over the last five years, SWFs have invested alongside a range of partners. In 2019, the trend of sovereign funds investing as part of consortia reached its highest level, particularly in sectors such as healthcare and technology: sovereign funds' involvement in consortium deals in technology companies has more than tripled since 2016. In 2019, the trend continued with SWF preferring to partner or co-invest in innovative industries. Eighty-three deals in healthcare and technology were completed as part of a consortium, versus sixteen as solo investors.

The healthy activity in direct investment is supported, to some extent, by the limitations of the conventional limited partner/general partner (LP/GP) fund structures. Fee structures, fund life cycles, and other aspects of the private equity model do not necessarily create alignment of interest or maximize long-term benefits to SWF investors—although access to co-investment can help. We note a rise in newer, innovative models such as deal-by-deal co-investment structures and even evergreen-style funds.

The last few years have seen the emergence of many innovative venture capital structures to incentivize research commercialization on a specific campus or university basis. Founded in 2015, Oxford Sciences Innovation (OSI) is one noteworthy example. OSI achieved scale, raising US$700 million in its initial fundraising and bringing together SWFs Temasek and the Oman Investment Fund, along with value-added tech investors Google Ventures and Sequoia Capital. Structured as a corporation, in which the University has an equity interest, it is an evergreen fund, which frees it from many of the time constraints of a traditional venture capital firm. Operating in partnership with the University of Oxford, OSI provides investment assessment and perhaps financing to research originating from the University in return for a certain percentage of a portfolio company's equity, even where OSI has chosen not to invest capital. Here the investors are not limited partners but hold equity in the business and receive returns in the form of stakeholder dividends and potential capital appreciation.

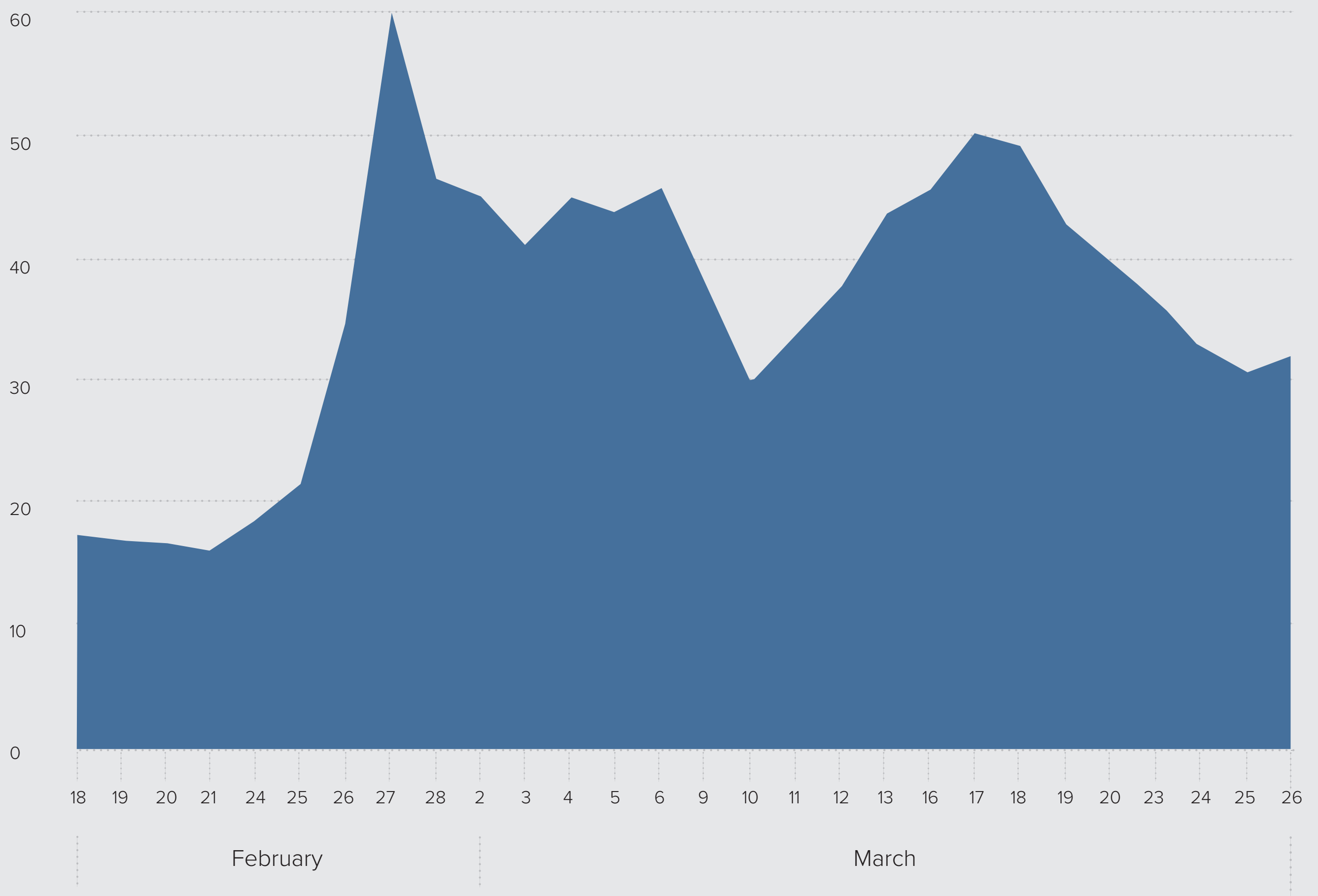
The individual structures that an SWF adopts when investing with partners largely depend on its internal private equity or venture capital capabilities. Research by the International Forum of Sovereign Wealth Funds published in 2016 noted that hiring the right people is key to the success of private-market investing, and this is particularly true for complex and evolving businesses in the technology space. As many sovereign wealth funds are based outside major financial centers, attracting and retaining talent that can successfully invest in technology requires creative solutions.[15] To attract this talent, obtain a detailed understanding of the ecosystem, and develop high-quality deal flow, some SWFs, such as Singapore's GIC and Temasek, Malaysia's Khazanah Nasional, Abu Dhabi's Mubadala Ventures, and the Qatar Investment Authority (QIA), have set up offices and subsidiaries in Silicon Valley.

## Improving skill sets and rethinking teams

The most prolific SWF innovation investors—Mubadala, Temasek, and (historically) Khazanah,[16] which together are responsible for half of all the SWF investments in this sector from 2015 to 2019—have their roots in running operational businesses. Temasek and Khazanah were initially formed to manage and improve the performance of government-linked companies in 1974 and 1993, respectively. Similarly, Mubadala was established in 2001 to diversify and develop the economy of Abu Dhabi and has deep experience in building industrial clusters and running operational businesses, including in the

FIGURE 3.4

## VIR Biotechnology, NASDAQ stock values, February to March 2020

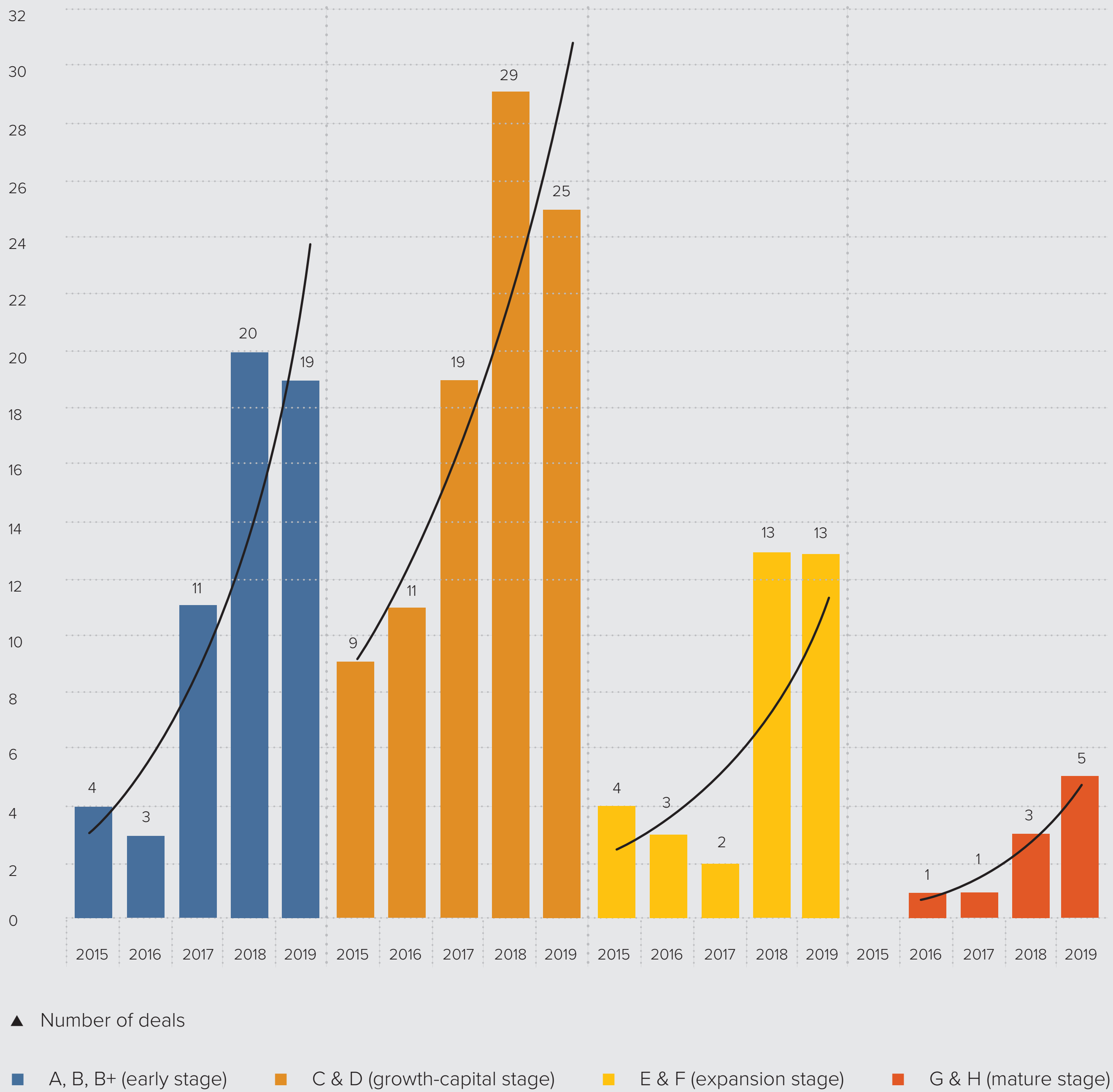



▲ US$, share price

Source: Bloomberg.

FIGURE 3.5

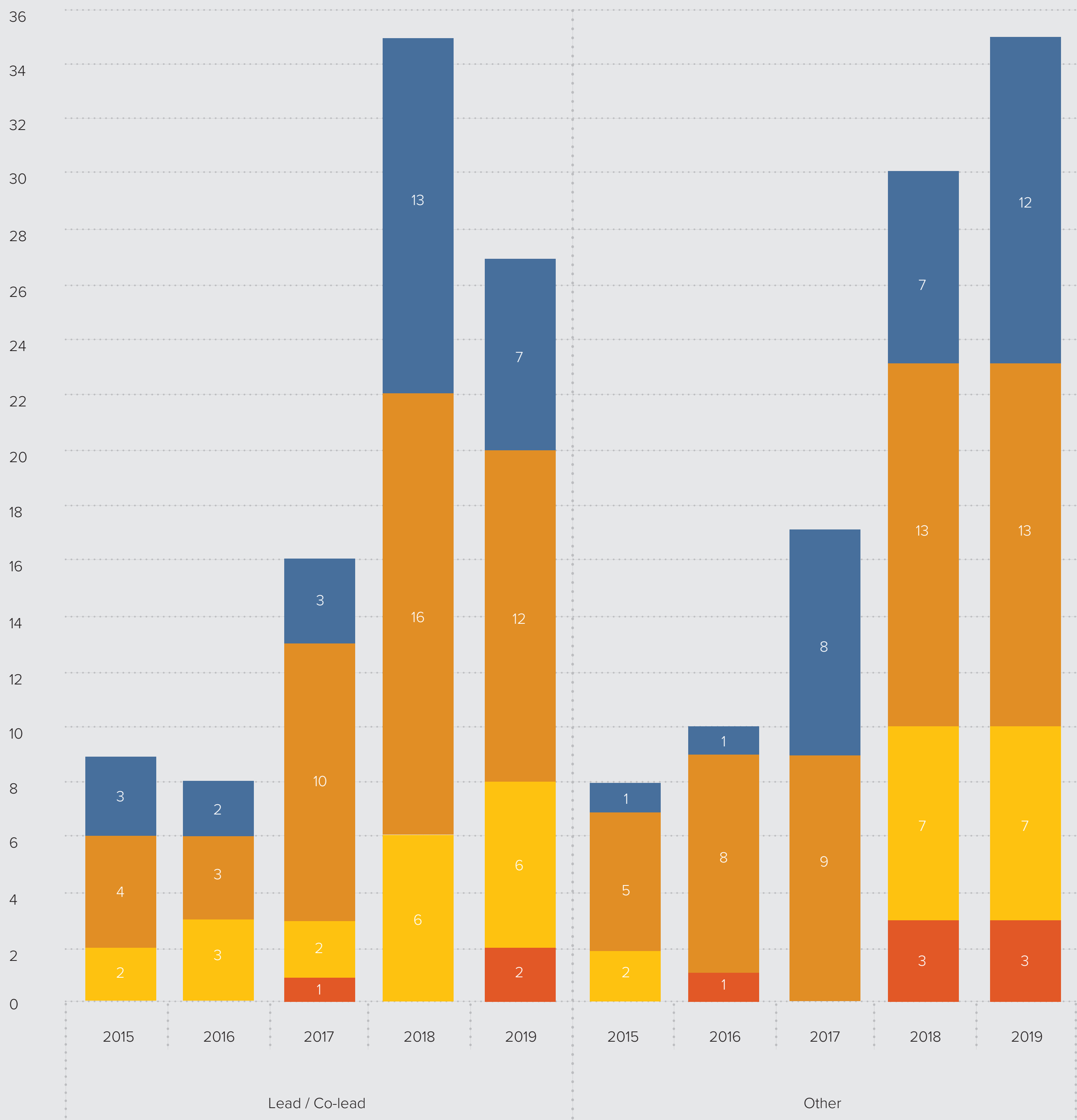
## SWF direct investments at different stages of venture financing, 2015-2019




Source: IFSWF Database, 2020.
Note: SWFs made no G&H round investments in 2015.

FIGURE 3.6

## SWF investments as a lead, by stage of financing




▲ Number of deals

■ A, B, B+ (early stage) ■ C & D (growth-capital stage) ■ E & F (expansion stage) ■ G & H (mature stage)

Source: IFSWF Database, 2020.

information and communications technology sector. It appears that, in the unlisted tech arena, this insight and corporate culture provides them with a competitive advantage over their peers that invest excess reserves in international markets and build such capabilities from scratch.

Highlighting the character of the three most prolific SWF investors in early-stage technology companies reveals the importance of developing human capital with appropriate skills and mindsets. In 2016, the authors identified several best practices that remain relevant, including building long-term, multi-vintage relationships with fund managers; developing competence to participate meaningfully in board governance; and learning and practicing value-added behaviors with fund managers and portfolio companies.[17]

To successfully execute more direct, early-stage, and multi-stage investments, SWFs need to develop hands-on skills in every aspect of portfolio construction and governance. Investing in technology and innovation requires a diverse range of people with different skills and backgrounds. SWFs are increasingly aware that cognitive diversity in teams helps them better understand the relevance of the business's products, markets, and financial potential as well as non-traditional issues, such as data privacy. These skills can be developed organically, but the pace of change may require an infusion of experienced venture capital-sector operators to augment the process. Such changes need to be made with intention and care. The recent move toward more fundamental technology and innovation platforms may also call for new skill sets in technology and intellectual property assessment as well as corporate governance and deal management. The rapidly evolving nature and manner of SWF technology and innovation investment will require heightened and continuing attention to SWF governance structures, investment team competency, behavior, and development. However, for SWFs, which are public-sector institutions, the cost and complexity of recruiting these skills may be out of their reach. Consequently, SWFs are likely to avoid investing directly and instead continue to rely on more traditional fund investments with co-investment rights.

Another upgrade that SWFs need to make to enhance investment outcomes in the unlisted technology is in governance and decision-making frameworks. Research from the International Forum of Sovereign Wealth Fund (IFSWF) in 2016 also revealed that to be successful in private markets generally, sovereign wealth funds needed to improve these processes to balance the markets' complexity. For investment opportunities at the cutting edge of innovation, this is even more important, as the risk is undeniably higher. Therefore, sovereign wealth funds need to build strong and deep due diligence frameworks to enable them to move decisively when opportunities arise.[18]

## Geographic disparity: "technology transfer" yet to yield fruit

The concept of technology transfer used to be an important driver for SWFs. Abu Dhabi's Mubadala was an early and leading proponent of this strategy as it sought to build a semiconductor cluster in Abu Dhabi, forming the GLOBALFOUNDRIES semiconductor manufacturing company with Advanced Micro Devices (AMD) in 2009.[19]

While this strategy is perhaps less important for SWFs today, there is anecdotal evidence that some are now choosing—or encouraged—to invest at home to spur local industries. One example of this home market technology and innovation investment strategy is in Nigeria, where the Nigeria Sovereign Investment Authority (NSIA) has invested heavily in healthcare technology in the country. In 2019, NSIA invested US$11 million, in partnership with the Lagos University Teaching Hospital, to rebuild and equip the hospital's cancer center for the provision of cutting-edge radiotherapy and chemotherapy treatment services. Equipping the cancer center required building strategic partnerships with leading oncology equipment manufacturers, including Varian Medical Systems and GE Healthcare. While this is a new investment with an obvious social need, it has, so far, been "very profitable" for NSIA, according to senior executives.

Domestic technology investments make up only a fraction of the overall total, as shown in Figure 3.7. However, the number of domestic tech investments is growing as sovereign wealth funds like the Russian Direct Investment Fund and the Ireland Strategic Development Fund (ISIF) seek to encourage foreign direct investors to help build innovation clusters. These sovereign wealth funds thus play a key role in implementing a government's innovation policy by de-risking projects that would otherwise have proved difficult to finance. For example, in 2018 and 2019, ISIF invested in Vectra, an artificial intelligence cybersecurity company, to establish and then expand its research and development center in Dublin.[20]

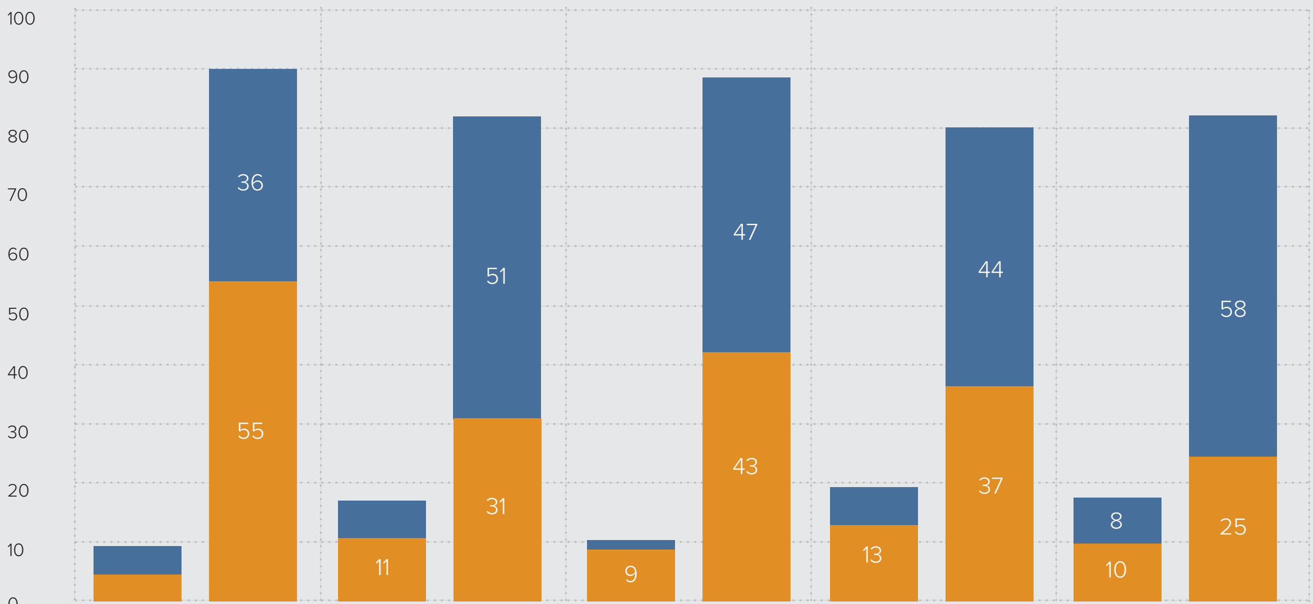
## Postscript: new political challenges?

The evolving political and economic climate since 2008 has brought about a revival in political and economic nationalism. Although SWFs have largely avoided being caught in high-profile disputes, we hear substantial anecdotal evidence that U.S. investors have been less welcoming of Chinese and Saudi SWF money during recent periods of heightened political sensitivity. This trend is also likely to be reinforced by geopolitics, such as exogenous developments including the U.S.-China Phase One Trade Deal agreed to in January 2020, which explicitly requires China to avoid pressuring U.S. companies to share technology with local joint venture partners or sell licensing to their technology at below-market prices for access to China's market. Looking more broadly, the decline in foreign direct investment is evident: Chinese FDI in U.S. industries fell in 2019 to an estimated US$3.1 billion—a fraction of the US$46.5 billion in 2016, and a decline of 42% from the US$5.4 billion in 2018, according to Rhodium Group.[21]

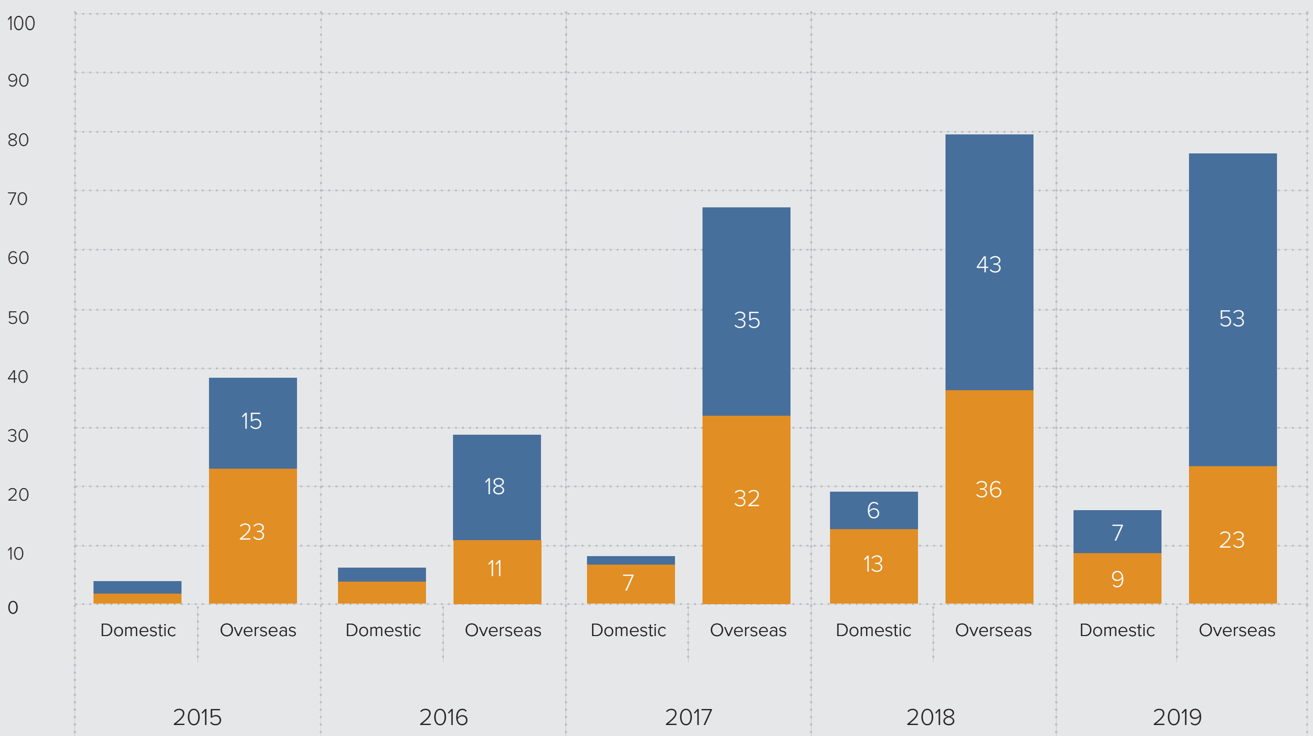
In today's investment climate, sovereign wealth funds with high-quality technology investment programs are likely to be attracted to sectors that may have significant public policy, foreign policy, public safety, national defense, and security

FIGURE 3.7

## Domestic SWF investments in technology




▲ % of total number of deals




▲ Number of deals

■ Technology ■ Healthcare

Source: IFSWF Database, 2020.

implications. This is not a politically motivated move; in a market where many tech businesses struggle to turn a profit, these types of products and services often have more robust intellectual property-based business models and income streams.

However, while geopolitics remains a major consideration for SWFs investing in foreign technology companies, there is a new frontier for political considerations—those of major global technology companies. As firms such as Alphabet, Facebook, and Amazon gather ever more data about their users, they are increasingly shaping people's lives and politics. For a government-owned investor looking to back major new technologies in an era where start-ups can quickly emerge as dominant global players—and big data can have unforeseen or unintended consequences—it is essential that they look ahead to these considerations and understand the potential reputational and political implications, both for them as an investor and for their government as an owner.

Additionally, SWFs may be seeking a more active investor role, given current concerns over valuations, governance, and IPOs. The latter implies more access to company data, board or observer seats, and use of voting rights. All these elements increase the likelihood of drawing greater negative attention from policymakers, perhaps creating more impetus for regulatory intervention in cross-border activity.

This is also a relevant question for SWFs investing in technology companies at home. Financial technology (fintech) and social media demonstrate that innovation is ubiquitous in our daily lives, and, in many countries, the role of the government in these companies could potentially raise questions from home citizens. SWFs can provide a strong governance framework, risk appetite, investment expertise, financial capacity, and culture to help grow these companies. However, if governance is compromised, then there is a particular risk that these institutions are captured by politicians to pursue non-commercial technology ambitions.

In 2008, SWFs developed the Santiago Principles of best practice for governance, investment, and risk management as a proactive response to heightened political concerns.[22] These investors now need to be aware that in a world where technology is global—but nations are becoming more nationalist and protectionist—there are additional risks to investing in technology companies, particularly as they invest in more sensitive technologies at an earlier stage. If they do not, then all the benefits they can bring to these companies—long-term financial stability, networks to benefit the business, and access to new markets—will be lost. It is a challenge worthy of the effort required.

## Summary of policy recommendations

Given the discussion above, SWFs—as patient and strategic investors in technology and innovation—appear to have the opportunity to assert a positive and proactive force for good. They are emerging as a new, competent, and increasingly effective tool of fiscal policy. Given this significance, the following policy recommendations should be considered:

- SWFs should become more aware of how they can invest to help address the increasing vulnerability of the global economy to major macroeconomic, political, environmental, and health shocks and disruptions, and become more proactive in enhancing their capabilities to do so.
- SWFs should continue to invest in enhancing technology development and business model innovation, both globally and domestically. For example, cross-border technology transfer to enhance domestic and global economic well-being should continue to be explored.
- SWFs are an under-exploited resource to engage with social challenges. More can be done, perhaps without significant (if any) sacrifice to financial returns. While this premise may be controversial, it is certainly worth exploring.
- Globally, financial market regulation should adapt to the increasing impact of larger investors, such as SWFs, in the later-stage private equity market.
- The changing nature and manner of how SWFs invest in technology and innovation require heightened and continuing attention to SWF governance structures, investment team competency, behavior, and development. This might be facilitated through institutions like the IFSWF, which can create a venue for shared identification, development, and deployment of best practices—especially qualitative factors that go beyond the traditional measure of financial returns.

The financial markets in technology and innovation investing are rapidly evolving. Sovereign wealth funds must now be recognized as a unique, substantial, and permanent member of the technology and innovation landscape.

**Notes:**

1 The authors would like to thank Enrico Soddu, Head of Data and Analytics at the International Forum of Sovereign Wealth Funds for his assistance in analyzing the data in this article and for generating the graphics. Any views or opinions represented in this article are personal and do not represent those of the institutions or organisations that the authors are associated with unless explicitly stated.

2 "Sovereign wealth fund" is a term subject to definitional differences. In the case of the cited 2016 report, the definition was kept very restrictive, focusing on long-term, internationally invested, intergenerational savings vehicles. Stabilization vehicles (to subsidize budgetary shortfall when necessary) and development funds (with explicit domestic economic development missions) were explicitly exempted. The following section, which features data on deals from the International Forum of Sovereign Wealth Funds, incorporates a broader group of government funds with a wider variety of mandate types. Among that broader group, only a minority invest in unlisted technology businesses.

3 Technology is "broadly defined" in this article—we do not mean the more restrictive venture capital-type classification, that is often IT-centric, but technology in its wider sense.

4 KPMG, 2020.

5 Baker McKenzie, 2019.

6 Baker McKenzie, 2019.

7 Engel et al., 2016.

8 Private Capital Research Institute, 2019; A recent report, *The Rise of the Asset Owner-Investor in Private Markets*, illustrated this trend with data covering the surge of activity, particularly in private equity co-investments.

9 IFSWF Annual Review, 2017.

10 PitchBook, 2019.

11 All the SWF direct investment data provided in this section is provided by the International Forum of Sovereign Wealth Funds (IFSWF), which maintains the largest and most comprehensive database of such activity in the world.

12 Covington, 2019; The data relates to technology companies with a market capitalization over US$10 billion.

13 Expert Group on Regulatory Obstacles to Financial Innovation (ROFIEG), 2019.

14 Financial Times, 2020.

15 International Forum of Sovereign Wealth Funds, 2016.

16 Khazanah underwent a major strategic change in 2018 following the historic election of 2018, which saw it roll back its international technology investment programme, and shuttering offices in London and Istanbul.

17 Engel et al., 2016.

18 International Forum of Sovereign Wealth Funds, 2016.

19 Mubadala, 2009.

20 ISIF, 2018.

21 Hanemann et al., 2019.

22 International Working Group of Sovereign Wealth Funds, 2020.

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