SOVEREIGN WEALTH FUNDS 2021

Changes and challenges
accelerated by the Covid-19 Pandemic

IE UNIVERSITY
CENTER FOR THE GOVERNANCE OF CHANGE

GOBIERNO DE ESPAÑA
MINISTERIO DE INDUSTRIA, COMERCIO Y TURISMO

ICEX

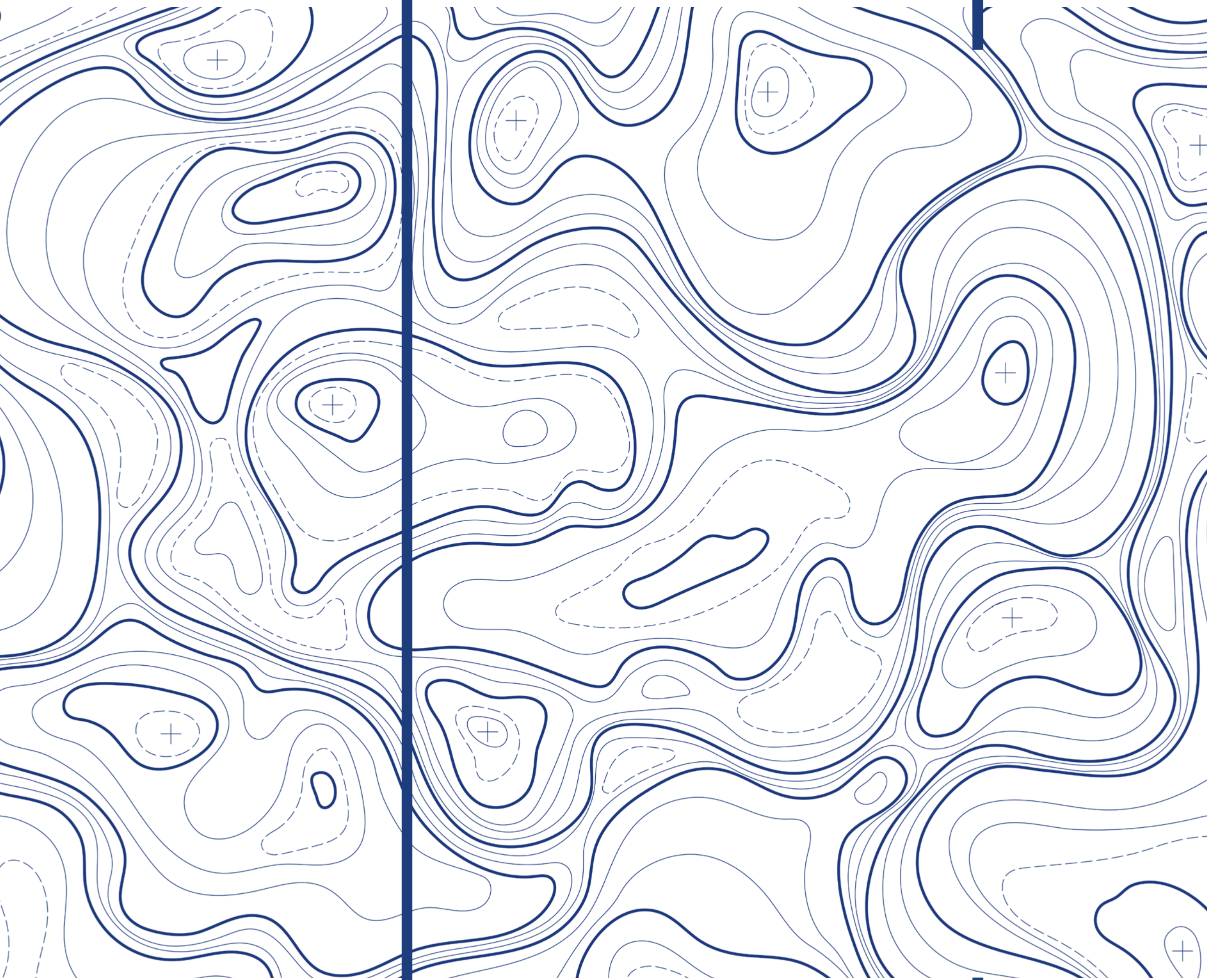
INVEST IN SPAIN

SOVEREIGN WEALTH FUNDS 2021

Editor

Javier Capapé Aguilar, PhD
Adjunct Professor and Director,
Sovereign Wealth Research,
Center for the Governance of
Change, IE University

Index



PREFACE

María Peña Mateos
Chief Executive Officer, ICEX

Manuel Muñiz
Provost, IE University and
Dean, IE School of Global and Public Affairs

Preface

It is a pleasure to present this 2021 edition of the Sovereign Wealth Funds Report which is produced by ICEX Spain Trade and Investment and the Sovereign Wealth Research at the IE Center for the Governance of Change.

Over the years, this report has become a reputed source for understanding the investment flows that arise from sovereign wealth funds and a valuable reference in the analysis of their trends. After the historic fall in the global economy recorded in 2020 due to the COVID-19 outbreak (-3.1%), the recovery was weaker than expected in 2021. As well as new restrictions on economic activity and mobility due to new variants of the virus, there were further new elements of uncertainty, such as disruptions of global supply chains and higher-than-expected inflation. There was also the expected rise in interest rates by the Federal Reserve and the first conversations on fiscal consolidation in the main global economies (after the public spending increase in support of companies and families). In this highly complex scenario, the IMF estimated that the global economy would grow by 5.9% in 2021, with significant regional differences. Among the large economies, the recovery was led by China (8% GDP growth), followed by the United States (6%) and the European Union (5.1%).

Looking ahead to 2022, global economic growth is expected to reach 4.4% of GDP, a figure that has been revised downwards by the main international organizations after taking the new Omicron variant and the above factors into account. The possibility of new variants of the virus emerging, the significantly different levels of vaccination across the world, as well as high energy prices continuing for at least the first half of the year, together with the foreseeable tightening of monetary conditions in many countries, have dampened the outlook for the global economy this year. All this, in addition to the current geopolitical tensions, puts even more pressure on energy prices. In any event, 2022 will continue to be framed by significant uncertainty and a continuous review of growth estimates will be necessary.

Foreign Direct Investment (FDI) showed a significant recovery of 77% in 2021 compared to the previous year, amounting to $1.65 trillion. This implies a recovery to pre-pandemic levels. The largest increase was seen in developed economies, which received an investment of $777 billion, triple that of 2020. It increased by 30% in emerging and middle-income economies to $870 billion, with pre-pandemic levels being reached in Latin America, although all regions recorded increases. The recovery of FDI around the world was mainly sustained by high levels of liquidity and the availability of capital on the financial markets, backed by the current low-interest rates, in addition to lower valuations of some companies hit by the pandemic that increased mergers and acquisition transactions. Beyond FDI, the global M&A market closed in 2021 at a record of $5.9 trillion in over 63,000 transactions, topping the previous high watermark set in 2015 by almost $1.5 trillion.

In line with the global frenzy of investment activity, the answer of sovereign wealth funds to this uncertain economic situation was clear: increase the investment pace and capture value in this global transformative period, flushed with cash, accommodative monetary policies, and soaring stock market valuations. With more than 450 deals, SWFs have tripled the investment activity of our last Report and become the most active investment year in the historical series. Moreover, capital accumulation continued fueled by stock market rebound and increasing hydrocarbon prices. For the first time, SWFs surpassed the 10 trillion dollars landmark in assets under management. That is an increase of 11% compared to our previous report.

This sovereign wealth funds report series, a joint project by ICEX-Invest in Spain and IE University, offers a rigorous in-depth analysis of the role SWFs play in the global changing economic arena. The report maps the activity and strategies of close to one hundred sovereign funds. According to the current 2021 edition, the post-pandemic world has accelerated pre-existing trends. SWFs continue massively betting on technology as their most preferred sector. Companies developing new enterprise software solutions, fintech firms offering innovative payment and insurance solutions, online education tools, or new mobility and logistics companies receive millions from sovereigns daily. Also, healthcare and biotech young companies developing new drugs, treatments, and patient care solutions, have been targeted preeminently by SWFs. Alternative and renewable energy projects, or clean tech companies, established in Canada, Singapore, Brazil, or Germany have been chosen by SWFs to continue their asset recycling strategies. By deal count, the SWF activity remains dominated by Singapore funds—Temasek and GIC—yet more closely followed by Mubadala, which executed an impressive deal activity, with almost 90 deals, a five-fold increase from our previous report.

The geographic destination has not changed greatly. The most interesting change comes from the emphasis made this year on India, which came second for the first time surpassing China in the number of deals and total transaction value. The urgency of adaptation and the opportunities offered by the pandemic explain the increase in deal volume to 120 billion dollars, tripling the last year's figure.

In addition to these trends, the tenth edition of the Report dives into the partnerships and relationships established by SWFs when investing in venture capital deals. Analyzing a database with more than 4,500 co-investors, we uncover the most frequent peers of SWFs when joining venture capital funding rounds. Also, the Report analyzes the strategic use of SWFs on food security and agriculture. Following a multipronged strategy, SWFs invest both in established agricultural operators and in the most advanced startups bringing robotics, alternative sources for proteins, vertical farming, or biotech, to mainstream ag and food spaces. Last, but not least, the Report includes an update of the sustainability-linked goals of sovereign funds. Through technology, active ownership, partnerships, and asset recycling, SWFs continue aligning their long-term portfolios to long-term risks including social, environmental, and governance considerations.

Two years after the pandemic onset, the SWF activity helps us to understand how long-term investors see through a painful human and economic crisis period. Moreover, investment professionals, policymakers, business leaders, and academia can benefit from the detailed and curated analysis we present here for this tenth edition of the annual report on sovereign wealth funds.

María Peña Mateos
Chief Executive Officer, ICEX

Manuel Muñiz
Provost, IE University and
Dean, IE School of Global and Public Affairs

EXECUTIVE SUMMARY

Executive Summary. Toward a New Normal? Sovereign Wealth Fund Direct Investment (2020-21)

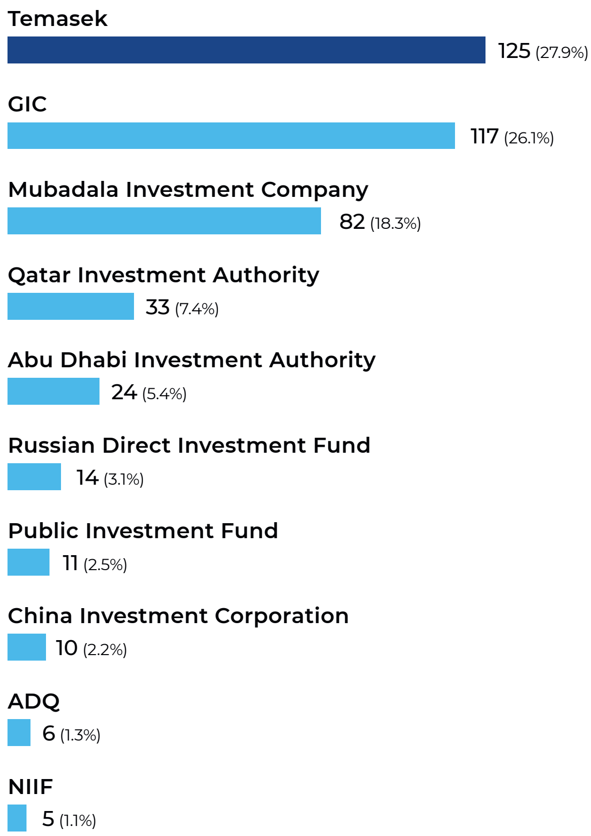
It has now been nearly two years since the onset of the coronavirus pandemic. Vaccine development and active public health campaigns have delivered us to the threshold of a return to "normal", even as we struggle to reimage its definition. In the wake of the immediate onset of the crisis, sovereign investment slowed dramatically consistent with an abrupt halt to an economic activity generally. As interest rates continued to decline and public market equity valuations recovered in 2020, the pace of global M&A activity also rebounded with quarterly deal counts returning to late-2019 levels by Q4 2020. In the intervening period, deal activity remained robust in depth, breadth, and velocity, as 2021 ended with record volumes and values. This transformation has paralleled the growth in direct sovereign investment activity that we have tracked and studied since 2010 and continues to feature prominently in the direct investing activity of the sovereign investors whose recent deals comprise of our current sample. Not surprisingly, and quite as usual, prior patterns – participating funds, volumes, geographies, and even co-investment practices – persist. However, the five quarters that constitute our current student have been anything but "normal".

Our current sample includes direct sovereign equity investments announced between October 2020 and December 2021. Our coverage includes 418 investments across 448 discrete deals with the difference attributable to investments in which sovereign funds invested in the same deal. Thus, our current sample is nearly 3 times larger than our 2019-20 sample and on average considerably larger than any prior sample. We track the investment activity of 40 SWFs. Similarly to previous reports, activity was dominated by the top 5. These include Temasek who comprise 27.9% of investment activity, GIC, Mubadala, the Qatar Investment Authority, and the Abu Dhabi Investment Authority. This group of five together represent approximately 23% of the funds included in our sample, but over 85% of the investments.

For our current sample, SWFs participated in transactions whose aggregate transaction value was approximately $120 billion. Our top five most active funds, as expected, were the most pronounced, participating in deals with combined aggregate

The most active Sovereign Wealth Funds (2020-2021)

Deal count and percentage of total deals*



* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

value of almost $98 billion, 82% of the aggregate value. At the country level, the traditional configuration of geographies continues dominated by the United States (28.8%), attracting the largest share of SWF direct investment. The scale up in India (14.7%) deals is notable, while China's (10.5%) share has remained relatively stable proportionately from our prior sample. The United Kingdom, Singapore, Russia, and Brazil round out the next four largest destinations, which collectively represent nearly 73% of all SWF deals in our current sample.

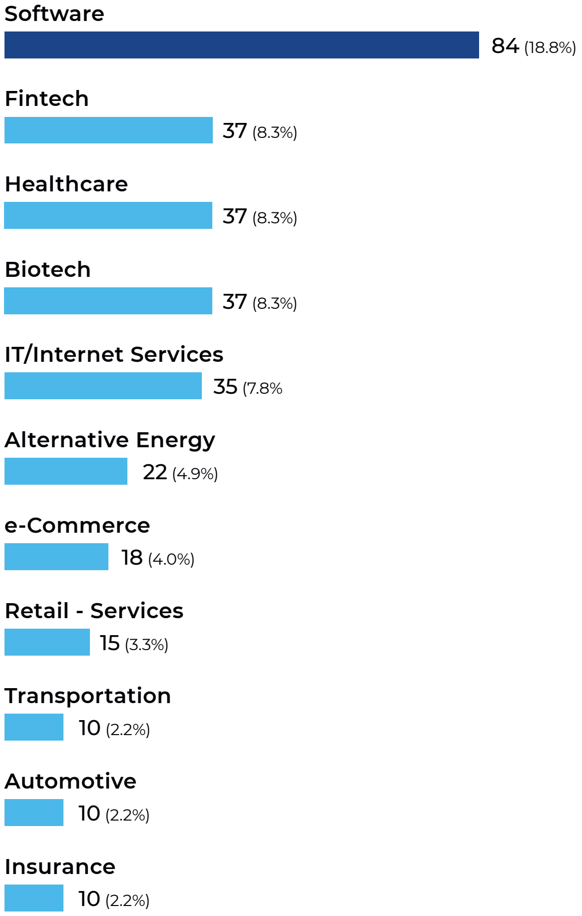
At the sector level, SWF direct investment activity is generally aligned with global M&A trends and reflects a forward view of medium to long-term sector performance. Technology is broadly defined, and software companies impact multiple different industries. Yet the sample shows a predilection for e-commerce with significant investments in India's giant Flipkart, UAE's Noon AD Holdings and Turkiye's Trendyol. These deals collectively suggest that SWF investment in regional e-commerce leaders is aligned with a long-run thesis linked to a global transformation in consumer behavior. On its part, fintech attracted SWF investment in 37 deals, including crypto themes. Of the top five biggest fintech deals, three are crypto-related, revealing the exposure of the most advanced SWF to digital currencies. Life sciences is the next largest sector destination in our sample, particularly focused on biotech and healthcare companies. We also count numerous deals in services (including retail companies) and education, with SWFs targeting Yuanfudao, the largest online live course platform in China or Unacademy, India's largest learning platform.

SWFs manifested an interest in renewable energy projects (solar, wind, geothermal) and new energy technologies, including companies developing small modular reactors, fusion technology, or solid lithium metal batteries.

With a 200% uptick in deal activity in the 15 months ending 2021 has SWF direct investing activity rebounded sufficiently to have "returned to normal"? This question is difficult to disentangle from the persistent trend among assets owners, and SWFs, to allocate higher proportions of portfolio holdings to alternative asset classes, both directly and indirectly. In the period from 2015 – 2021, sovereign portfolio allocations to private equity, real estate and infrastructure increased from 9.2% to 17.3% in 2018, and to 19.4% in 2021. As we turn with hope to a post-covid future, the global economy nonetheless remains plagued by supply chain disruptions, geopolitical tensions, under- and unemployment, yet rising inflation.

Top industries 2020-2021

Deal count and percentage of total deals*



* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

As adaptive global financial institutions, SWFs have contributed materially to the growth of private market finance, hence the parallels between SWF direct investment and global M&A activity which we document. Will SWFs continue to trade-off liquidity for yield enhancement in an uncertain post-covid global economy? Increased allocations to private markets - whether directly or indirectly - might well suggest "normal" reimagined.

FROM COWS TO CODES: SOVEREIGN WEALTH FUNDS IN THE AGRICULTURE AND FOOD SECTORS

Agricultural and food investments have traditionally been seen as defensive investments. Relatively unexciting -although many times politically sensitive- and safe, providing limited but consistent returns over long periods of time. The agri-food industrial complex has been responding to the ever-increasing food demands from a growing and hungrier world, expanding the amount of harvested land, developing new and more effective inputs, finding more efficient ways to produce meat and dairy products in “factory-like” farms and applying technology -albeit modestly- to increase efficiency levels throughout the value chain.

As a result, the world of Ag and Food investing is attracting a new and growing crowd of investors, from the “techies” (keen to bring the “Silicon-Valley-will-solve-this” mentality to one of the least digital sectors worldwide) to the sustainability activists (pushing to transform the industry and reduce its environmental footprint). Alongside them, many incumbent investors are doubling down their commitment to the industry, none as prolifically as the world’s largest sovereign wealth funds. Where do Sovereign Wealth Funds stand on this quasi-ideological spectrum? The short answer is everywhere.

The Chapter analyzes investments from 24 SWFs from 18 countries, which have made 233 investments since 2006 in the Ag and Food sectors. The aggregate deal value of these transactions is worth $40.5 billion, excluding retail companies such as SPAR or J Sainsbury.

Temasek is the most active SWF in this space, followed by Spain-based Cofides and France’s Bpifrance. The Qatar Investment Authority and Mubadala Investment Company complete the top 5. When included, the influential SoftBank Vision Fund (with the Public Investment Fund from Saudi Arabia and Mubadala itself as its main sponsors), occupies the fourth position with QIA. Other relevant SWFs heavily investing in Ag and Food are the Ireland Strategic Investment Fund and the RDIF, which demonstrates that agriculture is a matter of interest for strategic SWFs.

Geographically, SWFs bet on Ag and Food companies founded in the United States, China, India, Russia, or Singapore. By deal count, almost one-third of total deals take place in the United States. France ranks second, highly influenced by the focus of Bpifrance in domestic Ag and Food startups, which we analyze below. India, Russia, and China complete the top 5 by deal count. The leadership of the United States, and particularly California, is uncontested. California's agriculture and food startups are targeted more frequently than the combination of the next 10 countries.

We have made a second focus on the AgTech sector and analyzed 100 venture capital rounds participated by SWFs in industries like AgTech, Biotechnology, Food and Beverage, Farming, or Organic Food since 2015. By sub-industries, biotechnology has attracted the most SWF interest. SWFs have invested in companies such as Pivot Bio, Perfect Day, or Provivi, which produce sustainable fertilizers, the world's first milk protein made without animals or protect crops via biopesticides, respectively.

Sovereign wealth funds have become extremely sophisticated and increasingly relevant investors, unafraid to venture aggressively in a growing number of sectors. Their approach in the Ag and Food space is multipronged. First, SWFs are betting on the mainstream Ag and Food space, by acquiring relevant stakes in agricultural operators, meat and dairy producers, food processors, or trading companies. Their deep pockets and patient capital give them a strong competitive advantage in the sector, and their moves are followed closely by their competitors.

Second, they are supporting startups and emerging global challengers across the world. Ranging from robotics, biotech, aquaculture, alternative protein, vertical farming, or food delivery companies. Some of these investments may be just opportunistic and financially driven, but most of them are also strategically linked to the SWFs' food security efforts. Many of these SWFs come from countries that depend on others for most of their food and they actively support tech improvements that can strengthen their access to ample and affordable food.

Third, SWFs, aware of the current fragile geopolitical space, do not want to rely entirely on foreign companies for their food supplies. As such, they are establishing and developing a powerful and dense network of domestic champions that can help them secure and guarantee an adequate level of food supplies. While some territories lack sufficient domestic arable land, these local champions are strategically and smartly positioning themselves globally to support their countries' food security efforts. Some of these companies have become a force to be reckoned with, and their impact and role in the space are likely to become more relevant in years to come. Just like that of their parent companies and ultimate shareholders.

SWFs bet on renewable energy and new energy technologies (2020-2021)

Total deal size ($ million)

7 AFFORDABLE AND CLEAN ENERGY

Ensure access to affordable, reliable, sustainable and modern energy for all.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

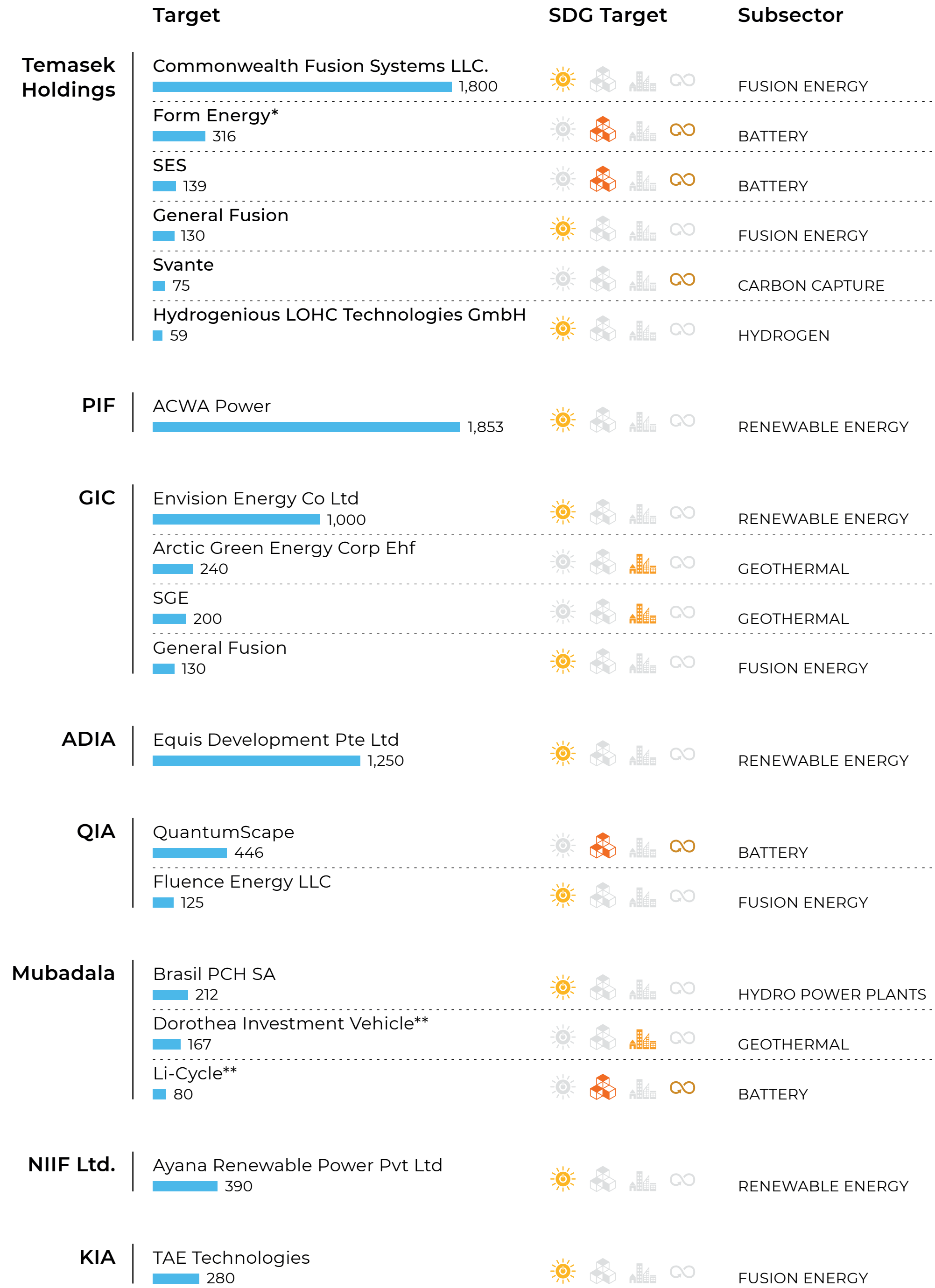
Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

11 SUSTAINABLE CITIES AND COMMUNITIES

Make cities and human settlements inclusive, safe, resilient and sustainable.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Ensure sustainable consumption and production patterns.



*Deal size includes the sum of the two investments made in Form Energy by Temasek in 2020 and 2021.
** Estimated value.
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

SOVEREIGN WEALTH FUNDS EMBRACE THE SUSTAINABLE DEVELOPMENT GOALS: WHO, HOW AND WHY?

SWFs have invested in traditional natural resources for years, from natural gas pipelines to railroads connecting shale gas wells to exporting ports, or chemical facilities powered by coal. Moreover, out of the $10 trillion in assets under management attributed to this institutional investment group, almost $5.5 trillion have been sourced directly or indirectly via exports of highly contaminating hydrocarbons. Yet, SWFs are changing rapidly. According to the 2021 IFSWF-OPSWF survey, now 85% of SWFs take climate-related risks and opportunities into consideration in their investment process (yet only 36% consider it specifically or within a broader ESG-Responsible Investment approach). More SWFs are engaging in mitigation and adaptation investment themes. As a corollary, more SWFs are joining the One Planet SWF platform, as an indication of their interest in engaging in change.

Yet there is an embedded paradox in a big portion of the SWFs story. SWFs increase their wealth by selling contaminating sources of energy to the World, while simultaneously trying to invest more and more in sustainability-aligned companies and projects and divest from high-emitting businesses. Yet, what is the net result? Moreover, what SWFs are doing to solve this conundrum? Where do SWFs invest today to change the future? Let's explore these and other questions in this chapter.

Beyond energy, a sustainable development economic agenda is pushed worldwide with the launch of the United Nations' 17 Sustainable Development Goals. Progress on this matter remains slow, data for most indicators is yet unavailable but the global effort on advancing the 2030 Agenda remains strong, amid recent distortions caused by the Covid-19 pandemic and geopolitical tensions.

In the period January 2020 to September 2021, 59% of all SWF transactions can be connected to specific SDGs. Also, SWF total investment value in alternative energy companies (comprising renewable energy companies and companies developing new and sustainable energy technologies) has grown 450% compared to the 2020 figures. SWFs joined deals with total value near to $9 billion representing a hopeful milestone in the transition of SWFs and of the world economy toward the achievement of SDGs. Despite of the enormity of the current financing gap, it is interesting to notice that the SWF effort goes beyond energy (SDG 7) and sustainable consumption and production firms (SDG 12). Indeed, SWFs have invested heavily in companies that will help to achieve other goals such as good health and well-being (SDG 3), the growth of a more sustainable industry, innovation, and infrastructure (SDG 9), and help increase the quality of education (SDG 4).

The SWFs' SDG-alignment is only beginning to get traction and will require a continued strong stakeholder effort to keep and increase it until Agenda 2030 goals become a reality. With ambitious companies and unlimited human creativity, paired with innovative and long-term managers and owners, including SWFs, we can hope a different and better world is possible.

SOVEREIGN WEALTH FUNDS AND VENTURE CAPITAL: CO-INVESTMENT PATTERNS AND PARTNERS

Sovereign wealth funds are living creatures. Adaptative by nature, SWFs keep exploring new sectors, new asset classes, and adjusting their organizations and international reach as they follow this diversification path.

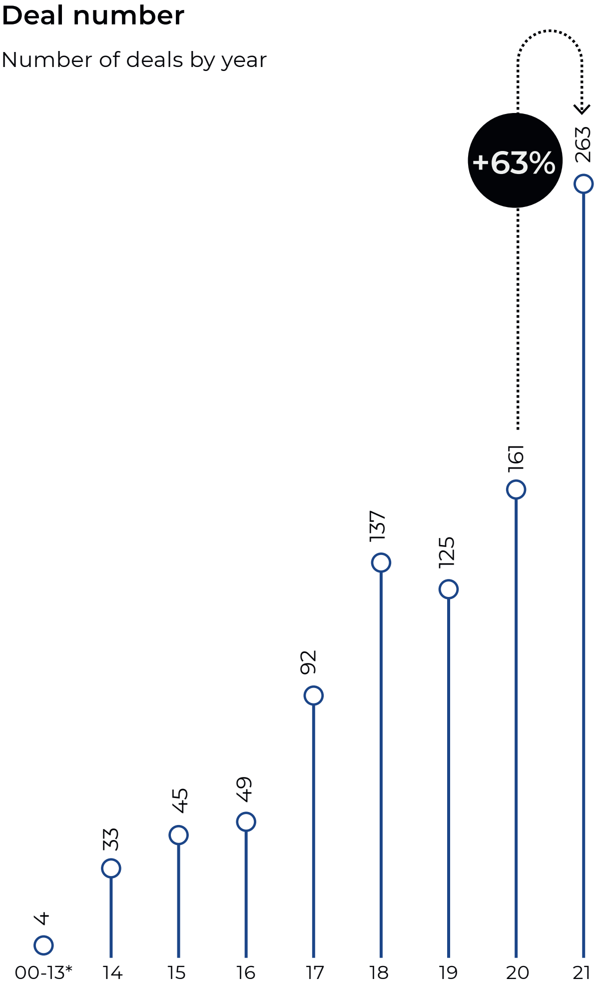
Sovereign wealth funds need to think over the long run. For many, its organizations' mission is to preserve and grow wealth for future generations. In the rapidly changing world we are living, it is fundamental to understand, use and invest in technology. Thus, to keep an eye on the long run, it is relevant for SWFs to add venture capital, as a key component in the asset class matrix of their long-term purpose. One of the most frequent channels used nowadays by institutional investors to capture technology new trends it to invest in venture capital-backed startups.

The boundaries of venture capital as an asset class are blurring. Years ago, only specialized investors participated in pitch elevator competitions, attended project presentations in venture accelerators and joined angel business associations, or simply shared their time with early-stage entrepreneurs in Palo Alto, Barcelona, or Beijing. But this has changed. Now specialized VC investors are not alone. Other non-conventional investors are joining. These include private equity firms, asset managers, hedge

Sovereign Wealth Fund Investments in VC by year

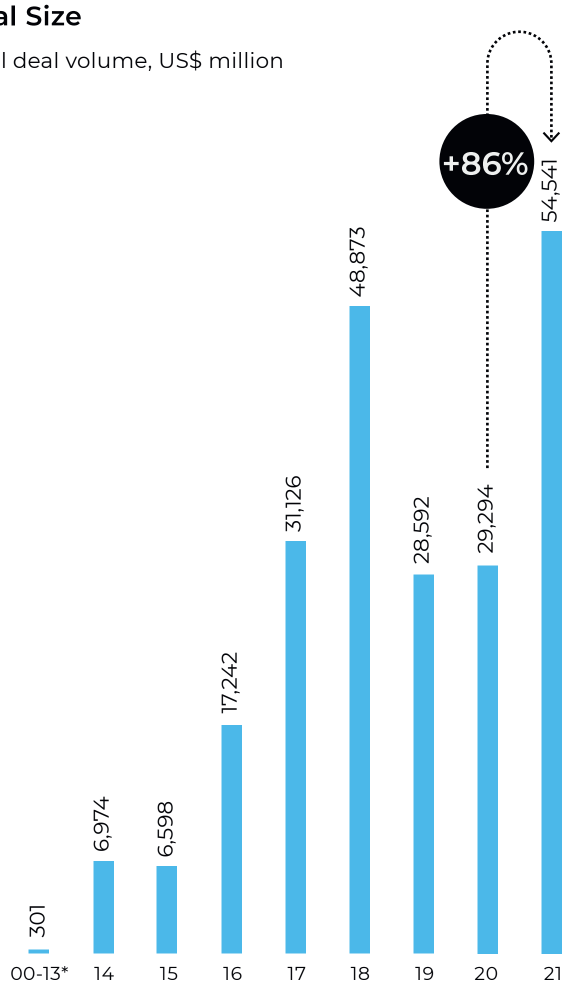
Deal number

Number of deals by year



Deal Size

Total deal volume, US$ million



*Period average 2000-2013. Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

funds, insurance companies and public pension funds, which has been active in the VC space for quite a time now.

Venture capital was considered a far too small niche for institutional investors only four years ago. But this asset class is getting huge traction, accelerated by the disruption and change brought by the pandemic. Indeed, in 2021, venture capital financings set a record with $621 billion in deals, more than double the $294 billion recorded in 2020, that is 92 percent growth year over year.

In the chapter we focus on the direct participation of SWFs investing in startups, the so-called investment rounds. We have tracked SWFs and public pension funds (PPFs) investing in startups since 2000. SWFs and PPFs have joined more than 1,600 investment rounds since then, for a total accumulated value of $392 billion. SWFs have participated in 1,197 deals, while PPFs joined 460.

Moreover, the venture capital industry is a co-investment industry. Indeed, out of the 915 VC rounds we tracked, just 11% are solo investments, the remaining include at least 2 co-investors. We have analyzed each of the deals made by SWFs in VC and identified every co-investor. The list of unique co-investors grows to 2,110. The average number of co-investors for VC rounds with SWF participation exceeds 6. Thus, in the chapter we analyze the profile of that group of SWF's co-investors in the VC industry.

SWFs are part of the venture capital revolution. After years of exploring new technologies, some SWFs can be considered now, as noted in the first chapter of this edition, as any other player in the global room. SWFs are part of the explanation of why startups stay private longer. In a feedback process, this bigger private asset class allows SWFs to identify more opportunities than ever. From the usual suspects (Temasek, GIC, and the SoftBank's Vision Fund) to the new key players (Mubadala, Future Fund QIA), we have uncovered their most frequent VC partners. We realize that SWFs do co-invest with some of the most emblematic VC firms such as Sequoia Capital, Tiger Global Management, or New Enterprise Associates. But interestingly, they are increasingly joined by asset managers and investment firms (Fidelity, Goldman Sachs) opening the VC space to potential new partners. Yet a question still needs to be answered, will all this fever for VC, with record-breaking investment figures, remain when interest rates go up? And more importantly, what would be the effect of all this frantic VC boom? Will these new companies generate welfare? Will it last? Only time will tell us.

1

TOWARD A NEW NORMAL? SOVEREIGN WEALTH FUND DIRECT INVESTMENTS 2020-2021

Patrick J. Schena (PhD)
Professor of Finance, Hult International School of Business & Adjunct Assistant Professor, The Fletcher School, Tufts University & Co-Head, SovereigNET

Javier Capapé (PhD)
Adjunct Professor and Director, Sovereign Wealth Research, Center for the Governance of Change, IE University

1. Toward a New Normal? Sovereign Wealth Fund Direct Investment (2020-21)

It has now been nearly two years since the onset of the coronavirus pandemic. Vaccine development and active public health campaigns have delivered us to the threshold of a return to “normal”, even as we struggle to reimage its definition. In the wake of the immediate onset of the crisis, sovereign investment slowed dramatically consistent with an abrupt halt to an economic activity generally. This was starkly evident in our last analysis of sovereign wealth fund transactions covering the period from July 2019 to September 2020 – some 165 deals. During the early stages of the pandemic, global M&A activity declined precipitously with Q1 2020 deal count falling 38%[1]. This was consistent with a sharp drop in SWF deals in the first quarter of 2020 and an overall decline in deal count from our 2018-19 fifteen-month sample.

As interest rates continued to decline and public market equity valuations recovered in 2020, the pace of global M&A activity also rebounded with quarterly deal counts returning to late-2019 levels by Q4 2020[2]. In the intervening period, deal activity remained robust in depth, breadth, and velocity, as 2021 ended with record volumes and values[3], driven by especially strong growth in information technology, healthcare, energy (particularly renewables), and consumer and business products and services[4]. Also important to note is the expanding engagement of financial sponsors in large deal investments. These include private equity general partners (GPs) and traditional limited partners (LPs), including pension funds and sovereign wealth funds, investing directly or via co-investment. Morgan Stanley reports that sponsor-backed transactions comprised over 30% of global M&A volume in 2021[5]. This is consistent with the steady increase in financial sponsor participation in M&A deals, rising from approximately 21% in 2009 to over 37% in 2021[6] and more broadly with the progressive expansion of private capital markets in the US[7].This transformation has paralleled the growth in direct sovereign investment activity that we have tracked and studied since 2010 and continues to feature prominently in the direct investing activity of the sovereign investors whose recent deals comprise of our current sample. Not surprisingly, and quite as usual, prior patterns – participating funds, volumes, geographies, and even co-investment practices – persist. However, the five quarters that constitute our current student have been anything but “normal”.

ABOUT THE 2020-21 SAMPLE

Our current sample includes direct sovereign equity investments announced between October 2020 and December 2021. Our coverage includes 418 investments across 448 discrete deals with the difference attributable to investments in which sovereign funds invested in the same deal[8]. Thus, our current sample is nearly 3 times larger than our 2019-20 sample and on average considerably larger than any prior sample. We track the investment activity of 40 funds and affiliates. The latter, for example, con-

[1] See Pitchbook, Global M&A Report, 2021, accessed at https://files.pitchbook.com/website/files/pdf/2021_Annual_Global_MA_Report.pdf

[2] For additional coverage of the 2021 rebound in global M&A activity, see Global M&A reports by JP Morgan, Bain and Company, Morgan Stanley, and PwC.

[3] Pitchbook, op. cit.

[4] Ibid.

[5] Morgan Stanley, “2022 M&A Outlook: Continued Strength After a Record Year”, accessed at https://www.morganstanley.com/ideas/mergers-and-acquisitions-outlook-2022-continued-strength-after-record

[6] This data was derived from the Excel dataset workbook that accompanies the Pitchbook 2021 Global M&A Report and is available for public download.

[7] See Morgan Stanley, “Public to Private Equity in the United States: A Long-Term Outlook”, 4 August 2020, at https://www.morganstanley.com/im/publication/insights/articles/articles_publictoprivateequityintheusalongtermlook_us.pdf

[8] Note for purposes of tracking fund-level transactions investments by affiliated funds are reported separately and not aggregated.

sists of funds under various venture capital structures affiliated with Temasek, as well co-investment vehicles established under the Russia Direct Investment Fund's (RDIF) platform. Geographic coverage includes investments in 43 countries and in over 50 sectors, implying broad diversification. However, it is the general lack of diversity, i.e. the concentration of deal activity by fund, country, and sector, that is perhaps most interesting and indicative of SWF investment activity and performance.

With the overall scale of transactions in our sample, we were also able to observe over 50 divestitures that involved SWFs as the selling party. As public equity markets recovered and valuation multiples expanded, private market pricing followed suit, offering opportunities for investors to recycle portfolio holdings. While our sample is not sufficient to draw conclusions concerning returns or performance, the volume of divestitures aligns with the broader theme of asset recycling by both strategic and financial investors in 2021.

INVESTMENT ACTIVITY AT THE FUND LEVEL

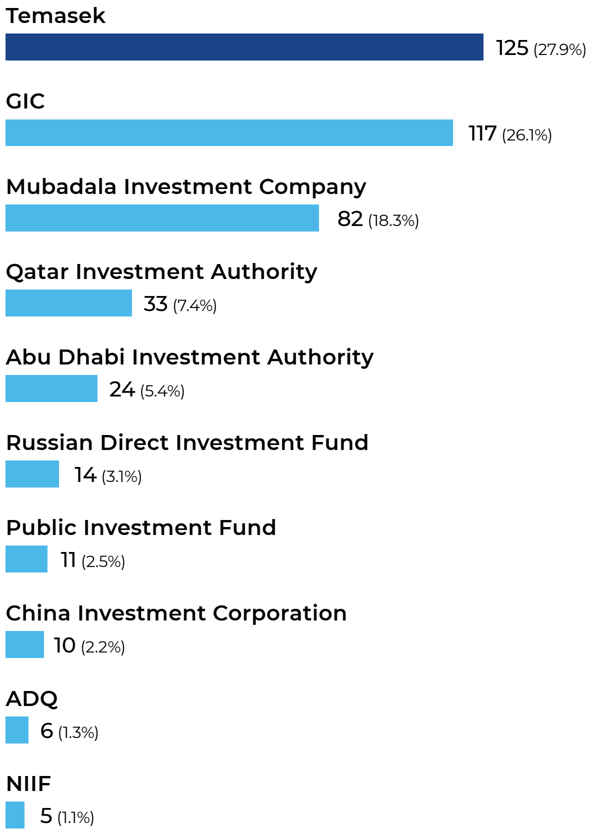
At the fund level, our 2021-22 sample is dominated by the top five funds. These include Temasek who comprise 27.9% of investment activity, GIC (26.1%), Mubadala (18.3%), the Qatar Investment Authority or QIA (7.4%), and the Abu Dhabi Investment Authority or ADIA (5.4%). Excluding affiliates, this group of five together represent approximately 23% of the funds included in our sample, but over 85% of the investments (Figure 1).

As is typical of our sampling, discrete capital commitments or funds deployed are generally difficult to source or estimate. Rather we report aggregate deal volumes when available. For our current sample, for deals with available data, SWFs participated in transactions whose aggregate transaction value was approximately $120 billion. Our top five most active funds, as expected, were the most pronounced, participating in deals with combined aggregate value of almost $98 billion, 82% of the aggregate value.

Figure 1

The most active Sovereign Wealth Funds (2020-2021)

Deal count and percentage of total deals*



* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

Among other sovereign investors of note in our 2020-21 sample, the RDIF participated in fourteen deals, the Public Investment Fund (PIF, Saudi Arabia) has eleven deals, while the China Investment Corporation (CIC) has ten deals. Also, noteworthy is the investment activity of the Abu Dhabi Developmental Holding Company or ADQ, which participated in six deals. The ADQ is considered the UAE's third largest SWF behind ADIA and Mubadala. Established in 2018, with a portfolio of key strategic assets, it has grown through the consolidation of additional state assets. The National Infrastructure Investment Fund (NIIF, India) was active during the period with five deals.

[9] One such transaction – Borsa Istanbul SA – actually involved SWFs as seller (Turkiye Wealth Fund) and buyer (QIA).

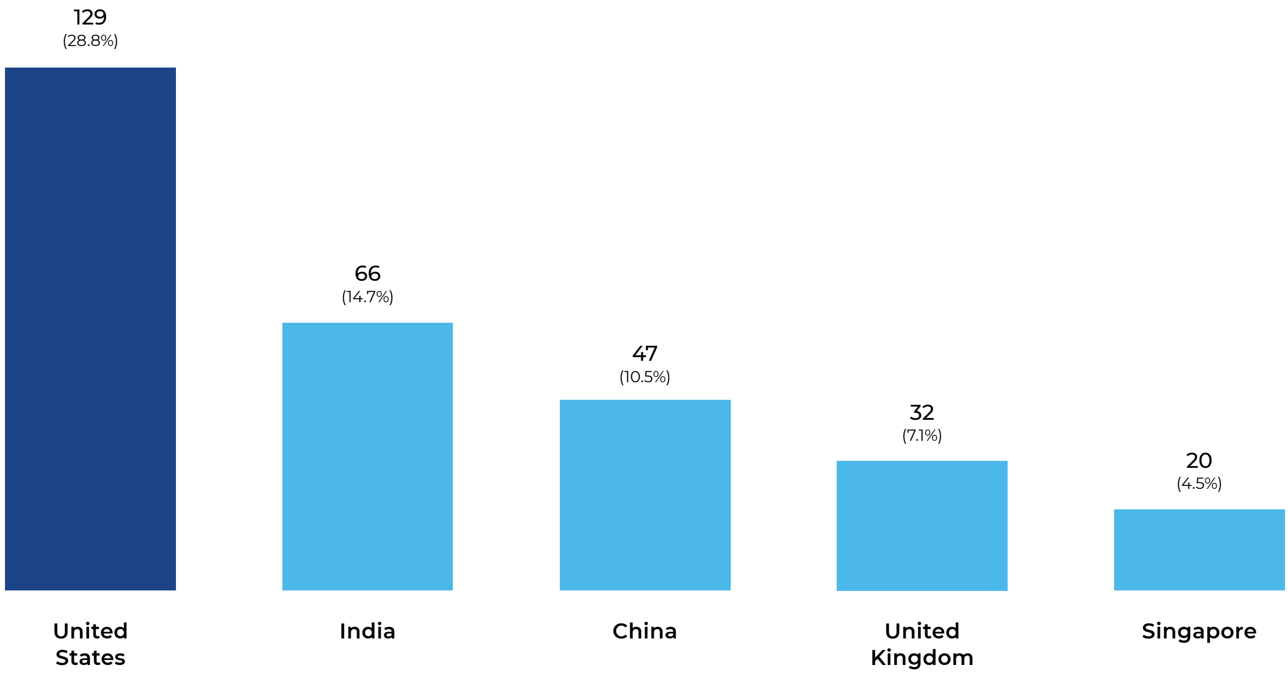
With 125 deals in our sample, Temasek was the most active of the funds we evaluated. The United States, India and China dominated Temasek's investing geographies. Singapore itself also featured prominently with eleven deals focused on e-commerce, healthcare, agribusiness, alternative energy, and fintech. Indonesia, Israel, and the United Kingdom also emerge as destinations for Temasek investment capital. Among indirect investments of note, Temasek made a $500 million commitment in 2021 to LeapFrog Investments, a Singapore-based impact investment firm that invests primarily in Asia and Africa, focused on high-growth financial services and healthcare companies. The partnership includes multi-fund investments by Temasek and also a minority stake in LeapFrog. Also included in our transaction analysis (but not included in our core sample) are 42 investments undertaken by Temasek-affiliated venture capital firms including several Vertex Venture investment partnerships. These transactions mirror Temasek geographies, including the United States, India, China, and Singapore. Vertex deals are characterized by significant commitments to software, internet, biotech and pharmaceuticals, as well as food and beverage.

Following Temasek, GIC, also from Singapore, participated in 117 transactions in our sample. These were dominated by investments in the United States, China, India, Brazil and the United Kingdom. Latin America, when aggregated including Colombia and Mexico, would thus become GIC's third largest investment destination only surpassed by the United States and China. GIC's target sectors included software, fintech more specifically, healthcare and biotech, and alternative energy. Among SWFs, GIC was also one of the most active investors in real estate, both directly and through real estate investment trust vehicles.

Figure 2

Top 5 destination countries 2020-2021

Deal count and percentage of total deals*



* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

Rounding out our top five SWF investors are Mubadala, QIA, and ADIA. Mubadala participated in 82 deals in our sample. These were overwhelmingly in the United States (40%), the United Kingdom (11%), as well as in the United Arab Emirates. By sector, healthcare and biotech, fintech, software, and mobility dominated. QIA, on its part, was involved in 33 deals. These were distributed largely across the United States, India, and the United Kingdom with broad diversification across sectors, including biotech and pharmaceuticals and e-commerce. ADIA's direct investment activity includes 24 investments in our sample with the United States and India dominating. Sector preferences include retail, software, and financial services, including discretely fintech.

INVESTMENT ACTIVITY AT THE COUNTRY LEVEL

At the country level, the traditional configuration of geographies continues (Figure 2). Dominated by the United States (28.8%), attracting the largest share of SWF direct investment. The scale up in India (14.7%) deals is notable, while China's (10.5%) share has remained relatively stable proportionately from our prior sample. The United Kingdom, Singapore, Russia and Brazil round out the next four largest destinations, which collectively represent nearly 73% of all SWF deals in our current sample. Among eleven deals announced in the UAE, all but two were undertaken by Mubadala with the remaining transactions being ADQ's investment in Eltizam Asset Management Group, a physical asset management company and the PIF's investment in Noon AD Holdings, an e-commerce platform. Among fourteen deals in Russia, all but four were undertaken by the RDIF either directly or under co-investment platforms established with the China Investment Corporation and Mubadala. The remaining deals in Russia are attributed directly to Mubadala.

The US, with 129 deals, was yet again the primary destination for SWF direct investment. Leading US sovereign investors included Temasek, GIC, Mubadala, and the QIA, all of which with investment offices in the US. Sector preferences reflect leading sectors of technological innovation: biotechnology and healthcare, software, fintech, alternative energy, and agribusiness. In India (66 transactions), Temasek and GIC again lead sovereign direct investors, followed by ADIA and QIA. Key sectors include software, internet, and fintech. Flipkart, the Indian e-commerce company, attracted capital from four SWFs –QIA, Khazanah, GIC, and ADIA.

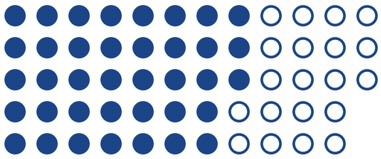
Infographic 1

IE Sovereign Wealth Research Ranking 2021

58

Pre-2010 SWFs

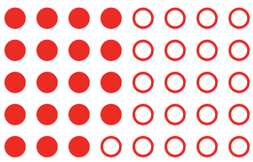
○ **20** IFSWF members



40

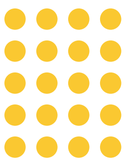
New SWFs (2010-2022)

○ **21** IFSWF Members



20

Countries considering establishing an SWF

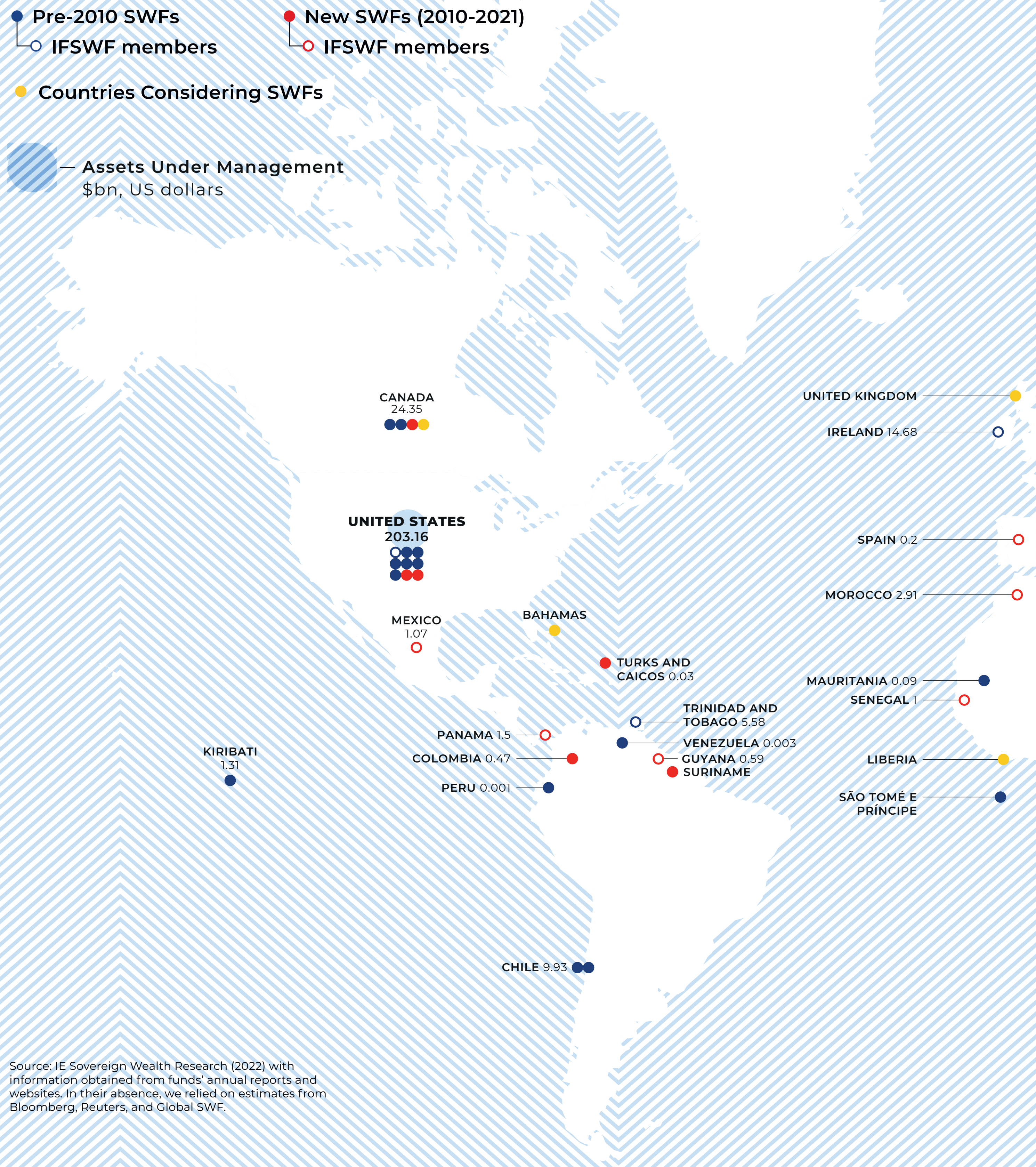


Source: IE Sovereign Wealth Research (2022) with information obtained from funds' annual reports and websites. In their absence, we relied on estimates from Bloomberg, Reuters, and Global SWF.

[10] See for example https://www.reuters.com/world/middle-east/abu-dhabis-state-holding-firm-adq-hires-more-bankers-it-steps-up-dealmaking-2021-09-19/

Infographic 2

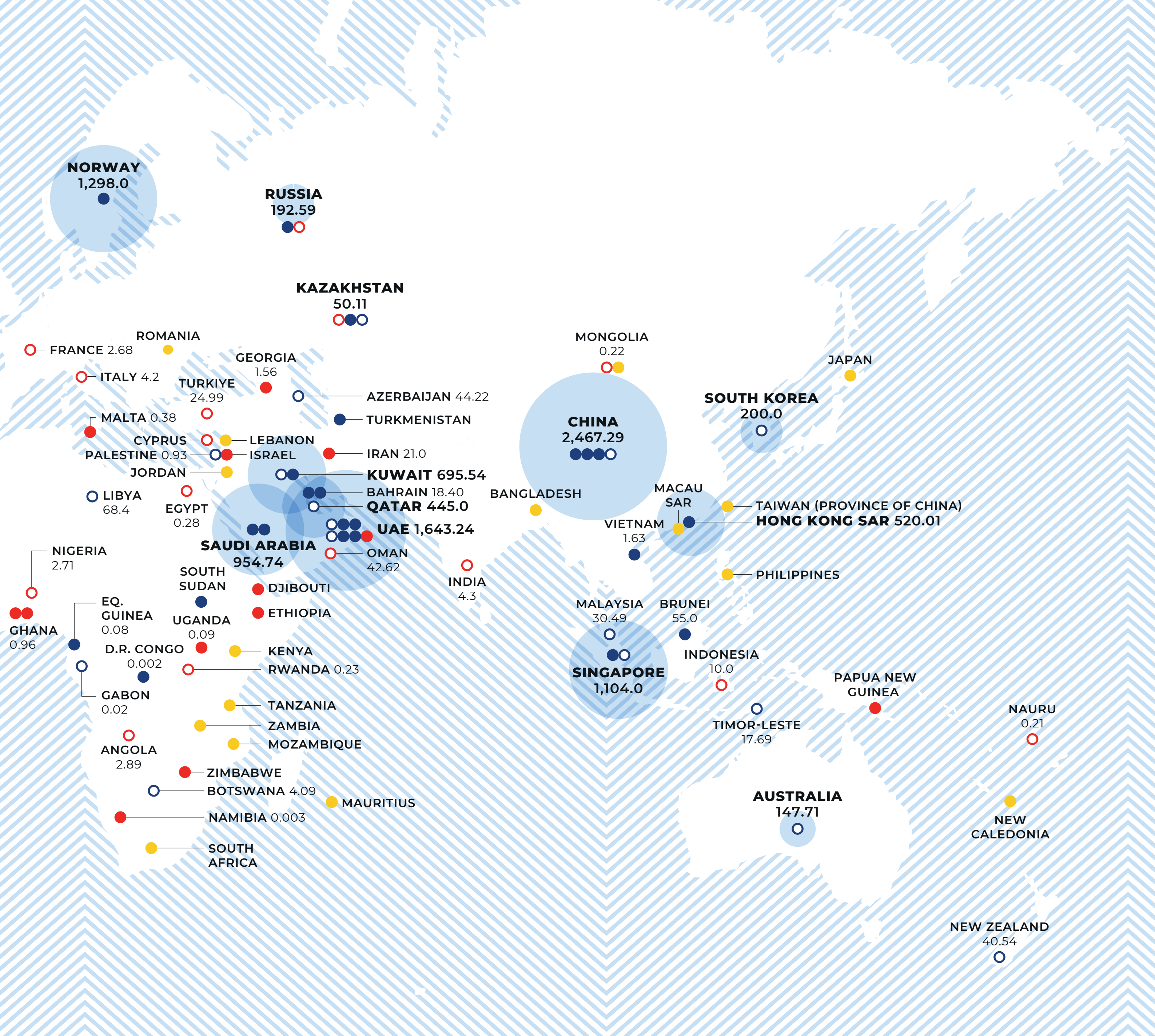
IE Sovereign Wealth Research Ranking 2021*



Source: IE Sovereign Wealth Research (2022) with information obtained from funds' annual reports and websites. In their absence, we relied on estimates from Bloomberg, Reuters, and Global SWF.

"Currently, there are 98 active sovereign wealth funds, three more than in our 2020 Ranking. 70 countries have established at least one SWF, three more than a year ago. The Middle East, China, Southeast Asia, and Norway are the four most relevant SWFs poles. Assets under management totaled $10.38 trillion. SWFs have widely spread in recent years.

Since 2010, 38 new funds have been established. Another 20 countries are actively considering establishing an SWF. Debates over new SWFs are growing in Africa and Central Asia. Thus, in 2021, there are 118 operating or prospective SWFs. 41 SWFs are full or associate members of the International Forum of Sovereign Wealth Funds."



We identify 47 deals announced in China. These were mostly invested by Temasek (51%) and GIC (26%) and targeted primarily biotech and healthcare and software. Thirty-two SWF deals in our sample were announced in the United Kingdom, broadly diversified among Mubadala, GIC, Temasek, ADIA, and QIA and focused predominantly on software, insurance and fintech, and biotechnology. The United Kingdom is the only country in our top five in which Mubadala and GIC, rather than Temasek, led deal count. Twenty deals were announced in Singapore, the majority of which – fourteen - were invested by Singapore funds Temasek and GIC. We identify 14 deals in Russia, of which 10 are directly or indirectly attributed to RDIF. Finally, Brazil was the destination of fourteen SWF deals. These were invested by GIC (9), who committed a physical investment presence to the region some years ago. Rounding out Brazil deals in our sample are three deals announced by Temasek and two by Mubadala.

INVESTMENT ACTIVITY AT THE SECTOR AND INDUSTRY LEVEL

At the sector level, SWF direct investment activity is generally aligned with global M&A trends and reflects a forward view of medium to long-term sector performance. Technology and life sciences represent nearly 60% of all deals, leading as key sectors for SWF investment. In addition, top 5 sectors include services, industry, and utilities (Figure 3).

Technology has led sector identification of deals since 2015. Technology is broadly defined and challenges conventional classifications, ranging from artificial intelligence to food technology, robotics, and data analytics. More than 40% of SWFs deals are in technology - some 190 companies. GIC, with 56 deals, led SWF investment in the sector, followed closely by Temasek and Mubadala. The latter consolidated its position as a significant sovereign venture investor in 2021.

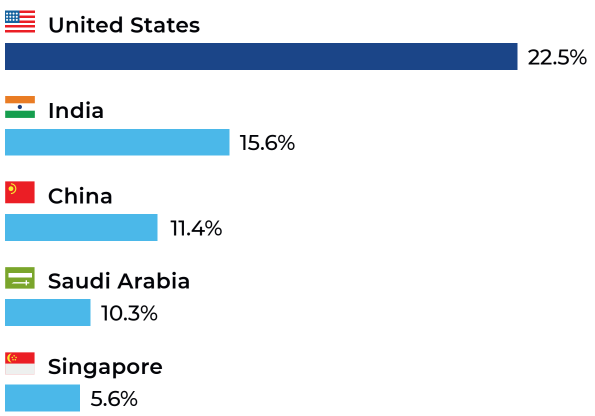
The largest number of SWF technology transactions in our 2020-21 sample are in e-commerce. These include India's giant Flipkart, invested by four SWFs in summer 2021; PIF's investment Noon AD holdings; and the ADQ and QIA stakes in Trendyol, the largest Turkish e-commerce company. These deals collectively suggest that SWF investment in regional e-commerce leaders is aligned with a long-run thesis linked to a global transformation in consumer behavior. Moreover, they also suggest a propensity to invest in technology in emerging markets, including China, India, Turkiye, Indonesia, and the United Araba Emirates.

Also in technology, fintech attracted SWF investment in 37 deals (Figure 6), including crypto the-

Figure 4

Top 5 destination countries by deal volume 2020-2021

Percentage of total deal volume*

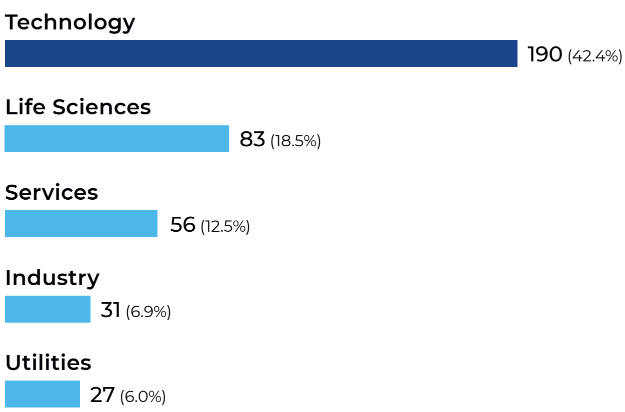


* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

Figure 3

Top 5 sectors 2020-2021

Deal count and percentage of total deals*

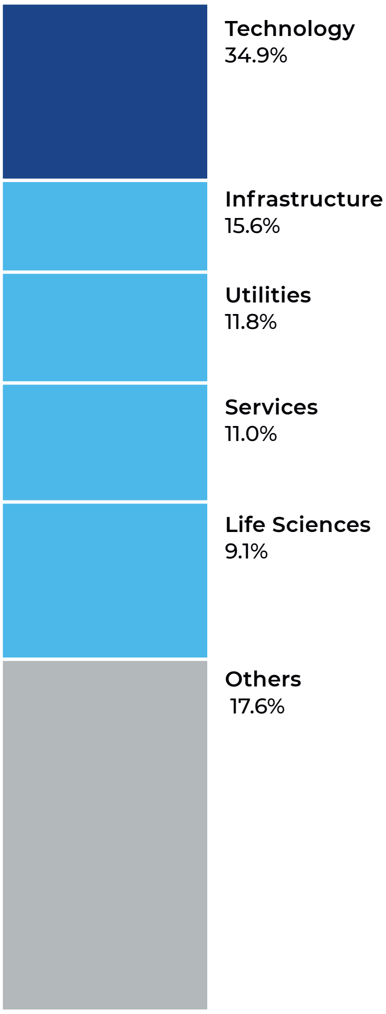


* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

Figure 5

Top 5 sectors by deal volume 2020-2021

Percentage of total deal volume*



* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

mes. Of the top five fintech deals, three are crypto-related. These include GIC's investment in Digital Currency Group, a venture capital firm at the center of the blockchain and bitcoin revolution whose portfolio includes Coindesk, Foundry, and Grayscale. It also includes Anchorage Digital, a digital asset platform that provides services for custody, trading, and financing of crypto assets.[10] Similarly, Temasek has invested in FTX, a crypto derivatives exchange. More broadly beyond crypto, SWF fintech deals include online payment services such as India's Razorpay and iCapital, a US-based wealth management software firm.

Life sciences is the next largest sector destination in our sample with 83 deals (18.5%). This sector was intensely targeted during the first months of the pandemic and continues to attract SWF investment led by Temasek and Mubadala, who together represent nearly 60% of direct SWF investment in the sector. The United States, with 40% of the deals, leads all geographies in SWF life sciences investment.

Biotech and healthcare companies constitute 37 deals each, largest among which is Mubadala's participation in a $1.2 billion financing in EQRx, an innovative biotech company whose aim is to accelerate the discovery, development and delivery of less expensive new medicines. Other large biotech deals include Alphabet Inc.'s research organization Verily and Neumora, a precision medicine company targeting brain disease. Among healthcare companies, investments include Biomat, the US subsidiary of the Spanish Grifols, the plasma center pioneer, and Pivot Bio, which produces an alternative biological fertilizer that substitutes for synthetic fertilizers.

We count 53 deals in retail services and education, including Yuanfudao, the largest online live course platform in China; Unacademy, India's largest learning platform; Witherslack Group Ltd, a UK-based network of special needs education schools; and 360Learning, a firm-focused platform for collaborative learning within companies.

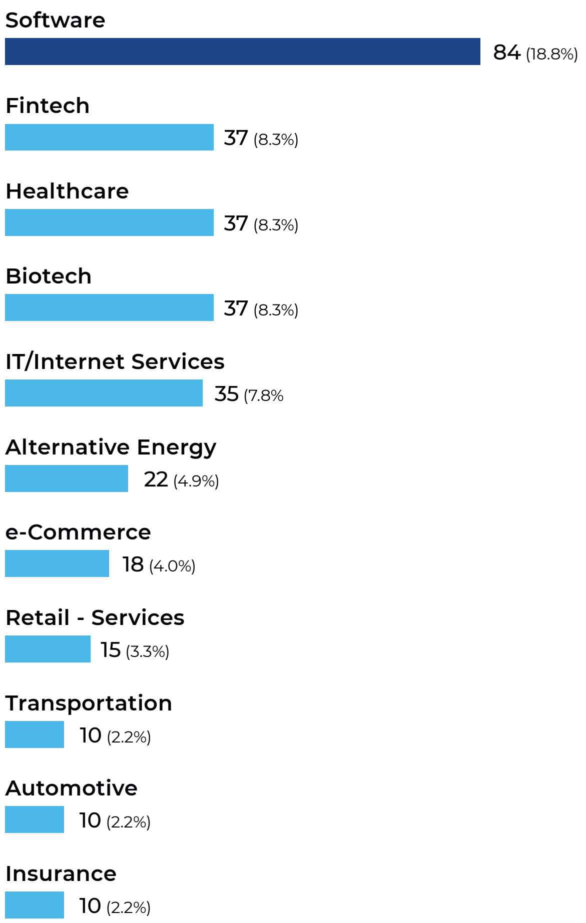
Industry deals (31) are dominated by companies involved in the automotive industry, from the global glass repair leader Belron to the truck accessories manufacturer Truck Hero to sports cars makers such as McLaren or Pagani. Beyond traditional automotive companies, SWFs are also investing in a new cohort of firms whose businesses focus on autonomous and electric vehicles. These include investments in Embark Trucks or Innovusion, which are designing the software and sensor systems for autonomous vehicles.

Utilities include investments in 27 deals but ranks third by total deal volume (Figure 5). This group is overwhelmingly dominated by alternative energy deals (23), diversified among 11 discrete countries.

Figure 6

Top industries 2020-2021

Deal count and percentage of total deals*



* October 2020-December 2021
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

These include renewable energy projects (solar, wind, geothermal) and new energy technologies. For example, QIA partnered with Rolls Royce to develop nuclear energy via small modular reactors, while Temasek invested in Commonwealth Fusion Systems, who is leveraging fusion technology spun out of MIT's Plasma Science and Fusion Center. SWFs are also funding renewable energy storage solutions, solid lithium metal batteries, and companies providing net-zero solutions. Examples include GIC's participation in a $1 billion investment in Envision and ADIA's co-investment with Ontario Teacher's Pension Plan in a 1.25 billion investment in Equis Development. Equis develops, constructs, owns and operates renewable energy infrastructure with a primary focus in Asia-Pacific.

A NEW NORMAL?

With a 200% uptick in deal activity in the 15 months ending 2021 has SWF direct investing activity rebounded sufficiently to have "returned to normal"? This question is difficult to disentangle from the persistent trend among assets owners, and SWFs in particular, to allocate higher proportions of portfolio holdings to alternative asset classes, both directly and indirectly. Invesco's 2021 study of sovereign investment management, for example, documents a rapidly extending sovereign investment horizon from 6.8 to 11.3 years between 2018 and 2021. In the period from 2015 – 2021, sovereign portfolio allocations to private equity, real estate and infrastructure increased from 9.2% to 17.3% in 2018, and to 19.4% in 2021.

As we turn with hope to a post-covid future, the global economy nonetheless remains plagued by supply chain disruptions, geopolitical tensions, under- and unemployment, yet rising inflation. With the prospect of interest rate increases looming, as 10-year Treasury yields rise from historically low levels, even short-duration bond strategies may be insufficient to insulate sovereign portfolios from low returns.

As adaptive global financial institutions, SWFs have contributed materially to the growth of private market finance, hence the parallels between SWF direct investment and global M&A activity which we document. Will SWFs continue to trade-off liquidity for yield enhancement in an uncertain post-covid global economy? Increased allocations to private markets - whether directly or indirectly - might well suggest "normal" reimagined.

[11] See for example https://www.temasek.com.sg/en/news-and-resources/news-room/news/2021/Temasek-and-LeapFrog-Investments-Forge-US500-Million-Partnership

[12] See Invesco Global Sovereign Asset Management Study 2021, accessed at https://www.invesco.com/igsams/en/home.html

[13] For an analysis of the current risks to institutional portfolios posed by low yields in a rising rate environment, see Massimiliano Castelli, "Challenging Times Ahead for Reserve Managers", 4 February 2022, accessed at https://www.omfif.org/2022/02/challenging-times-ahead-for-reserves-managers/

2

FROM COWS TO CODES: SOVEREIGN WEALTH FUNDS IN THE AGRICULTURE AND FOOD SECTORS

Jorge Fernández Vidal
Adjunct Professor, IE University & Investment Director, Liechtenstein Group;

Javier Capapé (PhD)
Adjunct Professor and Director, Sovereign Wealth Research, Center for the Governance of Change, IE University;

Javier Bernal
Research Assistant, ICEX

2. From cows to codes: Sovereign wealth funds in the agriculture and food sectors

INTRODUCTION

Agricultural and food investments have traditionally been seen as defensive investments. Relatively unexciting -although many times politically sensitive- and safe, providing limited but consistent returns over long periods of time.

The agri-food industrial complex has been responding to the ever-increasing food demands from a growing and hungrier world, expanding the amount of harvested land, developing new and more effective inputs, finding more efficient ways to produce meat and dairy products in "factory-like" farms and applying technology -albeit modestly- to increase efficiency levels throughout the value chain.

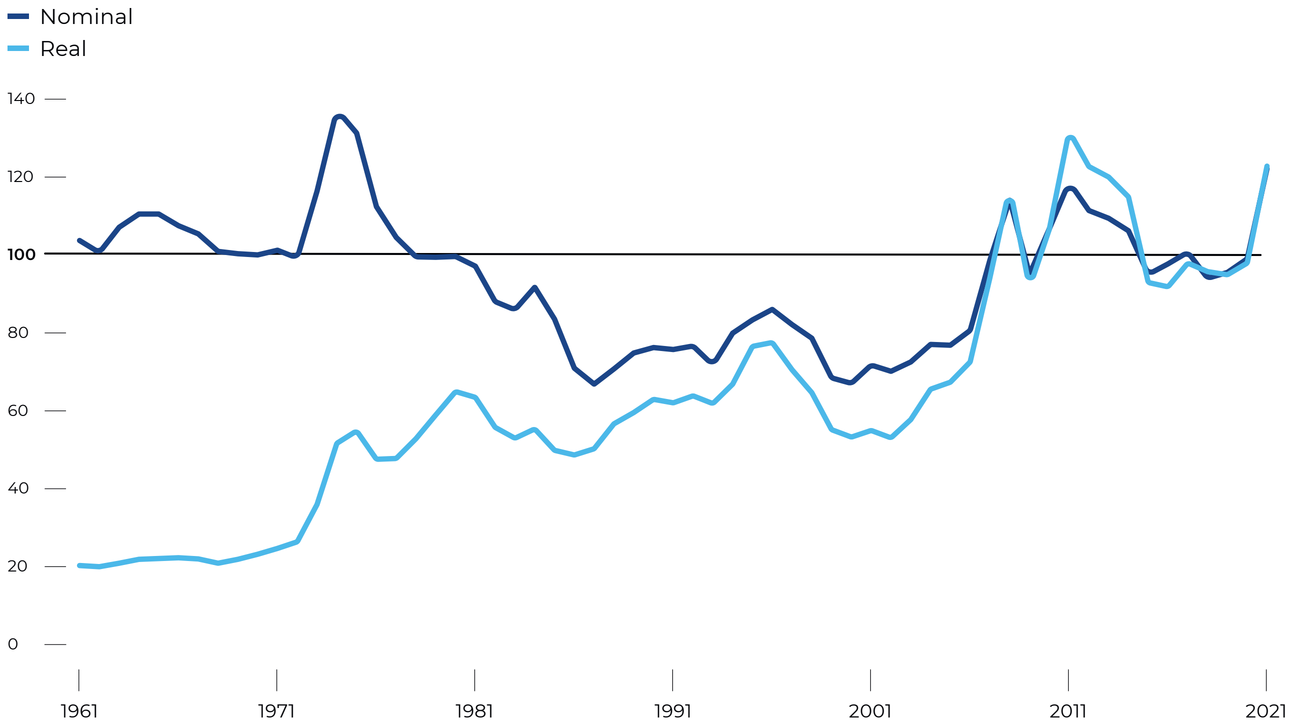
However, the COVID-19 and the climate change crises have evidenced the fragility of our food production system. As a result of the pandemic, an additional 70 to 161 million people are likely to have experienced hunger. Nowadays, more than 720 million people are undernourished in the World[1] . Moreover, the pandemic created labor shortages and reduced the availability of workers to grow, harvest, process, and distribute food.

Our world is increasingly sensitive to production shocks (as there is little excess supply to meet the growing demand) and these are becoming more and more frequent. According to the report of the Intergovernmental Panel on Climate Change—August

Figure 1

FAO Food Price Index (1961-2021)

Index 2014-2016 = 100



Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

2021—the rise of global temperatures is already generating more frequent and severe extreme climate events such as droughts, floods, or fires. A warning signal of what is to come and the impact it could have on the agricultural sector.

These shocks are of course affecting food prices everywhere. Surging prices -which have climbed rapidly since the mid-2020- are stirring memories of the 2008 and 2011 revolts, when food price spikes led to riots in more than 30 countries (and were one of the reasons behind the Arab Spring uprisings).

With the current food production system at risk from extreme weather events, some question how the world will be capable of feeding the almost 10 billion people expected to inhabit the world by 2050 (up from 7.8 billion in 2021) while reducing the environmental footprint from the food sector. While this may seem like a distant problem, it feels extremely real, particularly for countries that rely on global food imports to feed their populations.

The sample in this chapter analyzes 24 SWFs from 18 countries, which have made 233 investments since 2006 including funding agriculture funds, direct investments in private and listed food and agriculture companies or assets, participating in startup investment rounds, etc. The aggregate deal value of these transactions is worth $55 billion, including all sectors. If we exclude retail companies (investments made in J Sainsbury or SPAR or the massive IPO of the e-commerce Meituan), the total deal value declines but remains at a relevant $40.5 billion. We analyze the reasons behind the increasing support of SWFs to this growing sector.

Later, we put the focus on two geographic poles of active and large SWFs: the countries in the Gulf Cooperation Council and Singapore. Their geographic conditions, size, and strategic SWFs make them an interesting case study. These countries control 10 of the top 15 largest SWFs by assets under management. Combined, these 17 SWFs manage assets worth more than $4 trillion. These funds are hosted in countries where food security is a key national concern and with a fragile net food position[2] . Therefore, their interest in the Ag and Food industry is not just simply financial, but rather a matter of strategic relevance and national security.

[1] See United Nations' SDGs Goal 2 for a detailed description and statistics. Available at https://sdgs.un.org/goals/goal2

A CHALLENGE, AND AN OPPORTUNITY

In the spirit of never letting a good crisis go to waste, investors are flocking into the Ag and Food space committed to restructuring and transforming what many perceived to be a strained sector.

As a result, the world of Ag and Food investing is attracting a new and growing crowd of investors, from the "techies" (keen to bring the "Silicon-Valley-will-solve-this" mentality to one of the least digital sectors worldwide) to the sustainability activists (pushing to transform the industry and reduce its environmental footprint). Alongside them, many incumbent investors are doubling down their commitment to the industry, none as prolifically as the world's largest sovereign wealth funds.

The breadth and wealth of investors in the industry mean that the scale and scope of investment themes and objectives are expanding. However, four broad areas are dominating the space. First, increase food production to feed a growing and wealthier world; second, build more resilient ecosystems that can guarantee the availability of food all year round; third, digitize value chains to achieve more efficient, profitable, and sustainable practices; and fourth, transform the sector towards more climate-friendly practices.

Interestingly, while most investors in the sector would agree with the end goal, that is, to feed the world efficiently, affordably, and sustainably, there are contrasting views on how to achieve it. On the one hand, some are betting on the regeneration of our agricultural systems. In a world defined by hashtags, #regenAg (i.e., regenerative agriculture) and #realfood are a call to arms to step back, leveraging the powerful attributes of natural ecosystems, while limiting the consumption of ultra-processed foods. On the other hand, food-tech enthusiasts bet on the power of technology to solve our food and climate crisis, by providing the world with the protein it needs in ever-increasing amounts, without the need for any livestock.

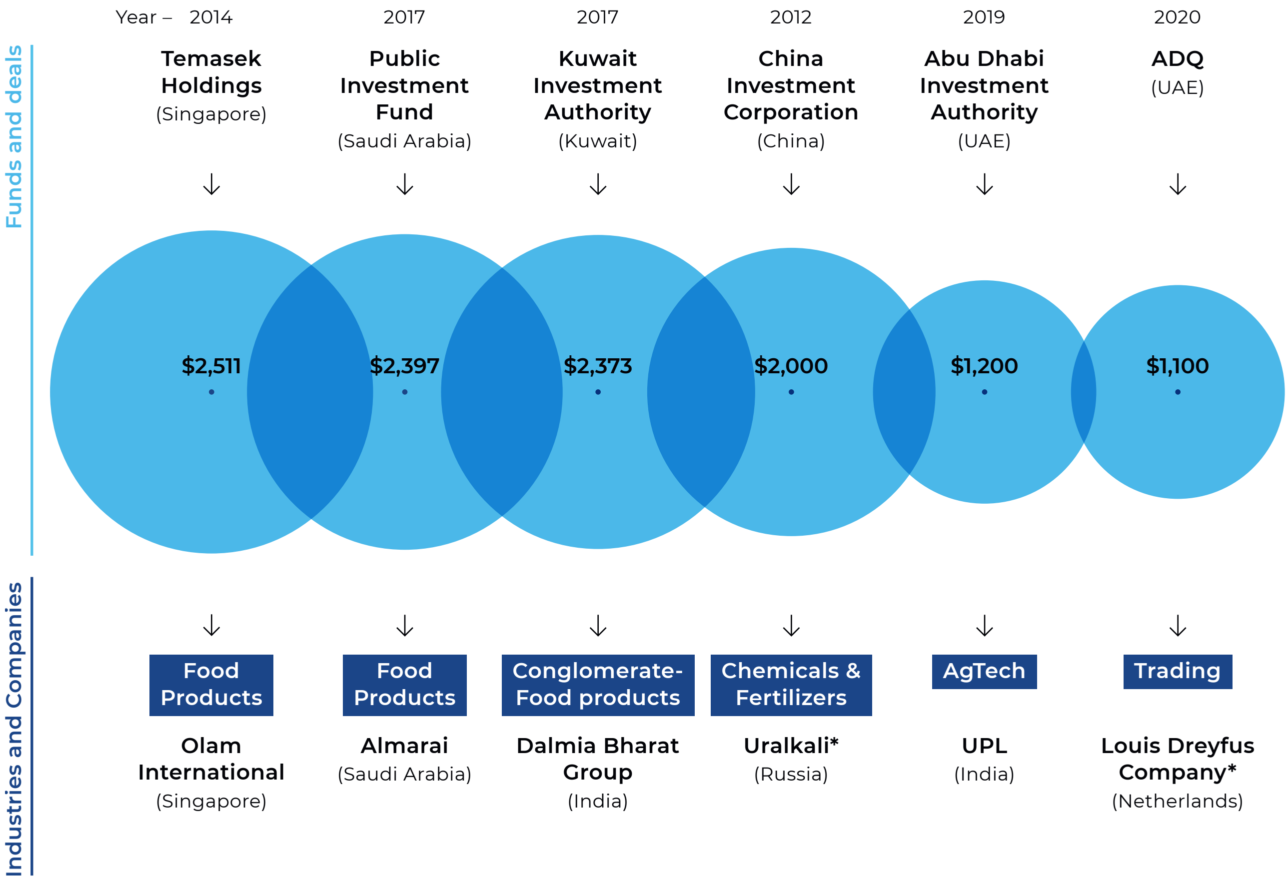
Where do Sovereign Wealth Funds stand on this quasi-ideological spectrum? The short answer is everywhere.

2 The UNCTAD computes the Food net position as a country's exports of agricultural products minus its imports of agricultural products, divided by agricultural trade (imports plus exports). The index varies between -1 and 1, with positive values meaning that the country exports more agricultural products than it imports. The GCC economies are close to -1. Other countries hosting SWFs and in a similar negative net position include Panama, South Korea, Botswana, or Angola. We have not covered them in this chapter. Qatar maintains a positive net food position.

Figure 2

Selected Investments by GCC Sovereign Wealth Funds in the Ag and Food Sector (2014-2021)

By deal size ($ million)



*Estimated deal value. Pure off- and online retail companies are excluded.
Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

THE ROLE OF SWFS IN THE AG AND FOOD SECTOR

SWFs are no strangers in the Ag and Food sector. Their strategic importance to the global Ag and Food sector is hardly a secret and the scale and scope of their investments in the sector are very significant. SWFs are cornerstone investors in some of the largest and most influential agri-food companies (e.g., Bayer, Olam, COFCO, Louis Dreyfus) and in some of the trendiest novel food start-ups (e.g., Impossible Foods, Perfect Day).

SWFs are directly or indirectly involved in all the major investment themes in the Ag and Food industry, and this is simply a reflection of their overall involvement and commitment to the sector, where SWFs have become a driving force.

The lack of publicly available data makes it very hard to quantify their influence in the sector, but their ubiquity is evident and quite telling. What we know publicly, shows the prominence of SWFs in the direct investing space (see Figure 2 for a list of some landmark investments by SWFs in the Ag and Food sector since 2014).

As discussed, we accounted for at least 224 transactions made by 24 SWFs from all over the world in the broad agriculture and food industry. These investments, executed since 2006, are worth almost

$55 billion in total value, including retail. Targeted companies belong to an array of sub-industries ranging from pure trading giants (Louis Dreyfus Company or Bunge), food products (dairy producers such as Almarai), agritech companies such as UPL, or food delivery companies like the Istanbul-based Getir. SWFs typically partner with other financial and sector specialists when engaging with these companies, including TPG, KKR, Sequoia Capital, and other peer SWFs, mainly the Singaporean SWFs (Temasek and GIC), and other global SWFs like Alaska Permanent Corporation Fund and regional strategic funds as the Russian Direct Investment Fund.

Temasek is the most active SWF in this space, followed by Spain-based Cofides and France's Bpifrance. The Qatar Investment Authority and Mubadala Investment Company complete the top 5. If included, the influential SoftBank Vision Fund (with the Public Investment Fund from Saudi Arabia and Mubadala itself as its main sponsors), occupies the fourth position with QIA. Other relevant SWFs heavily investing in Ag and Food are the Ireland Strategic Investment Fund and the RDIF, which demonstrates that agriculture is a matter of interest for strategic SWFs.

Geographically, SWFs bet in Ag and Food companies founded in the United States, China, India, Russia, or Singapore (Figure 3). By deal count, almost one-third of total deals take place in the United States. France ranks second, highly influenced by the focus of Bpifrance in domestic Ag and Food startups, which we analyze below. India, Russia, and China complete the top 5 by deal count. The leadership of the United States, and particularly California, is uncontested. California's agriculture and food startups are targeted more frequently than the combination of the next 10 countries.

SWFs are also heavily influential through their numerous PE and VC fund investments (e.g., Bits x Bites, Big Idea Ventures, Finistere Ventures, etc.), which is oftentimes their preferred investment strategy, through which they get exposure to interesting companies, diversify risk, learn from industry experts about novel sectors and derive direct co-investment opportunities or follow-on investments. As suspected, data accuracy and completeness of the SWFs' positions as limited partners (investors) in private equity and venture capital funds is very limited.

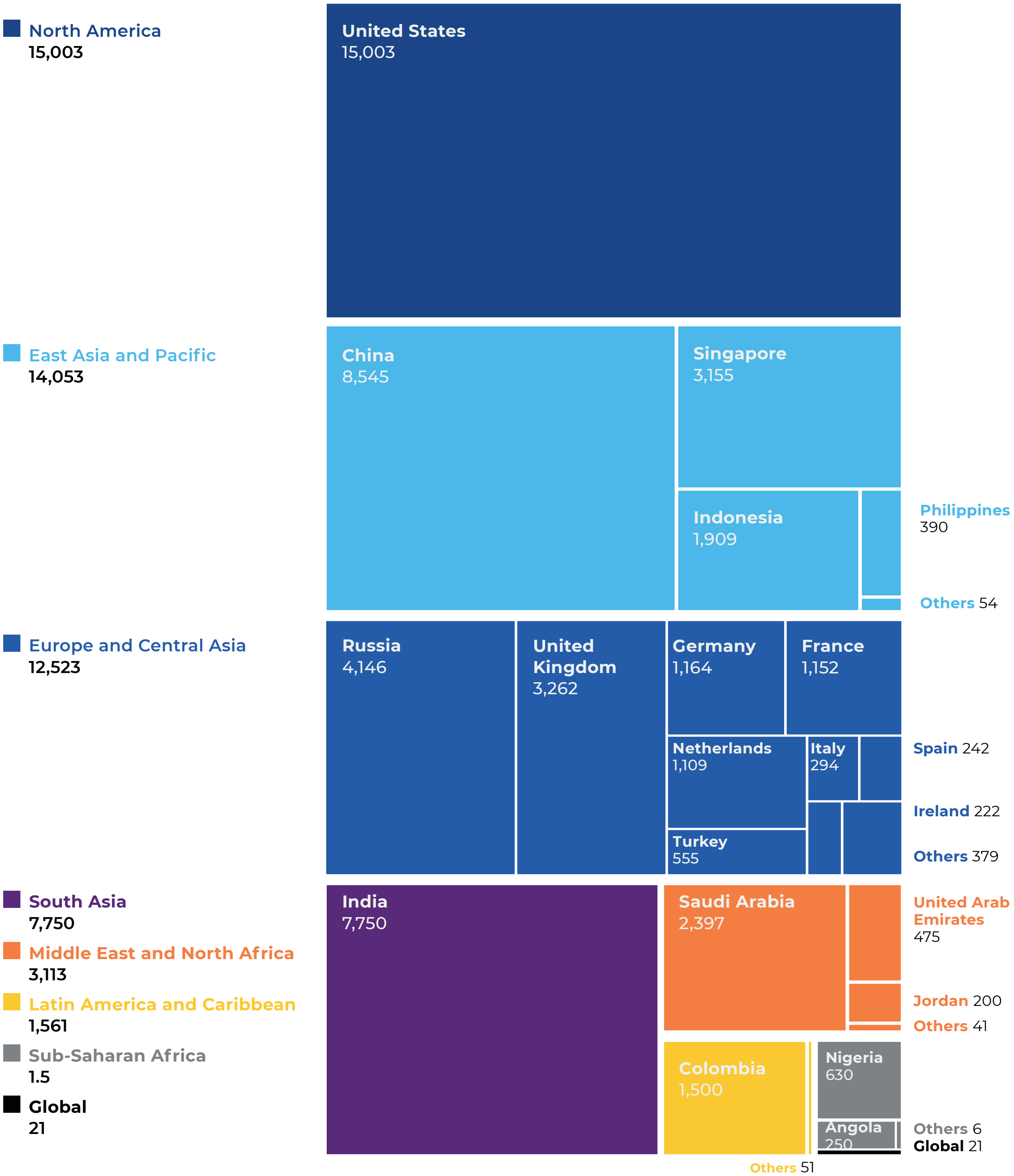
SWFs have significantly increased their appetite for investments in the sector. Figure 4 shows the number of deals since 2010. The number of targeted firms in the Ag and Food sector more than doubled in just 5 years, similarly to the total investment value of deals with SWF participation.

Figure 3

Sovereign Wealth Fund Investments in Ag and Food by Geography

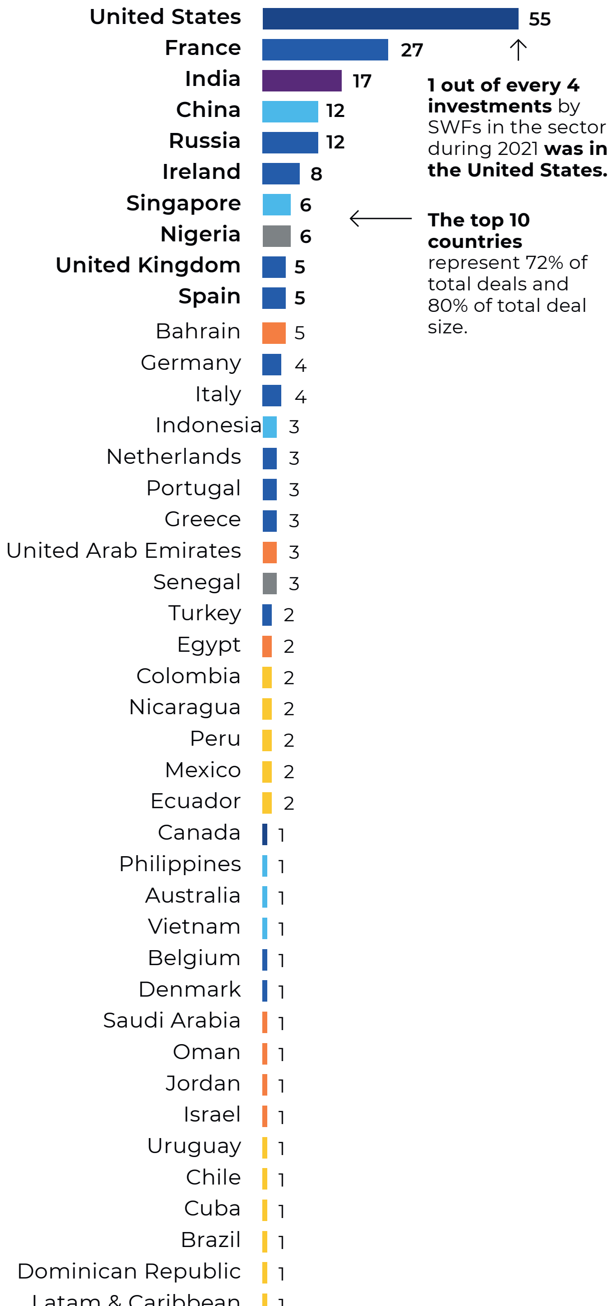
How much did SWFs invest?

Total deal size by country* and region, US$ million



How many deals?

Number of deals by country



*Data for the six investments made in Canada, Vietnam, Denmark, Oman, Brazil and South Africa respectively are not available and, therefore, not shown on the chart.

Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

GLOBAL SOVEREIGN WEALTH FUNDS IN AG AND FOOD STARTUPS

The analysis of the Ag and Food venture capital industry provides a reliable intuition about the long-term interests of SWFs, as they engage in riskier bets on the young companies that are disrupting the agriculture and food sectors. Understanding which sub-industries, technologies, and regions are selected by SWFs, can help us infer the type of future these long-term investors foresee and where they see value and opportunity within the agriculture and food sectors.

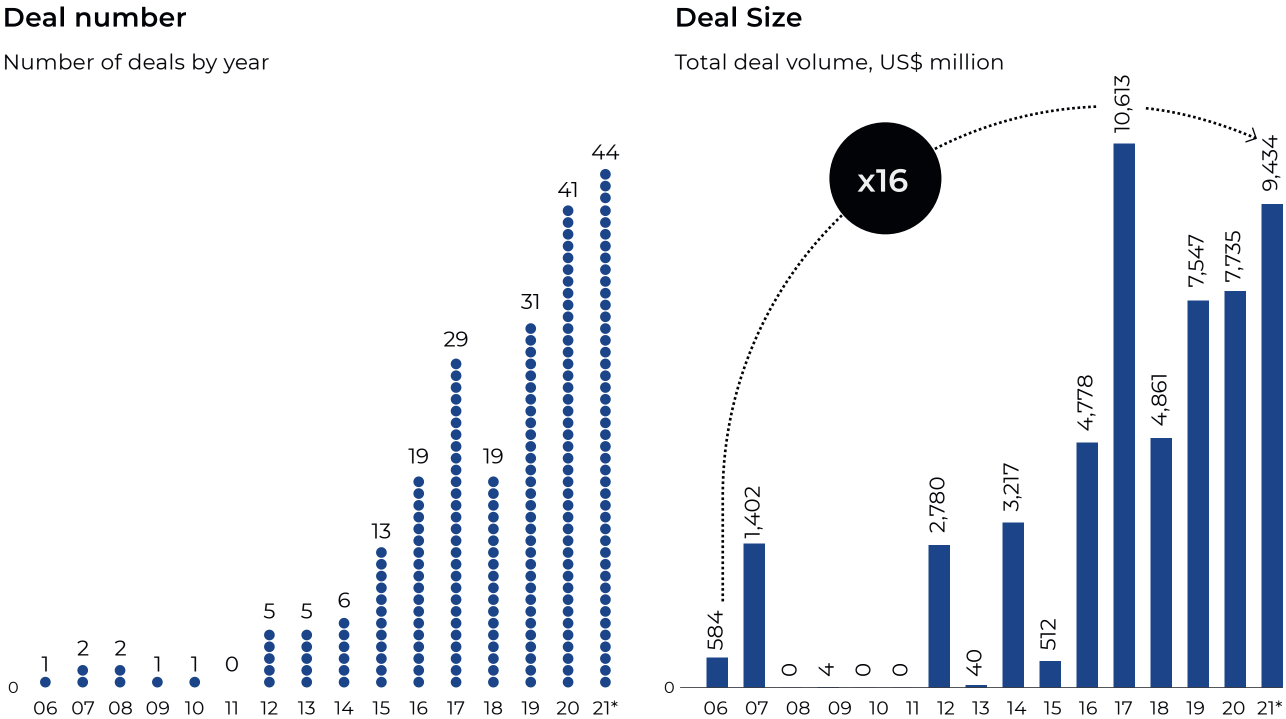
Thus, if we just put our focus on analyzing the investments made in tech startups in the space, Temasek (with 39 deals) emerges as a clear leader, followed by the SoftBank Vision Fund, GIC, and Bpifrance. Not surprisingly, as it happens in cross-industry venture capital investments, Temasek and GIC represent between 50 to 70 percent of all deals and dollars invested in Ag and Food startups (this concentration is even higher when the Vision Fund is excluded), but a more diverse set of SWFs are increasingly joining them.

We have analyzed 100 venture capital rounds participated by SWFs in industries like AgTech, Biotechnology, Food and Beverage, Farming, or Organic Food since 2015. Singaporean funds participated in 51 out of the 100 deals we tracked. The SWFs from GCC countries joined in 16 deals (32 if the Vision Fund is included in the regional grouping), representing the second-largest geography. France and a handful of deals made by China Investment Corporation, Ireland Strategic Investment Fund, Alaska Permanent Fund Corporation, or Russian Direct Investment Fund, complete this list.

By sub-industries, biotechnology has attracted the most SWF interest (Figure 5). With 27 deals, SWFs have invested in companies such as Pivot Bio, Perfect Day, or Provivi, which produce sustainable fertilizers, the world's first milk protein made without animals or protect crops via biopesticides, respectively. Temasek is an even stronger leader within this category, being responsible for more than 70% of deals. Temasek dominates these bets on the future of food, as part of Singapore's strategy of backing alternative Ag and Food companies that can strengthen and diversify the country's food sources.

Figure 4

Sovereign Wealth Fund Investments in Ag and Food Companies by Year



*2021, up to November. Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

Others, such as Qatar or the Investment Corporation of Dubai and Bpifrance have invested in companies that extend the shelf life of fresh produce while reducing food waste, use insect nutrients or provide seed gene editing. Biotechnology startups applied to Ag and Food have led the technology bets in 2020 and 2021, closely followed by food delivery companies.

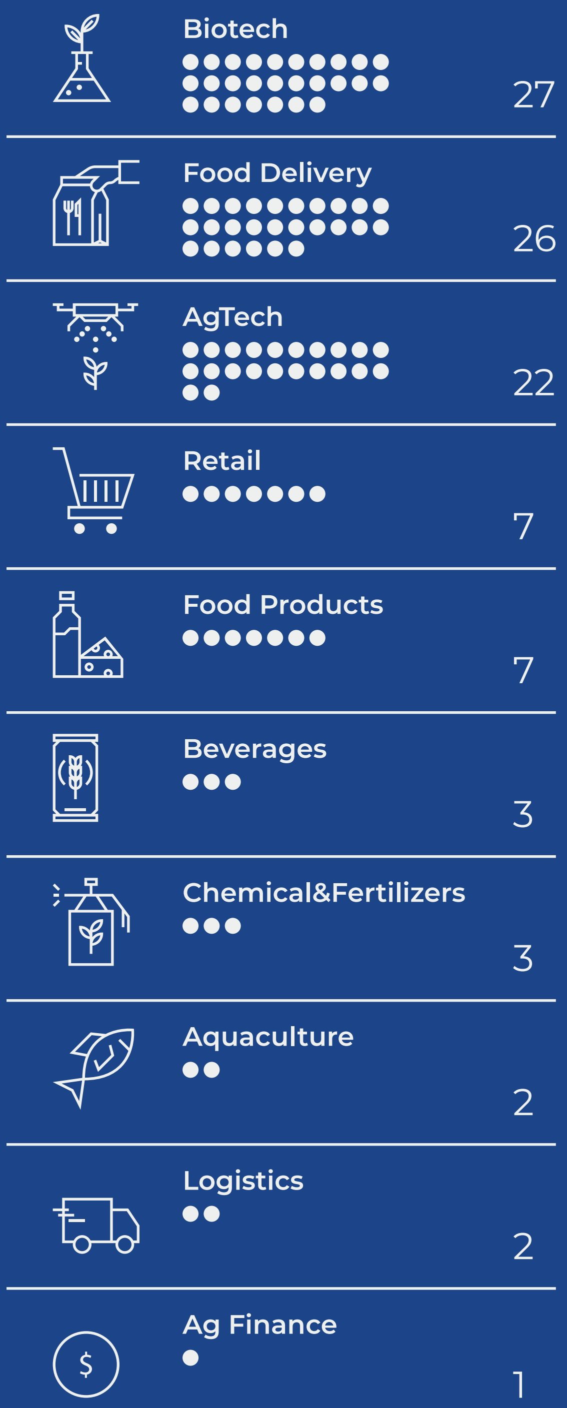
Sovereign capital has made 26 investments in the global food delivery industry since 2015 in companies such as Meituan, Ele.me, Grab, DoorDash, Rappi, and Glovo. The SoftBank Vision Fund is the clear leader in the food delivery space with key strategic stakes in Ele.me, Grab, DoorDash, Kitopi, Gopuff, or Grofers. The SWFs' interest in the space has declined since 2018, though. Regulatory concerns linked to the new economy and the labor status of riders, paired with a growing consolidation, may explain the lack of new investments in the space.

AgTech ranks third, with 22 deals. It has received more attention from SWFs, surpassing the number of investments in the food delivery industry for the past two years. This category has attracted a more diverse group of SWFs. At least 7 different SWFs have bet on companies that manufacture robots for viticulture, design and operate vertical farms or implement vision systems and automation technology to monitor plants and their growth. AgTech firms, with their focus on improving productivity in the sector, can materially assist in the growth and development in the sector, particularly in emerging markets, where agricultural systems have substantial modernization potential. Despite this global possibility, the startups targeted by SWFs are mostly located in the United States, with a few exceptions in India, China, or France.

Figure 5

Sovereign Wealth Fund Investments in Ag and Food Startups (2015-2021)

Deal Count



Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

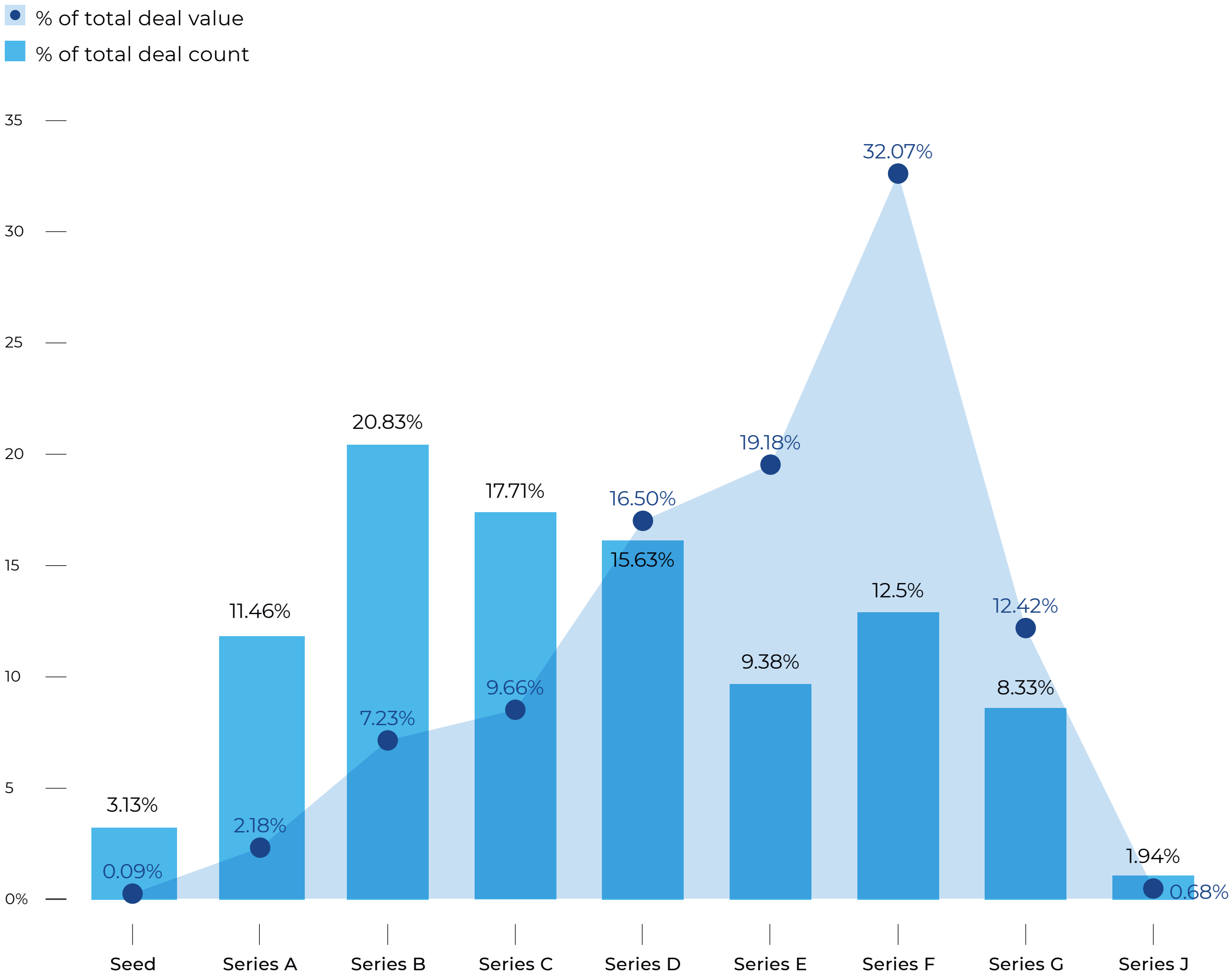
Given the risks embedded in any venture capital bet, what is the ideal moment for SWFs to invest in Ag and Food startups? Like other institutional investors, most SWF investments (53%) are made at the intersection of early and late investment rounds (Series B to D), where mature and already capitalized startups require funding to enter a growth stage that will engine an accelerated international expansion.

Indeed, earlier bets in seed or Series A attract only 15% of total SWF deals (Figure 6). There is still interest in exploring the Ag and Food industry at these very early stages, with at least five SWFs participating in early rounds for projects based in Russia, Germany, Singapore, or the United States.

With relevant geopolitical implications, the map of Ag and Food technology is dominated by the United States (Figure 7). More than 53% of the deals take place in California, New York, or Massachusetts. The leadership of the United States, and particularly California, is overwhelming. California's Ag and Food startups attract more investments than the next 10 countries combined.

Figure 6

Sovereign Wealth Fund Investments in Ag and Food Startups by Funding Round



Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

NOT ONLY FARMLAND

The presence of SWFs in the agricultural space has conjured fears of sovereign investors taking over farmland in foreign countries. SWFs (or their portfolio companies) have acquired or signed long-term leases of farmland in Argentina, Australia, Brazil, Kenya, Sudan, Venezuela, or Zimbabwe[3] . Not without a fair share of controversy and media scrutiny.

While the direct purchase of arable land is a clear investment target for SWFs, it is hardly representative of their interests and involvement in the sector, as we have just seen.

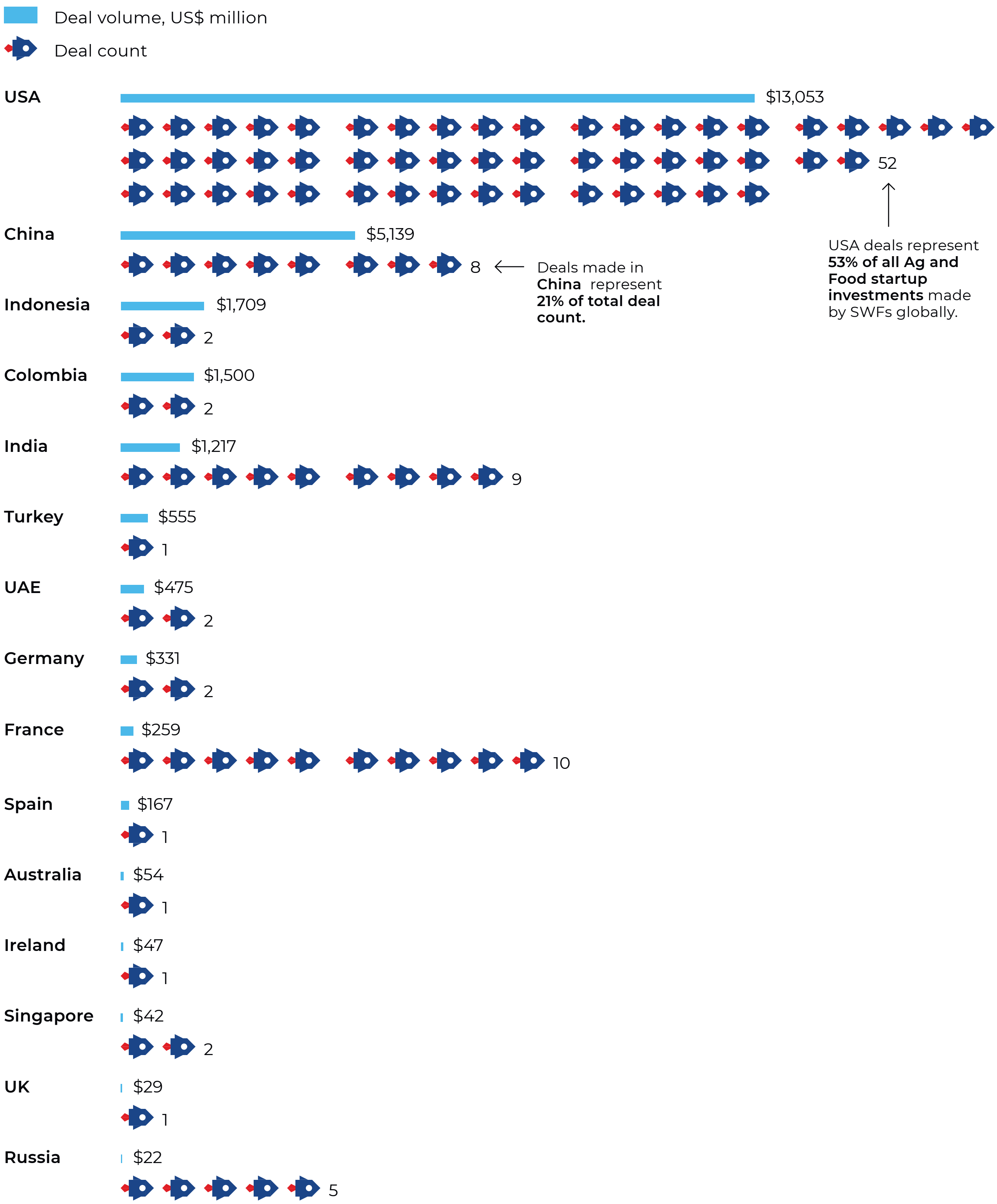
The reality is that SWFs play an active and influential role across the whole Ag and Food value chain. The strategic importance of the sector for many SWFs means that their commitment and involvement in the sector is here to stay.

As we can see in Figure 8, SWFs are present in all stages of the agricultural value chain. Interestingly, as the sector moves towards greater vertical integra-

3 The King Abdullah's Initiative for Saudi Agricultural Investment Abroad was launched in 2008 with the aim of purchasing agricultural land in foreign countries.

Figure 7

Sovereign Wealth Fund Investments in Ag and Food Startups (2015-2021)



Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

Figure 8

Sovereign Wealth Funds Investments in the Ag and Food Value Chain

	PRIMARY PRODUCTION **Agricultural inputs**	PROCESSING **Farmers and Farming Services**
Global Market Size*	€3 TRILLION	€3 TRILLION
Key Investment Themes for SWFs	• Crop optimization • Automated machinery • Ag biotech	• Large scale crop • Indoor farming • Precision Ag • Aquaculture
Selected deals by SWFs	BAYER PIVOT BIO Godrej agrovet VINASEED Tropic Biosciences PROVIVI SUPERBAC VOLOAGRI	Pure Harvest Hummingbird Technologies Minerva Foods PANFARM BOWERY indigo DAAWAT inari Agrotechnology MERREDIN FARMS PTY LTD

Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022) and Dealrom.co for the Global Market Size.

Trading

DISTRIBUTION
Food and Ingredient Companies

€1 TRILLION

- Large global trading
- Agribusiness marketplaces

€4 TRILLION

- Plant-based meat
- Cell-base meat&fish

tion -from producers to consumers- SWFs are uniquely positioned to provide the kind of large-scale and long-term funding required to transform the sector.

While the presence of SWFs in the Ag and Food value chain is ubiquitous, they play a prominent role in two subsectors, in particular, trading and novel foods (food & ingredient companies). This perhaps deserves closer scrutiny and investigation, beyond the scope of this chapter.

TRADING

As seen in the case of GCC, SWFs play a clear and strategic role in guaranteeing the food security of their respective nations. They do so by buying and leasing land abroad, by setting proactive import policies and actively building up their food strategic reserves, and by strategically investing in the world's largest global traders.

These investments, often in the billions of dollars, allow these global traders to further integrate and expand their production and trading of agri-food commodities and ingredients. They are also a way for SWFs to channel resources toward strategic projects and ensure strong and controlled food supply agreements for their nations.

SWFs have been active investors in the Ag and Food trading space for a long time. For instance, China Investment Corp (CIC), Korea Investment Corp, and Temasek purchased a stake in Noble Group—then Asia's biggest commodities supplier—which was later acquired by COFCO—where in turn CIC and Temasek are key shareholders. Temasek owns 46% of Olam, one of Asia's and Africa's largest traders, a stake currently worth over $2.2bn.

Back in 2012, GIC (Singapore) invested $496 million in a stake in Bunge Ltd -one of the so-called "ABCD-quartet" of global agricultural commodity traders that includes Archer Daniels Midland Co, Louis Dreyfus, and Cargill Inc, which collectively dominate the global trading market. In 2015, the Saudi Arabian SALIC joined forces with Bunge Ltd to create G3 Canada, a grain company that was established following their acquisition of a majority interest in the Canadian Wheat Board.

As previously seen, in the latest of these deals, closed in November 2020, ADQ acquired 45% of Louis Dreyfus (the "D" in the "ABCD" quartet). Revealingly, the transaction included a long-term supply agreement with LDC for the sale of agricultural commodities to the UAE.

NOVEL FOODS

SWFs are among some of the most active investors in novel food production categories, such as indoor farming, high-tech aquaculture, and alternative proteins. It is an open secret that the involvement of SWFs in the sector -with Singapore, the United Arab Emirates, and Saudi Arabia leading the charge- is driven by their desire to find novel ways to produce food domestically, via indoor farms, high-yield fish farms or even non-animal meat and fish.

The production of nutritionally dense food without using arable land would virtually solve the food security challenges of GCC countries and Singapore. Therefore, SWFs have backed multiple early-stage ventures in the novel food space in areas ranging from indoor farming (e.g., Bowery Farming), alternative dairy (e.g., Perfect Dairy), plant-based meat (e.g., Impossible Foods), cell-based meat (e.g., UPSIDE Foods, formerly Memphis Meats) or high-tech aquaculture (e.g., Pure Salmon). They have also backed up several venture capital funds with the primary mandate of investing in the novel foods space (e.g., Bits x Bites).

The SoftBank Vision Fund, the technology giant with a funding chest of around $100bn, backed by Saudi Arabia's Public Investment Fund and UAE's Mubadala, has participated in at least 17 investment rounds in Ag and Food-tech startups worth $7.5 billion, between November 2015 and September 2021.

While many of these technologies are still at an early stage, there is a clear consensus that these novel food technologies will disrupt the Ag and Food industry. BCG, for instance, estimates that the alternative protein market can reach $295 billion in 2035 and Grand View Research estimates that the indoor farming sector can be worth $75 billion in 2028.

SWFs are certainly close to these developments and will likely use their financial leverage and strategic influence as investors to secure preferential supply agreements with some of the winning firms, or even establish physical operations in their countries. One way or another, this seems like one of the most promising bets for some of these SWFs to address their chronic domestic food security challenges.

A SWF CASE: FOOD SECURITY AND SOVEREIGN WEALTH FUNDS

The GCC countries and Singapore invest substantial private and public resources to ensure that their populations have ample access to affordable, safe, and nutritious food .

These countries have very limited natural resources to grow their food—countries like Singapore, the United Arab Emirates, or Kuwait have barely any arable land at their disposal (1.1% on average, compared to the world's average of 10.8%). As a result, GCC countries are among the world's largest net importers of food per capita (as they need to import almost all the food they consume) and spend more than $18 billion per annum in food products imports alone, around $283 per capita per year, four times more in relative terms than the world average. Singapore almost quadruples the GCC figures[7] . India, China, and the USA are the most important food trading partners for the GCC countries, with France, Malaysia, China being the key partners of Singapore.

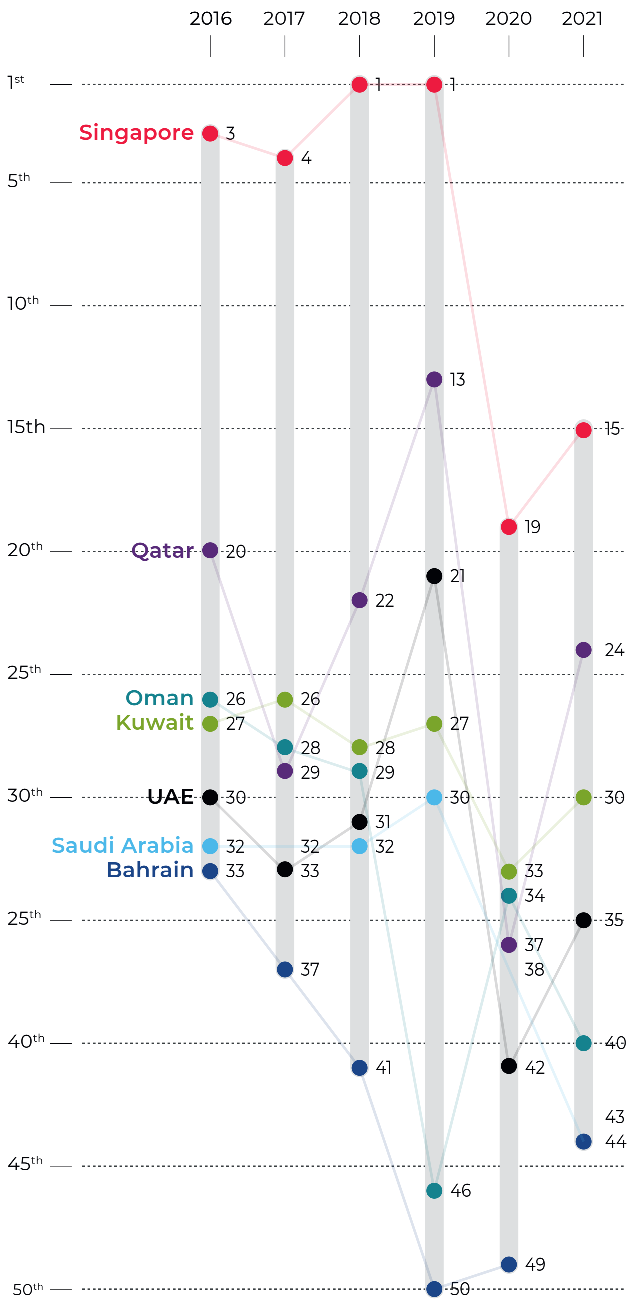
The efforts of the GCC countries and Singapore in ensuring an adequate food supply have consistently positioned them among the best performing countries in the The Economist's Global Food Security Index—a comprehensive benchmark that assesses the affordability, availability, quality, and safety of

Figure 9

Food Security Country Ranking

The Global Food Security Index (GFSI) measures food security through affordability, availability, quality and safety, natural resources and resilience, across 113 countries.

Rank position



Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022) based on The Economist Intelligence Unit.

4 BCG. "Food for Thought: The Protein Transformation". Available at https://www.bcg.com/press/23march2021-alternative-protein-market-reach-290-billion-by-2035

5 Grand View Research: "Indoor Farming Market Size, Share & Trends". Available at https://www.grandviewresearch.com/industry-analysis/indoor-farming-market#:~:text=The%20global%20indoor%20farming%20market%20is%20expected%20to%20grow%20at,USD%2050.30%20billion%20by%20 2025

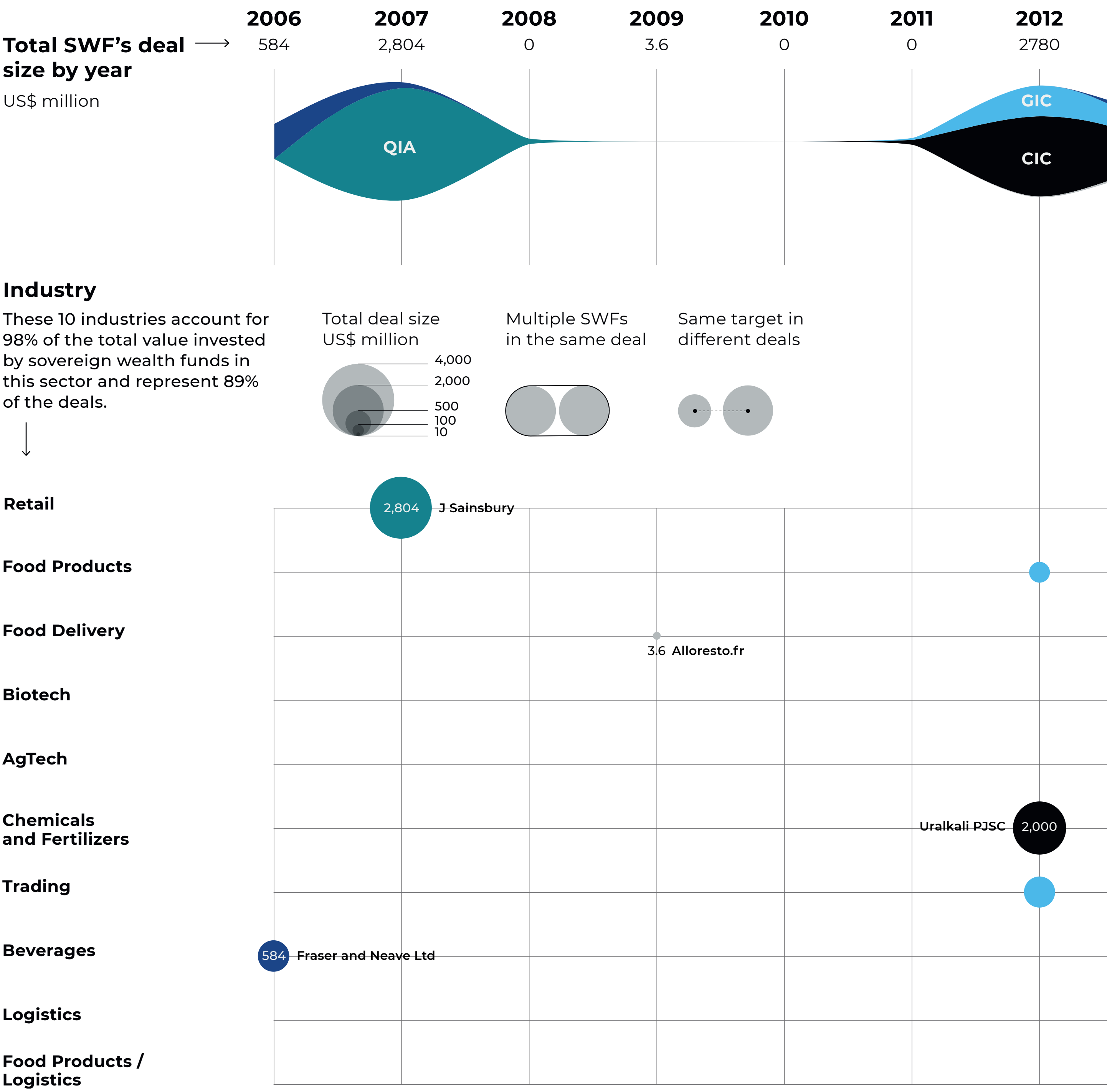
6 The United Nations definition of "food security" appeared first in 1996, during the World Food Summit, and it states that "food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life". From a FAO Policy Brief, available at https://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf

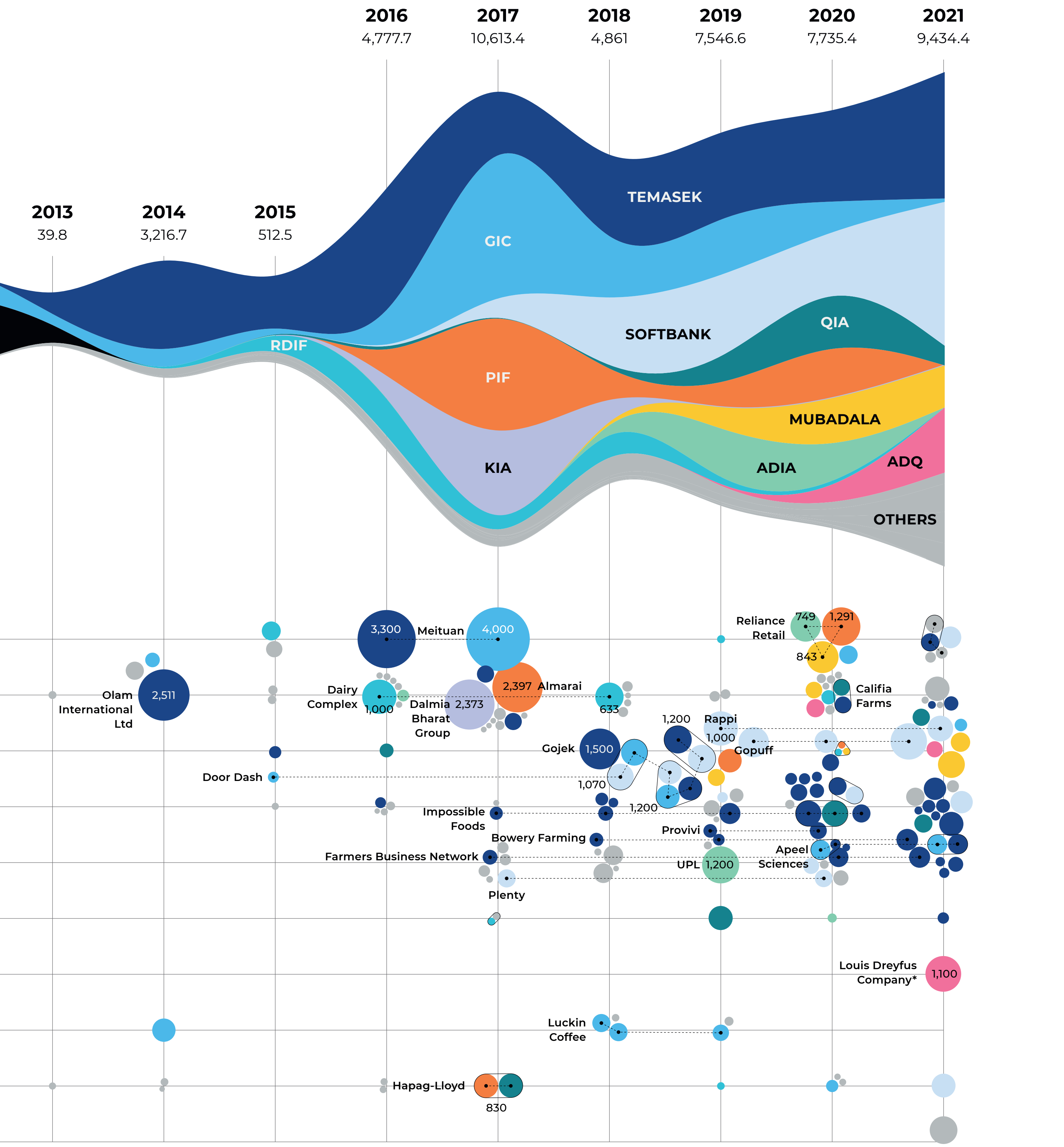
7 Data on food imports from the World Integrated Trade Solution, available at https://wits.worldbank.org/

Infographic 3

Sovereign wealth funds in the Agriculture and Food sectors (2006-2021)

The eleven sovereign wealth funds marked in color participated in 58 transactions valued at $50.92 billion, representing 93% of the total value invested by SWFs in this sector between 2006 and 2021. The category “others” marked in grey, includes 13 other sovereign wealth funds investments, that made a total of 97 transactions valued at $3.99 billion.





2013
39.8
2014
3,216.7
2015
512.5
2016
4,777.7
2017
10,613.4
2018
4,861
2019
7,546.6
2020
7,735.4
2021
9,434.4
TEMASEK
GIC
SOFTBANK
QIA
RDIF
PIF
MUBADALA
KIA
ADIA
ADQ
OTHERS
Olam International Ltd
2,511
3,300
Meituan
4,000
Dairy Complex
1,000
Dalmia Bharat Group
2,373
2,397
Almarai
633
Reliance Retail
749
1,291
843
Califia Farms
Gojek
1,500
1,070
1,200
Rappi
1,000
Gopuff
1,200
Door Dash
Impossible Foods
Bowery Farming
Farmers Business Network
Plenty
Provivi
UPL
1,200
Apeel Sciences
Louis Dreyfus Company*
1,100
Luckin Coffee
Hapag-Lloyd
830

food across countries. However, the covid-19 pandemic, and the disruption to global supply chains, have affected these countries, which dropped materially in their food security rankings (Figure 9).

The GCC countries have developed strong and committed strategies to guarantee their national food security. Through the establishment and development of new companies, or the acquisition of national and international companies and projects, GCC countries do have a presence in multiple stages of the global food value chain.

Five out of the six GCC members have established a public company to either acquire stakes in foreign food and agriculture companies or to build a resilient domestic food and agriculture sector (Figure W0). All these state-owned enterprises are fully or majority-owned by the corresponding SWF, thus involving strategically SWFs in this relevant country goal.

SAUDI ARABIA

First, consider the case of SALIC (Saudi Agriculture and Livestock Investment Company). Established in 2009, a year after King Abdullah's Initiative for Saudi Agricultural Investment Abroad was launched, SALIC is fully owned by the Public Investment Fund.

SALIC began operations in 2012 and has signed partnerships with key Ag and Food companies worldwide. It controls 30% of Daawat which produces 130,000 tons of (basmati) rice annually in India. SALIC fully owns Continental Farmers Group, a Ukrainian giant with 195,000 hectares of land, with an estimated production capacity of half a million tons of wheat, barley, corn, and rice. Similar portfolio companies include the Australian Merredin Farms (211,000 ha of arable land and livestock exceeding 40,000 merino sheep).

SALIC also holds investments in aquaculture, grains, and red meat. In 2015, it purchased 19.95% of Minerva Foods, Brazil's third-largest meat exporter, for $188 million. Minerva has a production capacity of more than 1 million tons in more than 100 countries. In September 2020 SALIC decided to increase its stake to 33,83% and in February 2021 both companies announced a joint venture in Australia for the processing and export of red meat. During the pandemic, SALIC played an active role in price stabilization and securing the supply of food products via international agreements.

Oftentimes, these SWF-dependent SOEs engage with strategic SWFs. In fact, in October 2019, the Russian Direct Investment Fund (Russia's strategic SWF) and SALIC signed an agreement to procure investment opportunities in Russian agricultural and livestock sectors as well as a memorandum to increase mutual food exports.

Figure 10

Sovereign Wealth Funds and Ag and Food State-owned Enterprises

	Sovereign Wealth Funds	Ag and Food SOEs
Saudi Arabia	Public Investment Fund	سالك SALIC
United Arab Emirates	ADIA جهاز الإمارات للاستثمار EMIRATES INVESTMENT AUTHORITY ADQ القابضة MUBADALA INVESTMENT CORPORATION OF DUBAI	سلال silal
Qatar	QIA جهاز قطر للاستثمار QATAR INVESTMENT AUTHORITY	حصاد الغذائية HASSAD FOOD
Oman	جهاز الاستثمار العُماني Oman Investment Authority	OFIC Oman Food Investment Holding Co. (S.A.O.C)
Kuwait	KIA	
Bahrain	Mumtalakat INVESTING FOR BAHRAIN	Khairat Al Bahrain

Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

UNITED ARAB EMIRATES

ADQ is one of the latest additions to the group of SWFs. Established in 2018 in Abu Dhabi, it is becoming a key player in the national Emirati food security strategy. The nature of this SWF is not clearly defined. In the words of its CEO "we do have characteristics of a sovereign fund, but we are defined in our articles as a holding company with developmental nature"[8] . The fund's domestic focus is evident, since Abu Dhabi assets account for 90% of its portfolio, with the energy industry accounting for 65%. Yet Ag and Food is growing and expanding globally.

Indeed, ADQ made the headlines in September 2021 when it completed the transaction for an indirect 45% equity stake in Louis Dreyfus Company (LDC), one of the world's most relevant food and agriculture merchant companies.

ADQ holding is built around four key portfolio companies: Silal, Al Dahra, Louis Deyfrus itself, and Senaat with its agro firm Agthia. While Silal is mainly focused on developing the local agricultural sector, the other three companies have interests in a wide range of food products including juice, mineral water, oil, flour, dairy products, animal feed, coffee, rice, sugar, bakery, pasta, and vegetables.

Silal is a very young venture. Founded by ADQ in 2020, its mission is to boost Abu Dhabi's food and agricultural sector. It works with local farmers and manages food procurement programs and strategic stockpiles. Silal deploys advanced Agtech solutions providing farming inputs, technology, and equipment. It also carries out specialized knowledge transfer programs on desert farming techniques. Silal operates 16 collection centers and three pack-houses across the emirate of Abu Dhabi.

Al Dahra was founded in 1995 but it was in 2020 when ADQ acquired a 50% stake. The corporation is a global agribusiness leader with operations in North America, Europe, Asia, Africa, and the Middle East. Al Dahra's hub in the UAE's Fujairah port, with 20 silos and a 300,000 MT storage capacity, is among the most relevant globally. Al Dhara is vertically integrated, and cultivates, produces, trades, and distributes a wide range of food commodities. It has made multi-million agriculture investments in companies such as PKB (€105m) in Serbia or Agricost Braila (€230m), Romania's largest agriculture company, to ensure the availability of such critical commodities. Al Dahra has a Spanish subsidiary that processes, markets, and sells forage with more than 8,500 ha and five production factories, mainly in Aragon and Catalonia.

Finally, Agthia, majority-owned via Senaat, one of the largest industrial and investment holdings in the Emirates, completes the food strategy approach of ADQ, a young but vibrant SWF with a strong food and agriculture focus.

8 Bloomberg, May 5, 2021. Available at https://www.bloombergquint.com/global-economics/craving-more-abu-dhabi-s-new-wealth-fund-can-t-move-fast-enough

QATAR

Hassad Food is the leading food player in Qatar. Fully owned by Qatar Investment Authority, Hassad Foods was established in 2008 and focuses on forages, vegetables, and poultry. It controls fully or partially eight different portfolio companies in Qatar, Canada, Australia, and Oman.

In 2018, Hassad Food sold more than 100,000 ha of farmland to Macquarie Infrastructure Real Asset (MIRA) for $185 million. Yet, it kept its long-term interest in Australian agriculture by investing in MIRA's agricultural portfolio. The agreement reinforces Hassad Food's efforts "of supporting Qatar's food security"[9] .

Interestingly, Hassad Food acquired, in 2020, a 25% equity stake in the Canadian Sunrise Food International, the world's largest supplier of non-GMO organic grains and oilseeds. The company runs the world's only dedicated organic port in Turkey. It shows the sophisticated view of GCC countries in their approach towards Ag and Food, beyond mere land acquisitions.

Hassad Food is used strategically to engage in international partnerships with other SWF-owned SOEs, too. This is the case of the International Seafood Company. Hassad Food acquired a 20% equity stake in 2018. This Omani company is also owned by OFIC (Oman Food Investment Holdings), proving the increasing cooperation and interconnection between SWF-owned food companies.

OMAN

OFIC, fully owned by the national sovereign wealth fund (Oman Investment Authority), was established in 2012. With more than a dozen subsidiaries, OFIC plans to launch a food-centered technological park, a food logistic company, a B2B platform for online commodity trading, and an agro-focused equity fund backed by the Public Authority for Stores and Food Reserve.

OFIC's interests go beyond the core Ag and Food subsectors, as they are an active investor in the animal health space (including livestock vaccines, for instance).

All in all, SWFs play a fundamental role in controlling, launching, or growing Ag and Food companies across the whole value chain. These national Ag and Food companies seek to play a strategic role in their country's food security programs and they fulfill this mission using an increasingly diverse set of business and investment strategies. Some focus on strengthening and building up national champions, others establish strategic partnerships with key producers and traders, while others support state-of-the-art technological innovations, or acquire significant stakes in some of the largest food companies worldwide.

9 Hassad Food's CEO during the announcement. Available at https://realassets.ipe.com/news/mira-buys-australian-farm-portfolio-from-qatars-hassad-food/10026704.article

CONCLUSION

Sovereign wealth funds have become extremely sophisticated and increasingly relevant investors, unafraid to venture aggressively in a growing number of sectors. Their approach in the Ag and Food space is multipronged.

First, SWFs are betting on the mainstream Ag and Food space, by acquiring relevant stakes in agricultural operators, meat and dairy producers, food processors, or trading companies. Their deep pockets and patient capital give them a strong competitive advantage in the sector, and their moves are followed closely by their competitors.

Second, they are supporting startups and emerging global challengers across the world. Ranging from robotics, biotech, aquaculture, alternative protein, vertical farming, or food delivery companies. Some of these investments may be just opportunistic and financially driven, but most of them are also strategically linked to the SWFs' food security efforts. Many of these SWFs come from countries that depend on others for most of their food and they actively support tech improvements that can strengthen their access to ample and affordable food.

Third, SWFs, aware of the current fragile geopolitical space, do not want to rely entirely on foreign companies for their food supplies. As such, they are establishing and developing a powerful and dense network of domestic champions that can help them secure and guarantee an adequate level of food supplies. While some territories lack sufficient domestic arable land, these local champions are strategically and smartly positioning themselves globally to support their countries' food security efforts. Some of these companies have become a force to be reckoned with, and their impact and role in the space are likely to become more relevant in years to come. Just like that of their parent companies and ultimate shareholders.

3

SOVEREIGN WEALTH FUNDS EMBRACE THE SUSTAINABLE DEVELOPMENT GOALS: WHO, HOW AND WHY?

Javier Capapé (PhD)
Adjunct Professor and Director, Sovereign Wealth Research,
Center for the Governance of Change, IE University

3. Sovereign wealth funds embrace the Sustainable Development Goals: Who, how and why?

INTRODUCTION

The World desperately looks for solutions to the energy conundrum. Countries need the energy to grow. Larger countries aiming to grow faster (India, Indonesia, China, or Nigeria) need even more energy. Nowadays, renewable energy and regulation are helping to reduce the greenhouse gas emissions generated by traditional hydrocarbon producers, but the data remains stubborn. Of the total energy used by humans in 2019, 84.3% came from fossil fuels including oil, coal, or gas. In 2000 it was 86.1%. The transition is not quick enough. In 2021, emissions resumed their steady growth rate at a faster pace than just before the exceptional global lockdown of 2020. During the first half of 2020, there was an 8.8% decrease in global C02 emissions compared to the same period in 2019. The magnitude of this decrease is larger than during previous economic downturns or World War II. SWFs, as long-term large investors controlled or owned by governments, look for long-run solutions to the energy and sustainability global challenges.

SWFs have invested in traditional natural resources for years, from natural gas pipelines to railroads connecting shale gas to key ports, or chemical facilities powered by coal. Moreover, out of the $10 trillion in assets under management attributed to this particular institutional investment group, almost $5.5 trillion have been sourced directly or indirectly exporting to the World highly contaminating hydrocarbons. Yet, SWFs are changing rapidly. According to the 2021 IFSWF-OPSWF survey, 85% of SWFs take climate-related risks and opportunities into consideration in their investment process (yet only 36% consider it specifically or within a broader ESG-Responsible Investment approach). More SWFs are engaging in mitigation and adaptation investment themes. As a corollary, more SWFs are joining the One Planet SWF platform, as an indication of their interest in engaging in change.

Yet there is an embedded paradox in a big portion of the SWFs story. SWFs increase their wealth by selling contaminating sources of energy to the World, while simultaneously trying to invest more and more in sustainability-aligned companies and projects and divest from high-emitting businesses. Yet, what is the net result? Moreover, what SWFs are doing to solve this conundrum? Where do SWFs invest today to change the future? Let's explore these and other questions in this chapter.

Beyond energy, a sustainable development economic agenda is pushed worldwide with the launch of the United Nations' 17 Sustainable Development Goals. Progress on this matter remains slow, data for most indicators is yet unavailable but the global effort on advancing the 2030 Agenda remains strong, amid recent distortions caused by the Covid-19 pandemic and geopolitical tensions.

SWFS IN SUSTAINABLE DEVELOPMENT GOALS AND CLIMATE ACTION.

SWFs are investing heavily in technology, as described in detail in the Chapter 4 of this Report. Since the term Sovereign Venture Funds was coined by Santiso (2015), more SWFs are looking for innovative startups capable of providing solutions to the world's most pressing threats. The sustainability transition is one of them.

The United Nations' Sustainable Development Goals, launched in 2015, deal with energy and the environment in at least 6 different SDGs and go well beyond them. SDGs are primarily about ending poverty, eliminating hunger, or providing health, water, or sanitation for all. Technology can play a tremendous role in achieving all of these: from improving quality and access to education, building quicker and safer houses to reduce population living in slums vulnerable to any form of natural disaster, keeping fresh produce longer to avoid food waste, or by building safer roads for rural populations. Many of these, including the electric vehicle industry, developers of alternative food (please refer to Chapter 2 in this Report for a focus on food and agriculture), or renewable energy suppliers, have received an increasing commitment from SWFs and expanded their businesses worldwide.

Over the last fifteen months (October 2020-December 2021), SWFs have joined investment rounds in some of these pivotal issues, where businesses are continuously developing solutions at different scales. It is interesting to notice the renewed interest of SWFs in emerging markets such as India or the continued bet on China. Yet, SWFs are still finding it difficult to enter and directly impact communities in regions such as Latin America or Africa, where long-run capital and infrastructure remain highly needed.

RENEWABLE AND ALTERNATIVE ENERGY

We need energy. We need energy for work, for cooking, for treating patients in a hospital, for harvesting corn grain fields, for extracting and transforming basic materials, and for lighting up our homes or schools. But we cannot continue using sources of energy that emit high volumes of carbon dioxide to the atmosphere. Carbon dioxide (76%) and other gases (methane, nitrous oxide) contribute to almost 98% of the global greenhouse gas emissions that in turn causes and accelerates global warming, and thus climate change.

These greenhouse gases are mostly emitted to the atmosphere by one single source: energy. Whether used in industry, used for transportation , or used in buildings, energy represents 73.2% of all greenhouse gas emissions .

Thus, focusing on reducing emissions from those highest polluting sectors will be key for a liveable world in the future. Renewable energy is trying to substitute oil and natural gas when it comes to providing energy for industrial companies (chiefly manufacturing and construction) or transportation (it represents 25% of all the emissions in the EU or 29% in the US). Thus, electric vehicles powered by renewable energy sources, power plants based on solar or wind energy for industrial activities, or better management of land and livestock remain central points.

What if energy can be produced without emitting greenhouse gases? That is the goal of alternative sources of energy being invested by SWFs over the last few years. One of them stands out as a mid-term alternative: fusion energy. Others, like advanced renewable energy systems, receive continued support from SWFs. Over the past 18 months, we have identified at least 27 deals in “energy generating companies”. Of this, 23 deals were made in the “alternative energy” category, comprising renewable energy companies and projects, energy storage firms, and startups developing new sources of energy.

These alternative energy deals reveal interesting geographic and fund trends. First, the top country preference remains unchanged, with the United States representing 31% of all the alternative energy deals between October 2020 and December 2021. Yet, the role of Canada in this category is remarkable. With 14% of the alternative energy deals, it comes second by the number of deals, ahead of China or Singapore. By contrast, both India and the United Kingdom do not appear in the top 5 in the category, below their overall ability to attract SWF deals. As we will see below, Temasek and GIC keep their leadership position in this category too, with eight and four deals, respectively. Three of the five biggest deals in the period corresponded to a Singaporean fund. They are followed by Mubadala and QIA.

[1] Global Greenhouse Gas Emissions. 2019. United States Environment Policy Agency, based on the Intergovernmental Panel on Climate Change (IPCC) 2014 Report. Available at https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

[2] Energy use in industry is the most pollution category with 24.2% of global GHG emissions, and includes one of the most contaminating subcategories: iron and steel industries (7.2%). Energy use in buildings represents 17.5% of global GHG emissions, transport comes third with 16.1%. Within transport, road transport is the most polluting subcategory with 11.9% of all the greenhouse gas emissions. Agriculture, forestry and land use, with 18.4% of total emissions, is the second largest source of greenhouse gas emissions after energy. It includes livestock and manure (5.8%), or agricultural soils (4.1%). The third position in thi ranking goes for industries like cement (3%) or chemicals (2.2%).

[3]Our World in Data. 2020. Powered by the University of Oxford. Available at https://ourworldindata.org/emissions-by-sector

SOVEREIGN WEALTH FUNDS AND THE 2030 AGENDA. SELECTED CASES.

SWFs are increasingly betting on SDG-related solutions. This will help the world achieve the ambitious goals set by the United Nations' Agenda 2030. Mitigation and adaptation of long-run policies will require a tremendous financing effort. In 2018, the 2030 Agenda required mobilisation of $3.3-4.5 trillion per year to achieve its goals. At 2018's level of both public and private investment in SDG-related sectors, developing countries faced an average annual funding gap of $2.5 trillion.

Temasek led the $75 million Series D equity financing into Svante, the largest private investment into point source carbon capture globally to date. Svante is one of these Canadian startups participating in climate-change mitigation via their on-site carbon capture, focused on hard-to-abate emissions from industrial operations in industries such as cement and hydrogen production. Svante, founded by four professionals from the gas purification and separation industry in 2007, can directly capture CO2 from industrial sources at less than half the capital cost of existing solutions. The challenge remains enormous, but the push on carbon capture and removal technologies, brought to a global scale will be one of the most critical steps, the specific target of SDG 9 when it comes to developing sustainable industries, in particularly challenging situations such as cement, hydrogen and natural gas.

On its part, both GIC and Temasek invested in General Fusion. Another Canadian company. Temasek led again an oversubscribed $130 million Series E funding round. This Canadian company has received capital support from both public and private sources including the Canadian, UK, and US governments, and important individual investors, including Amazon founder Jeff Bezos, Tobias Lütke (founder of Shopify), and Kam Ghaffarian (founder of Axiom Space). General Fusion is currently building a "fusion demonstration plant" to be in operation in 2025 and aims to bring fusion energy onto the world's energy systems by the early 2030s.

Fusion Energy is not the only bet of SWFs into fusion energy. Indeed, Commonwealth Fusion Systems (CFS) raised a record $1,800 million Series B to commercialise fusion energy. The company, launched in 2018 after decades of research at MIT, is a spin-off of MIT's Plasma Science and Fusion Center. The round was led by Tiger Global Management and included the participation of individual investors such as Bill Gates, John Doerr, and other technology, energy, and venture capital firms such as Coatue, DFJ Growth, Google, Soros Fund Management, Khosla Ventures, and Eni. Temasek joined this round too after leading a previous round in 2020. CFS is already developing SPARC, the world's first net energy compact fusion system, and aims, similarly to General Fusion, to complete its first fusion power plant by the early 2030s. Magnetic fusion and manufacturing specialists, as well as plasma physics, are dedicated to this mission of delivering clean, limitless fusion power to the world.

A third deal completes the push of SWFs on fusion energy companies. In April 2021, the Kuwait Investment Authority joined old and new investors such as Venrock, Charles Schwab, NEA, and Google, to raise $280 million for TAE Technologies. Founded in 1998 in California as Tri Alpha Energy, today's TAE Technologies operated in stealth mode for years. In May 2019 it was valued at $2.6 billion. The new money will be used for further fusion work and a new reactor-scale facility. As in the previous two cases, commercially viable reactors will be ready within ten years, or the beginning of the 2030s, which will mark a fundamental transition point in the production of clean energy, if fulfilled. TAE Technologies products go well beyond energy. For instance, the patented particular accelerator technology has been already tested in life sciences and applied to destroy cancer cells. A long-term bet that SWFs do not want to miss.

Heating and cooling cities in the 21st century will be key to determining the outcome of the battle against air pollution and GHG emissions. Today, according to the IEA, buildings are responsible for almost one-third of total global final energy consumption and nearly 15% of direct CO2 emissions. SWFs are targeting solutions to this global and pressing issue. Geothermal district projects have been growing globally since the early 2000s.

Infographic 4

SWFs bet on renewable energy and new energy technologies (2020-2021)

Total deal size ($ million)

7 AFFORDABLE AND CLEAN ENERGY

Ensure access to affordable, reliable, sustainable and modern energy for all.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

11 SUSTAINABLE CITIES AND COMMUNITIES

Make cities and human settlements inclusive, safe, resilient and sustainable.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Ensure sustainable consumption and production patterns.

	Target	Deal size	SDG Target	Subsector
Temasek Holdings	Commonwealth Fusion Systems LLC.	1,800	7	FUSION ENERGY
	Form Energy*	316	9, 12	BATTERY
	SES	139	9, 12	BATTERY
	General Fusion	130	7	FUSION ENERGY
	Svante	75	12	CARBON CAPTURE
	Hydrogenious LOHC Technologies GmbH	59	7	HYDROGEN
PIF	ACWA Power	1,853	7	RENEWABLE ENERGY
GIC	Envision Energy Co Ltd	1,000	7	RENEWABLE ENERGY
	Arctic Green Energy Corp Ehf	240	11	GEOTHERMAL
	SGE	200	11	GEOTHERMAL
	General Fusion	130	7	FUSION ENERGY
ADIA	Equis Development Pte Ltd	1,250	7	RENEWABLE ENERGY
QIA	QuantumScape	446	9, 12	BATTERY
	Fluence Energy LLC	125	7	FUSION ENERGY
Mubadala	Brasil PCH SA	212	7	HYDRO POWER PLANTS
	Dorothea Investment Vehicle**	167	11	GEOTHERMAL
	Li-Cycle**	80	9, 12	BATTERY
NIIF Ltd.	Ayana Renewable Power Pvt Ltd	390	7	RENEWABLE ENERGY
KIA	TAE Technologies	280	7	FUSION ENERGY

*Deal size includes the sum of the two investments made in Form Energy by Temasek in 2020 and 2021.
** Estimated value.
Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

For instance, Arctic Green Group is a geothermal company founded in Iceland, a country that generates 25% of its electricity from geothermal power facilities. In 2006, this group joined forces with Sinopec and established a joint venture to build up a geothermal district heating business in China. Nowadays it has developed 595 heating systems serving 2 million customers, displacing 11.4 million tons of C02 since then. The figures remain very small relative to the country's size. Yet GIC believes their cooling and heating geothermal technology can play an ambitious role in the transition toward a zero-carbon world. GIC committed $240 million to Arctic Green Energy to expand its technology to new markets in Europe and Asia.

GIC was not the only SWF betting on district heating. Mubadala took a significant stake in Dorothea, an APG and EIB-backed fund managed by Asper Investment Management. Dorothea plans to invest $550 million to build a network of district heating services across the Netherlands. The country plans to increase renewable energy sources penetration from the current 7% to 100% by 2050. Over the next 30 years, millions of households in the country will switch to CO2-free heating solutions. In the case of Dorothea, it plans to use a combination of geothermal, residual heat, and locally-sourced biomass.

What is behind this push for sustainable district heating? Apart from developing sustainable energy infrastructure, these investments "are stable assets providing predictable cash flows and steady returns", according to the Mubadala Renewables CEO. A perfect investment thesis for long-run investors, and an illustrative case of how we can imagine the transition toward a net-zero world by developing attractive long-run bankable projects where clean technology companies and long-run investors join forces (directly targeting Goal 7 and Goal 11 for resilient and sustainable cities).

Another critical race toward the lower carbon future is energy storage. QIA invested in February 2021, in QuantumSpace, a company developing solid-state lithium-metal battery technology, founded in 2010, and today listed on the New York Stock Exchange. The company also has Bill Gates in its investor base and has partnered with key automotive global leaders including Volkswagen. In January 2021, QuantumSpace announced its first-ever non-automotive partnership with Fluence. Precisely, Fluence had been invested by QIA only a few months before, in December 2020. Fluence is the market-leading energy storage provider with more than 3.6GW of storage deployed or in pipeline projects. Established in January 2018 as a joint venture of Siemens and AES, Fluence is focused on providing solutions for the fragmented electric and storage ecosystems. Again, the role of long-term investors in backing this type of initiative can be pivotal for the achievement of the 2030 Agenda on aspects such as sustainable infrastructure and transportation (Goal 9) and sustainable cities (Goal 11).

On its part, Mubadala joined another Canadian key battery industry company, Li-Cycle. Focused on lithium-ion battery recycling, these companies will play a critical role in the sustainable transportation sector by reducing waste and through the recovery of critical materials from all types of lithium-ion batteries. Li-Cycle, founded in 2015 by Ajay Kochnar and Tim Johnston, is listed on the NYSE, thanks to a deal with a SPAC, only five years after it was established in Toronto. Li-Cycle joins a growing list of companies in the waste and recycling sector that have gone public in recent times. Goal 12 aims for responsible consumption and production, and among its targets, circular economy innovations will be central. The waste industry keeps adding value to an economy that will be designed based on circular models.

Sovereign wealth funds, with their patient capital, are fundamental pieces in the development of long-term technology projects helping to achieve net-zero energy systems. For instance, Temasek invested in September 2021 in Hydrogenious LOHC Technologies, a German startup developing handling, distribution, refuelling, and storage solutions for hydrogen. The European Commission launched several public-private initiatives to foster hydrogen and fuel cell technologies in Europe and set a 2050 target of 40GW capacity and a sevenfold increase in its current presence in the energy mix to 13%. Thus, it will not be surprising to witness more SWFs joining this long-run effort in collaboration with European states and private companies as they approve their investment plans under the umbrella of the EU's NextGen funds. The 2020 hydrogen strategy developed by the EC expects investments in renewable hydrogen in Europe up to €140-470 billion by 2050, implying a €5-17 billion per annum in the coming 28 years.

Beyond these cases, SWFs have also invested in renewable energy and hybrid infrastructure companies in Asia (Equis Development), India (Ayana), the Middle East (ACWA), and North America (Duke Energy). These four deals amount to $3.7 billion, showing how infrastructure capital needs remain big for solving the challenges presented by Goals 7 on developing a clean energy system by 2030. In total, SWFs have deployed capital in deals valued at $8.9 billion during the report sample period (October 2020-December 2021). According to the IFSWF-OPSWF report on climate change, SWFs invested in 18 companies in the agritech, forestry, and renewables industries in 2020 valued at $2 billion, and a total of over $5 billion in the last 5 years (2015-2020). Thus, our sample reflects an exponential growth in sustainability-linked sectors, at least in the alternative energy industries (renewable energy and batteries, primarily). Excluding agritech companies, which are analyzed in a different chapter in this Report, these investments have accelerated almost five-fold (450%) over the last two years, reaching $8.9 billion in the 15-months sample of this Report. A remarkable effort that we will continue tracking carefully in the years to come.

Moreover, this effort excludes multiple deals targeting other SDGs not linked to energy directly such as food and agriculture companies helping on SDG 2 to end hunger, education startups improving quality education and access (SDG 4), clean water distribution companies (SDG 6). Technologies and businesses that help to reduce inequalities (SDG 10) or those fostering good health and well-being in developed and developing countries (SDG 3).

Despite all the investment effort, there are still multiple doubts about what should be the proper path for those companies already contaminating at higher proportions. Should investors engage and foster change or should they leave and signal the polluters or non-SDG complaints? Is it better to engage or to divest? The question remains open, but what is sure, is that both channels will be very much needed in the transition, as oil giants transform into "integrated energy companies" and set up ambitious plans to reduce their emissions until complete the transformation into net-zero companies.

DIVEST OR ENGAGE? THE TRANSFORMATION OF THE OIL GIANTS

Today, investing in oil & gas companies is a profitable bet, from a purely financial perspective. Since the big crash of March 2020, prices have rebounded firmly for the largest operators. The S&P Global Oil Index, which measures the performance of 120 of the largest publicly-traded companies engaged in oil and gas exploration and extraction and production from around the world, is up 142% from the very low levels of March 2020. It is even better than 5 years ago. The recent robust increase of oil and gas prices explained by an expansionary post-crisis demand and increased geopolitical uncertainties, drive oil and gas stocks to old records again.

Among the top 8 largest oil and gas companies by revenue, the two Chinese giants (Sinopec and PetroChina) are the only ones that have been unable to recover 5-year stock prices. The rest of these oil giants' stocks, which make almost a quarter of a trillion in revenue yearly, either keep the price level of February 2017 or are seeing new highs, including Chevron (26% compared to February 2017), Aramco (11.5% compared to December 2019, when the company listed its shares for the first time), and Total (10.1% up compared to February 2017).

These companies are already engaging in the rotation of their energy sources mix but still derive most of their revenue from non-renewable energy sources such as oil or natural gas.

Yet, the ambition to change is huge, and unthinkable only five years ago. Consider the plans of Total, the French company aiming to become net-zero in 2050, and to add 100GW of installed renewable power generation capacity by 2030. It has changed its logo and company name to TotalEnergies, with that specific goal of becoming an integrated diversified energy company, rather than just an oil-focused company, with increasing presence of renewable energy, particularly solar and wind, "a responsible energy company" stressed TotalEnergies's CEO.

Yet, numbers and trends come with their inertia. For instance, Total is expecting the signing of a large-scale oil project in Iraq. The Ratawi field can generate gross revenue of $2.4 billion a year at current barrel prices, and almost 40% of these sales would go to Total. This 40% represents a quite attractive revenue-sharing proportion compared to regular 10-15% averages elsewhere. The deal includes, as an annex, a 1GW solar plant project. These types of deals are representative of the new global energy era and are reflected in the new logo of TotalEnergies: the old business (Total) will be kept for some time and share the same room with the new energy sources (Energies). For the next few years, the complexity of transforming old fossil fuel-based giants into diversified energy companies will require big efforts and expected and unpredicted transaction costs.

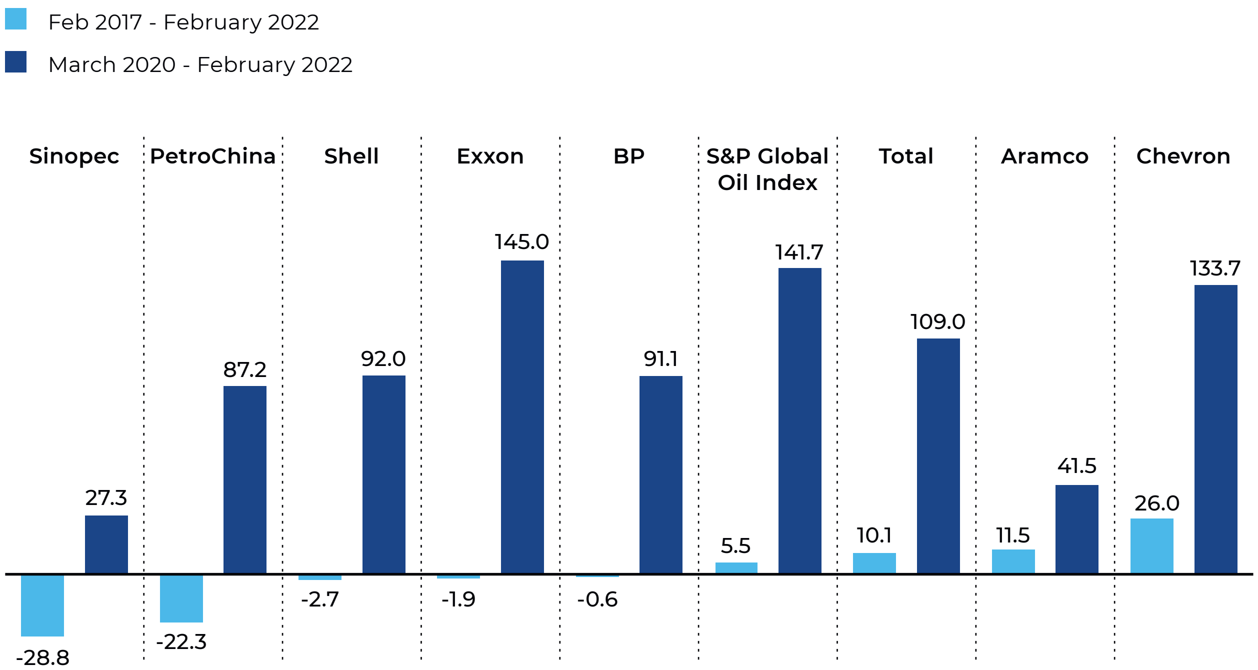
TotalEnergies is not alone. Repsol, the Spanish energy giant, plans to invest €2.5 billion in the next 8 years on green hydrogen technologies and install a capacity of 1.9GW by 2030. Renewable power generation is one of the decarbonization pillars for oil and gas companies: Repsol targets 20GW of installed "green" capacity by 2030, a 60% increase over the previous target. Interestingly, these accelerated transition efforts are not independent of sovereign wealth funds decisions. BP, the UK oil giant, made similar commitments, with the goal of achieving net zero by 2050 and investments averaging $600 million per year on low carbon investments, including wind, solar and carbon capture and storage technologies. BP has been investing in wind energy projects for more than 10 year and has an installed capacity of 9.1GW.

Over the last few years, SWFs have supported the "asset rotation/greening/recycling" strategies of oil and gas corporations. For instance, Mubadala partnered in September 2021 with Eni, the Italian

Figure 1

Major oil stocks rebound

Price change, percentage



Source: Sovereign Wealth Research – IE Center for the Governance of Change & SovereigNET - Fletcher School at Tufts University (2022).

oil and gas giant. With operations in 66 countries, Eni is one of the seven oil supermajors. It plans to install a renewable energy capacity of 15GW by 2030, and 60GW by 2050, when the company will be net-zero. Among its efforts, carbon capture and storage will be central, with an estimated 7 million tons of C02 captured per year in 2030. To help with this transition, the Mubadala-Eni partnership will develop a long-run strategy on hydrogen and carbon capture, one of the central components of the carbon neutrality plan designed by the oil and gas giant. Mubadala is also helping in the asset greening of another European oil giant, Spanish CEPSA. Through Masdar, a Mubadala fully-owned subsidiary, it has established a joint venture company named Cepsa Masdar Renovables to focus on wind and solar photovoltaic energy projects in the Iberian Peninsula.

GIC partnered in November 2021 with Sequoia Capital and Primavera Capital, an American VC firm and a Chinese-based global investor, respectively, to invest $1 billion in Envision Group, one of the largest net-zero bets ever. Envision Group exemplifies well the challenges of the transition: global supply chains, fragmented solutions, and urgent climate targets require integrated solutions. Here, old integrated energy companies have the advantage of a systemic approach to energy. In the transition, net-zero goals will require clean energy generation, efficient storage systems, including electric vehicle batteries, and the software that can make it all run harmoniously.

CONCLUSION

Solutions will harness human creativity and entrepreneurship. For instance, consider the case of Solugen. Backed by GIC and other VC investors, this startup founded in 2016, designs and grows enzymes that can turn sugar into chemicals that are needed to make multiple products and have various industrial applications. Historically, chemical companies have relied extensively on oil and gas energy to make their products, thus expanding their negative impact on air and water pollution.

At IE Sovereign Wealth Research we are committed to increasing the research and participation of SWFs in the 2030 Agenda. In the period January 2020 to September 2021, we have identified more than 330 deals of which 59% linked directly to specific SDGs. SWF total investment value in alternative energy companies (comprissing renewable energy companies and energy technologies) has grown 450% compared to the 2020 figures. SWFs joined deals with a total value of $8.9 billion over our 15-months sample period representing a hopeful milestone in the transition for SWFs and the world economy toward the achievement of SDGs. Despite the dimension of the financing gap, it is interesting to notice that apart from energy (SDG 7) and other sustainable consumption and production firms (SDG 12), SWFs have invested heavily in companies that will help to achieve good health and well-being (SDG 3), sustainable industry, innovation, and infrastructure (SDG 9), and help increase the quality of education (SDG 4). So the SWFs' SDG-alignment is only beginning to get traction and will require a continued strong stakeholder effort to keep and increase it until Agenda 2030 goals become a reality.

With ambitious companies and unlimited human creativity, paired with innovative and long-term managers and owners, including SWFs, we can hope a different and better world is possible.

4

SOVEREIGN WEALTH FUNDS AND VENTURE CAPITAL: CO-INVESTMENT PATTERNS AND PARTNERS

Adrián Blanco (PhD) Head, Funding Department and LATAM Desk, ICEX-Invest in Spain;

Javier Capapé (PhD) Adjunct Professor and Director, Sovereign Wealth Research, Center for the Governance of Change, IE University

4. Sovereign wealth funds and venture capital: co-investment patterns and partners

INTRODUCTION

In the last decade (2010-2019) institutional investors, including sovereign wealth funds, have consolidated a new investment strategy. Traditionally, these investors have sought long-term, low-return, low-risk investments, with government bonds being the paramount example of this strategy. However, after the Great Recession (2008), and the continuous interest rate cuts that followed, the composition of their investment portfolio has been profoundly revised. Institutional investors even realized that investing in bonds was not entirely risk-free and that the low remuneration of government bonds increasingly reduced investment returns. Several SWFs reduced their expected long-term investment return benchmarks in this period.

Thus, institutional investors gradually began to add other types of assets into their portfolios, often called alternative assets. These are private markets assets such as private equities, real estate, and infrastructure. This was a profound change in the way institutional investors perceived risk and expected returns. For instance, these changes required to change their mandates, their structures, and their teams. Sovereign wealth funds became even more professionalized to accommodate the analysis and acquisition of these assets and began to look more and more like fully private equity funds.

Singapore's Government Investment Corporation (GIC) or the UAE's Abu Dhabi Investment Authority (ADIA) have been early adopters of private market asset classes. Other SWFs are following suit over the last decade. These organizational, operational, and investment adaptations helped SWFs to approach a growing number of new niche sub-asset classes that have sprung in the last decade as investors searched for alternative returns.

This is the case of private equities, and in this chapter, we will analyze a particular niche of private equities defined as venture capital, the investments made in early-stage tech companies.[1]

Given their importance as funders and investors, their presence has had many relevant implications for the industry itself. One of the clearest consequences is that of the immense investment capacity added by SWFs to the industry. With assets under management close to $10 trillion, SWFs, alongside other institutional nontraditional VC investors, are part of the record investment figures in the VC industry in 2020 and 2021.

This is exemplified in the launch of the SoftBank Vision Fund (today in it its second edition). The SVF funded by the SoftBank CEO Masayoshi Son is above any metric. It was the largest ever private equity (or venture capital, here the definitions overlap, as we will see below) technology-focus fund with $98.6 billion. To give an idea about the size of this fund, the biggest VC fund before SVF came into existence in late 2016 was ten times smaller.

So indeed, the first consequence of having SWFs joining VC rounds is the expanded investment capacity of venture capital vehicles themselves, in which sovereign wealth funds are increasingly participating as limited partners (LPs). This allows the vehicles to have an additional source of funding (alongside other nonconventional VC investors such as pension funds, family offices, hedge funds, or government funds), and to increase the size and ambition of their operations.

1 It is interesting to note that the SEC recently announced it is preparing to force more transparency from big private companies. An article from SEC Commmisioner Allison Herren Lee, with a telling title, anticipated this decision: "Going Dark: The Growth of Private Markets and the Impact on Investors and the Economy". Available at https://www.sec.gov/news/speech/lee-sec-speaks-2021-10-12#_ftnref8

Secondly, financing by sovereign wealth funds in this asset class also directly benefits start-ups, as it is common for them to invest directly. Thus, these young companies also have additional access to capital that allows them to gain scale and access global markets. Thirdly, in addition to venture capital funds and the companies themselves, the entry of SWFs into the industry has generally increased the size of deals due to enhanced startup valuations. Later and larger rounds are explained by rapidly escalating valuations.

The arrival of Covid 19, with its enormous impact on the business fabric in terms of speeding up digitalization, has only accelerated this trend. As UNCTAD points out in its latest annual World Investment Report, there is a clear shift in business interest towards digital and technologies such as artificial intelligence and robotics, which means that intangible investment is increasingly becoming more important than physical investment in Foreign Direct Investment (FDI). Sovereign wealth funds, because of their size and the decisiveness with which they have approached their entry into venture capital, have an important role to play in this great wave of cross-border investment.

SWFs are not only pursuing new and better returns for their investment portfolios when investing in VC-backed companies. There is a strategic and long-term objective too: capacity building. To the extent that these institutional funds are public by nature, they act as a catalyzer for government policies. And governments, in the case of many sovereign wealth fund countries, have for years focused on diversifying sources of public revenue beyond natural resource revenue.

Venture capital investments fit in this strategy, as they allow countries to identify and invest in companies developing technologies in different business sectors and thus gain exposure and insightful knowledge of the major innovations and disruptions taking place in a given industry. Ultimately, this investment may end up attracting tech companies to the country, and facilitating the sought-after sector diversification.

This SWF strategy of increasingly allocating funds to the venture capital industry entails risks that should not be underestimated, in addition to the opportunities mentioned above. The higher risk of investing in young technology companies, which have a high mortality rate, is evident, the same applying to the venture capital industry, whose profitability depends on the success of one or two large companies offsetting losses in the others. But we should not overlook the fact that low-interest rates over the last twelve years around the world have shifted a huge amount of capital into technology companies, making their valuation much more complicated, and raising their entry prices, which introduces an additional element of risk.

Despite all of the above, which indicates the importance of the phenomenon of SWFs' entry into the venture capital industry, this aspect has not been sufficiently analyzed in recent years. In this respect, the present analysis aims to advance our understanding of this reality, and more particularly how SWFs operate when investing directly in VC-backed startups ranging from multiple industries.

Also, we have created an original and unique database that tracks more than 20 years of SWF VC investments. It will allow us to know the main actors, the volume of capital, or the targeted sectors. More importantly, for the first time, an exhaustive analysis of the SWF VC co-investment patterns is included in the chapter below. This analysis is also intended to serve as a guide for fund managers by clearly identifying those sovereign wealth funds that are most active in the venture capital space.

SOVEREIGNS GO FOR VENTURE CAPITAL, AND VENTURE CAPITAL GOES FOR SOVEREIGNS

Sovereign wealth funds are living creatures. Adaptative by nature, SWFs keep exploring new sectors, new asset classes, and adjusting their organizations and international reach as they follow thins diversification path.

Sovereign wealth funds need to think over the long run. For many, its organizations' mission is to preserve and grow wealth for future generations. In the rapidly changing world, we are living it is fundamental to understand, use and invest in technology. Thus, to keep an eye on the long run, it is relevant for SWFs to add venture capital, as a key component in the asset class matrix of their long-term purpose.

Consider the changes in the way we eat, travel, buy, enjoy or work. Accelerated with the current pandemic, these transformations are challenging incumbent global business leaders in multiple well-established industries. SWFs have been traditionally invested in all of these incumbent leaders, and the only way to remain invested in top industry leaders is to keep an eye on those future leaders of tomorrow that are today in their early startup stages.

One channel to get exposure to these new technologies and businesses is to invest in venture capital. The boundaries of this particularly popular asset class are blurring. Years ago, only specialized investors participated in pitch elevator competitions, attended project presentations in venture accelerators and joined angel business associations, or simply shared their time with early-stage entrepreneurs in Palo Alto, Barcelona, or Beijing. But this has changed. Now specialized VC investors are not alone.

Venture capital was considered a far too small niche for institutional investors only four years ago. But this asset class is getting huge traction, accelerated by the disruption and change brought by the pandemic. Indeed, in 2021, venture capital financings set a record with $621 billion in deals, more than double the $294 billion recorded in 2020, that is 92 percent growth year over year.

Several reasons explain this evolution. Startups now grow bigger and faster than ever, and investing in technology companies despite remaining privately owned is perceived as a less risky bet than years ago. For instance, in 2021, the number of unicorns, private companies valued at $1 billion or more, rose almost 70% compared to 2020, to 659. These are more mature companies, and they offer more opportunities for alternative VC investors such as hedge funds, asset managers, or private equity funds to join the startup movement worldwide. Today joining late rounds of large startups represent an attractive opportunity for large investors. And these opportunities abound.

As a result, the venture capital industry has extended its scope to later and bigger rounds where institutional investors feel more confident. The overlap between specialized-VC funds and generalist private equity funds (or asset managers or hedge funds) is widening with the growth of mid-to-late-stage investment rounds. And the noise comes from both ends, the specialized-VC funds build larger funds, that allow them to make continuation bets on successful startups in later stages; on the other side, the nontraditional investors want to access opportunities at earlier stages of development and thus deploy capital where they have not been entering before.

There is a clear feedback effect here: as more institutional money enters, private companies can stay longer and avoid the regulatory administrative burden and exposure of listing their shares in a stock exchange. At the same time, the longer and bigger they stay private, the more opportunities institutional investors have to either acquire direct stakes in privately-held companies or acquire them in the growing secondary market.

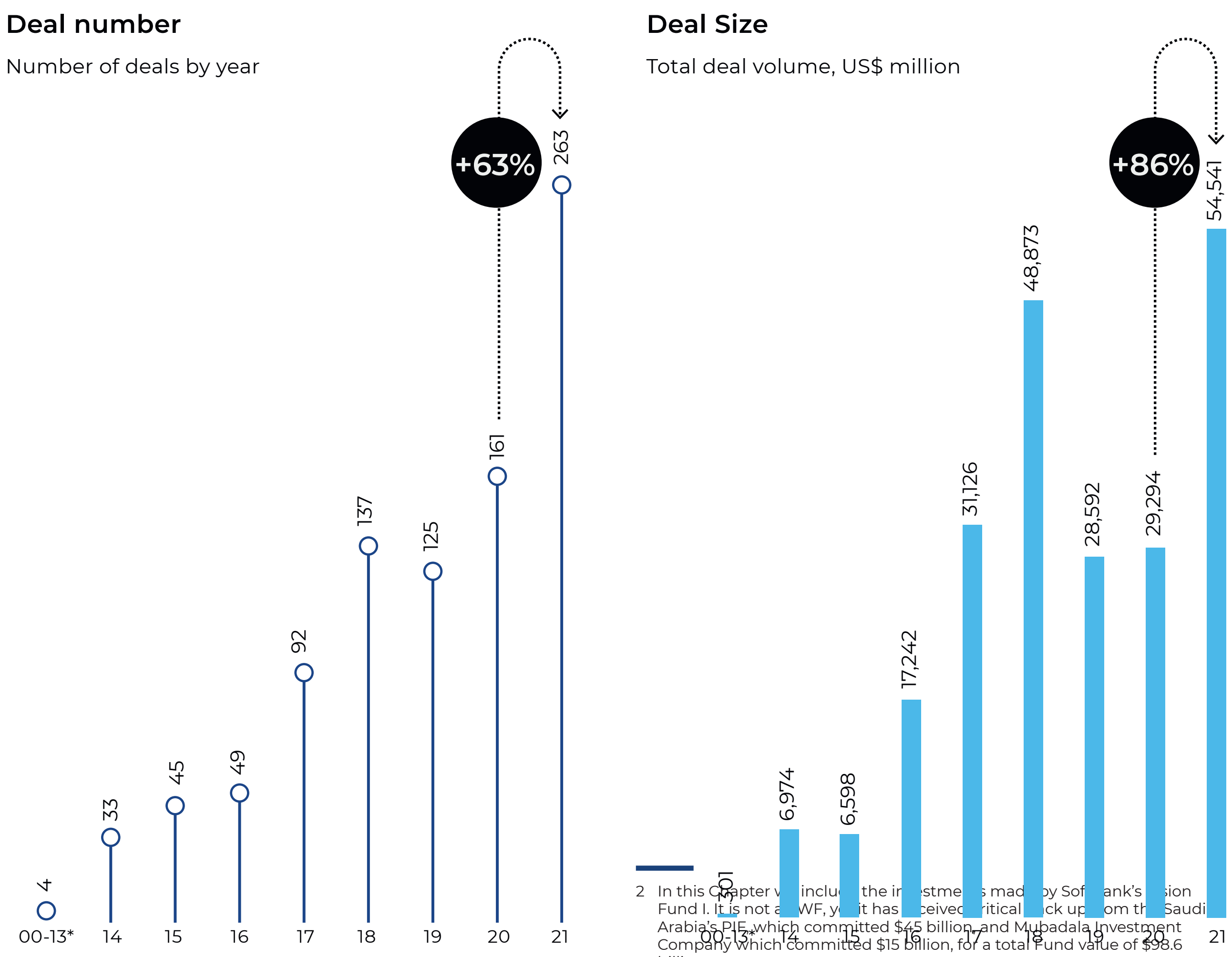
Other reasons help to understand why startups and unicorns remain private longer. One is regulatory, the JOBS Act signed in 2012 in the United States—by far the largest unicorn market—and several additions to the Act made in 2016 has made it easier for private companies to stay private, by increasing the record shareholder threshold for registration and reporting. Founders prefer to follow the "winner takes all" strategy and grow faster and wider rather than spending time in an IPO process that would provide a capital influx that today can be found from private investors, willing to take a piece of these new giant private companies .

The growing participation of institutional investors in private markets (from real estate to infrastructure, private equity funds to timber) added venture capital more recently. Their role can become central for mature and bigger startups. Only they, with their deep pockets, can provide the next capital injection. In this regard, the number of startups that engage in multi-million rounds to secure their growth is expanding too. The number of mega-deals (investment rounds of $100 million-plus) has proliferated. By June 2021, the number of the United States mega-deals was 385, compared to 212 in 2018, which is an 81% increase only for the first six months. This provides an extended pipeline of new investment opportunities for institutional money. A pipeline that institutional investors can affect by keeping the ball rolling.

Indeed, institutional investors have reasons to keep an eye on these new disruptors. Beyond direct financial returns, SWFs as long-term investors may bet on these new companies and industries, in the belief that they can disrupt incumbent leaders. Thus, to hedge against that risk, and as a way of competing for value, institutional investors have developed their capabilities and hired and trained talent to invest in the enlarged venture capital industry.

Figure 1

Sovereign Wealth Fund Investments in VC by year



2 In this Chapter we include the investments made by SoftBank's Vision Fund I. It is not a SWF, yet it has received critical back up from the Saudi Arabia's PIF, which committed $45 billion, and Mubadala Investment Company which committed $15 billion, for a total Fund value of $98.6 billion.

*Period average 2000-2013. Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

SOVEREIGN WEALTH FUNDS IN THE VENTURE CAPITAL INDUSTRY

There are different channels used by institutional investors to access venture capital. And SWFs are not an exception. Indeed, SWFs do invest in venture capital using multiple channels. The most sophisticated investors create their own VC firms (Temasek's Vertex is an active VC firm that attracts third-party money; Mubadala Capital Ventures); others participate in small and large VC funds (the most salient case is the Vision Fund[2] , the giant $100 billion fund managed by SoftBank and majority funded jointly by Saudi Arabia's PIF and UAE's Mubadala). Other SWFs join or create VC platforms (Alaska Permanent Fund's Capital Constellation) while many invest directly in global startups along with other industry specialists. In this last case, some SWFs are even happy to lead those deals, demonstrating their commitment and capabilities to this growing asset class.

In this section, we focus on the latter, the direct participation of SWFs investing in startups, the so-called investment rounds. We have tracked SWFs and public pension funds (PPFs) investing in startups since 2000. SWFs and PPFs have joined more than 1,600 investment rounds since then, for a total accumulated value of $392 billion. SWFs have participated in 1,197 deals, while PPFs joined 460. There is an overlap, as frequently we find SWFs joining investment rounds participated by PPFs, and vice versa.

This trend is consistently increasing since 2014. That year, SWFs participated in 33 rounds with total capital investment amounting to $6.9 billion. That year GIC joined the Series E of a young but promising company: Xiaomi, established only 4 years earlier. That same year, 2014, KIA joined the Series G of Flipkart (India's e-commerce giant acquired by Wal-Mart for $16 billion in 2018) while QIA entered the capital of a young startup from California, Uber, which was already expanding and conquering the ride-hailing world.

In 2021, these figures have exploded. Despite the slower SWF activity of 2020, in both the number of rounds joined and the total capital invested during

Figure 2

Sovereign Wealth Fund Investments in Venture Capital Funding Rounds

Percentage of deals joined by SWFs in each funding round by year.

0% 10% 20% 30% 35%

	Seed	Series A	Series B	Series C	Series D	Series E	Series F
2014	4%	7%	21%	14%	14%	14%	7%
2015	0%	6%	12%	35%	12%	29%	3%
2016	3%	18%	26%	12%	21%	6%	12%
2017	0%	6%	23%	23%	24%	9%	10%
2018	1%	11%	19%	21%	23%	14%	6%
2019	3%	9%	17%	15%	19%	16%	9%
2020	2%	13%	17%	23%	19%	13%	5%
2021	1%	6%	14%	32%	21%	10%	6%
TOTAL	2%	9%	18%	25%	20%	12%	7%

Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

the initial and worst stages of the COVID pandemic, 2021 has witnessed a strong record-figure recovery.

The SWF VC growth is robust across all dimensions: the number of deals, total capital invested, geographic destinations, and the variety of industries targeted. In 2021 (up to September 30th), 14 different SWFs have joined 255 investment rounds (62% growth year-on-year), for a total deal value estimated beyond $54 billion.

These record figures were achieved by the continued drive of historic sovereign venture funds such as GIC, Temasek, and the Vision Fund (backed by both PIF and Mubadala), paired with a stronger presence of active new players such as Qatar Investment Authority and Mubadala, which established and expanded VC investment programs, respectively.

The technology disruption spawns new businesses while incumbent business leaders try to cope with the velocity of these changes. As GIC reflects, SWFs should focus on identifying good companies, good technologies, and good business models. All of them can be found in multiple industries.

Yet, doubts remain about the ability of SWFs to successfully engage in this volatile and changing industry. This very question was discussed by Mr. Adrian Orr (currently New Zealand's central bank governor) in an interview in this Report series back in 2018. He considered how labor-intensive these investments are, the number of capabilities required to invest in direct deals of $50 and sometimes just $5 million. Mr. Orr considered how difficult is to make VC a viable proposition for large, long-term institutions. Yet, he continued, to invest in the transformation, expansion, and implementation of these technologies, can offer an opportunity for institutional investors. This is where the current trend and 2018's forecasts of Mr. Orr converge: unicorns and large-scale startups are already transforming, expanding, and implementing disruptive technologies while remaining private, completing the business cycle, and thus offering reasonable and attractive opportunities to institutional investors, including SWFs.

Series G	Series H	Series I	Series J
7%	11%	0%	0%
3%	0%	0%	0%
3%	0%	0%	0%
6%	0%	0%	0%
3%	3%	0%	0%
8%	2%	0%	2%
5%	3%	0%	1%
3%	3%	1%	1%
4%	2%	0%	1%

3 The bulk of data comes from CrunchBase. In this section we put the focus on VC-backed companies, thus these figures should be taken as a smaller sample of the larger private markets exposure of SWFs. For example, the investments of ADIA in ReNew Power, the Indian giant renewable energy company (now listed in the Nasdaq), are excluded from our list. "Regular" private equity deals such as the investment of both ADIA and KIA in Reliance Nippon Life Asset Management Co Ltd are excluded too. This will explain the share of traditional private equity firms and investment banks from the top ranks of SWF VC co-investors. We do not include any post-IPO deal, given the focus on private markets. The top 10 co-investors group remains unchanged.

THE SWFS' VC PARTNERS

The venture capital industry is a co-investment industry. Out of the 915 VC rounds we tracked[3], just 11% are solo investments, the remaining include at least 2 co-investors. The average number of co-investors for VC rounds with SWF participation exceeds 6. Thus, what is the profile of that group of SWF's co-investors in the VC space? What can we learn from this analysis? This is the main goal of this section.

The idea of co-investment was analyzed in this Report series three years ago with the analysis of the "friends of SWFs". This time, we go in-depth on identifying the most significant partners of SWFs in the VC adventure. We have analyzed each of the deals made by SWFs in VC and identified every co-investor. The list of unique co-investors grows to 2,110.

One dimension of interest is to identify what are the institutions that most frequently co-invest with SWFs. The analysis of our dataset reveals the rank of such venture partners. In the first place is a historical venture capital group, Sequoia Capital, founded in 1972, which has co-invested in 87 deals with at least 9 different SWF[4] , but manifested a preference for deals where the Vision Fund, Temasek, and GIC participated.

The second is shared between Tiger Global Management and New Enterprise Associates, which co-invested in 43 deals. Tiger Global Management joined 6 different SWFs. This investment group does not focus solely on private investments but established a public equities arm in 2001. It has just raised a new VC fund of $11 billion and made more private tech investments than any other firm in 2021. It preferred to partner with the same triad as Sequoia (GIC, SVF, Temasek) but was particularly active with QIA completing at least four co-investments in the period.

On its part, New Enterprise Associates, known as NEA in the VC jargon, is an "old" venture capital firm established in 1977, which has partnered with 8 different SWFs. It is interesting to observe the deep relationship between NEA and Australia's Future Fund, as they have joined forces in at least 21 rounds (all of them in the United States), representing 60% of the Future Fund forays in the VC industry.

The case of Fidelity is quite different. This asset manager, the world's fourth-largest after BlackRock, Vanguard, and UBS Group, with $4.6 trillion in assets under management, represents utterly the group of non traditional VC investors. With 36 deals, most of them executed since January 2020, Fidelity co-invests principally with the usual suspects (SVF, Temasek, and GIC), but interestingly has joined over the average with QIA.

The presence of large asset managers and investment banks, including Goldman Sachs (32 deals), BlackRock (26), or T. Rowe Price (21), in some of the top ranks of the list, can be part of a wider collaboration. These large asset managers and investment firms are typically awarded external mandates to invest portions of SWFs portfolios. Thus, a closer and previous relationship may explain the frequency of interactions, and the trust built may explain the confidence when entering into the more complex investment scenarios of technology-based startups and VC rounds.

The rest of the table includes big tech firms such as Tencent or GV (the VC arm of Google which spun off in 2009) and other global investment firms including Baillie Gifford and DST Global. Other VC specialists appeared below in the ranks in the next ten such as equity growth firm General Atlantic, Vertex Ventures (partially owned by Temasek, as mentioned), ARCH Venture Partners, or Andreessen Horowitz. They are joined by other investment firms including Hillhouse Capital Group or Dragoneer Investment Group.

Thus, a few conclusions can be obtained from this first analysis. The most active SWFs on VC prefer to co-invest with expert VC firms such as Sequoia,

4 We have run the same analysis for public pension funds. The results are heavily affected by the presence of Canada Pension Plan Investment Board (CPPIB). Out of the top 25 co-investors in our list 20 showcase CPPIB as its most frequent partner.

Figure 3

The Ten Most Frequent SWFs' Co-Investors in Venture Capital

Frequency a co-investor joins VC funding rounds with SWF participation (2000-2021).

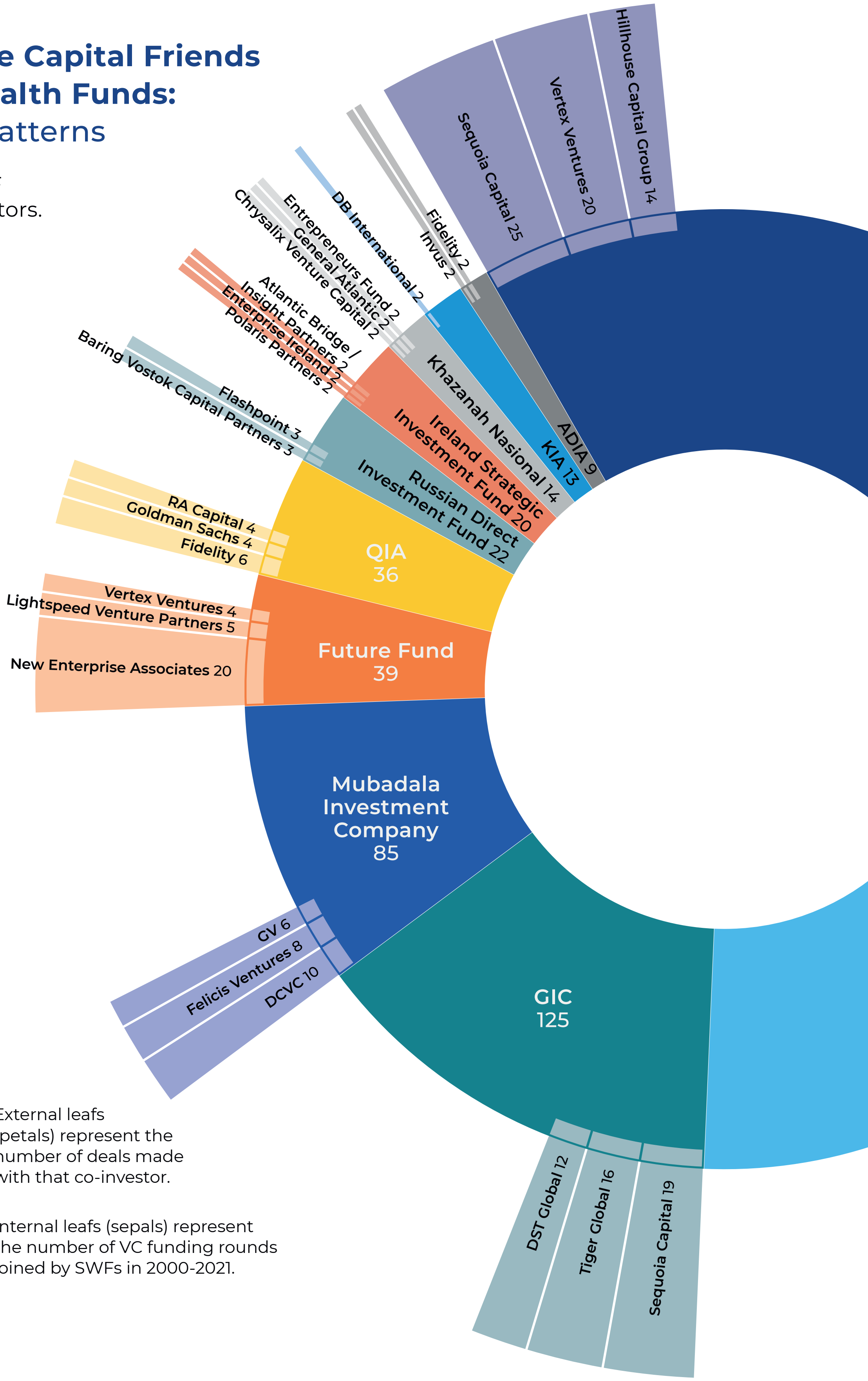
	Number of deals	Number of different SWF	Preferred SWF	Preferred PPF
SEQUOIA	87	9	SoftBank Vision Fund	CPPIB
TIGERGLOBAL	43	6	GIC	CPPIB
NEA	43	8	futurefund	PSP Investments
Fidelity	36	7	SoftBank Vision Fund	OTPP
GV	35	7	TEMASEK	PSP Investments
DST GLOBAL	33	4	TEMASEK	CPPIB
Goldman Sachs	32	8	TEMASEK	CPPIB
BAILLIE GIFFORD	31	8	TEMASEK	CPPIB
Tencent	31	4	TEMASEK	CPPIB
vertex	30	5	TEMASEK	CPPIB

Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022).

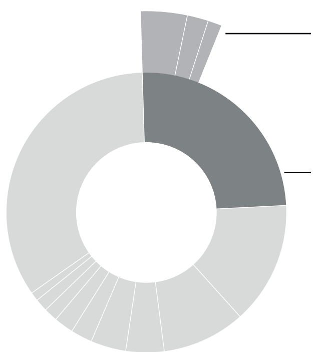
Infographic 5

The Best Venture Capital Friends of Sovereign Wealth Funds:
Co-investment Patterns

Total deal count by SWF and their main co-investors.

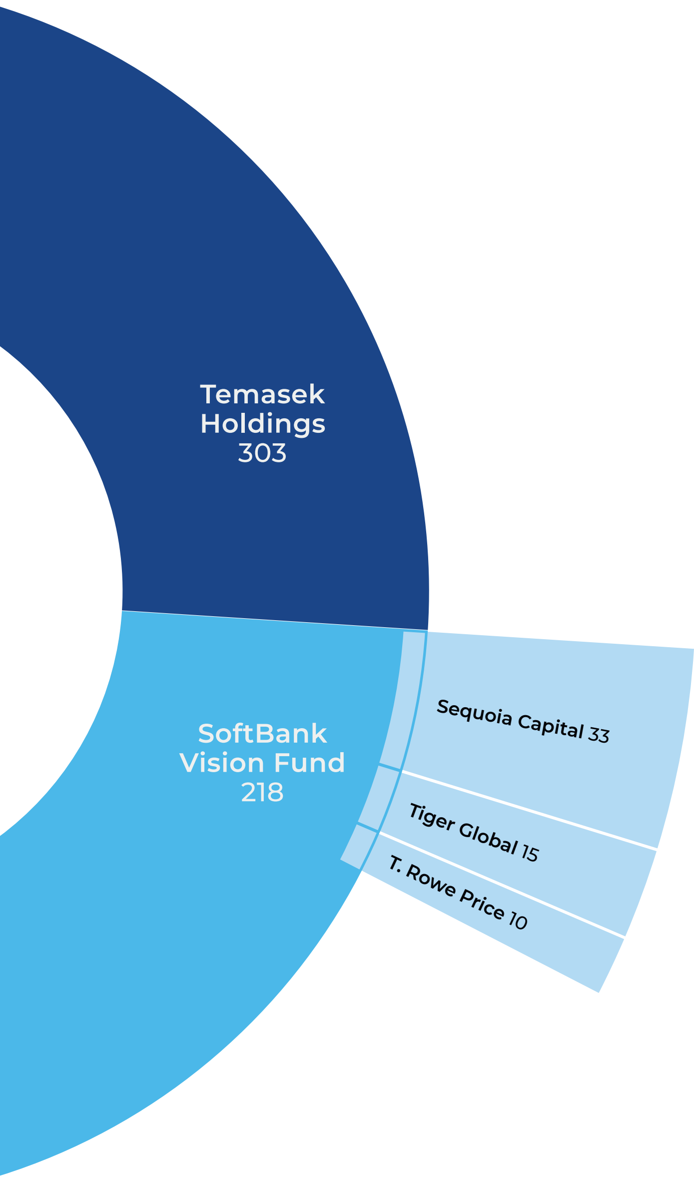


How to read it:



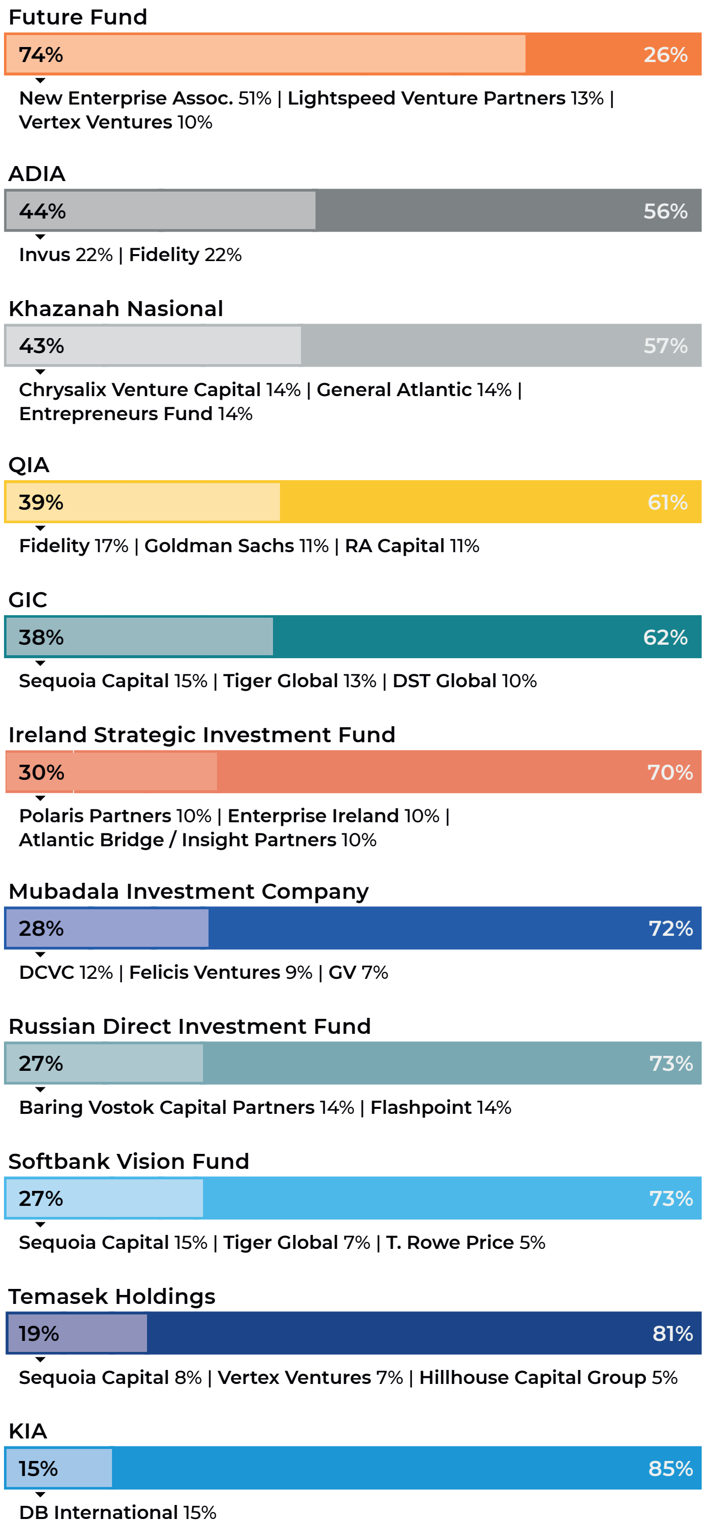
External leafs (petals) represent the number of deals made with that co-investor.

Internal leafs (sepals) represent the number of VC funding rounds joined by SWFs in 2000-2021.



Percentage of total deals

% of deals made with main co-investors.



Source: Sovereign Wealth Research – IE Center for the Governance of Change (2022) based on CrunchBase.

Tiger Global, or NEA, but do like to repeat in rounds with other relevant institutional investors and asset managers such as Fidelity, Goldman Sachs, or BlackRock (ranks 13th). Apart from these two groups, only a few technology giants such as Google, Tencent and Microsoft joined VC rounds to[5].

Other private equity global firms like Warburg Pincus, Silver Lake, or TPG average 17 co-investments in late rounds, where the boundaries of venture capital and private equity blurred. For instance, these global PE firms joined SWFs in more visible deals including late rounds in Waymo or Kakao T (largest ride-hailing app in South Korea) or secondary transactions of Uber shares. These three PE firms joined rounds with an average value of $726 million, which exceeds the average round of traditional VC funds, which focused on earlier stages, such as that of ARCH Venture Partners ($143 million), NEA ($214 million) or Lightspeed Venture Partners ($283 million), but is comparable to other large VC firms such as Sequoia Capital ($537 million) or Tiger Global Management ($720 million).

A second conclusion is that the VC co-investment partners are not exactly the usual suspects. A few “unexpected” partners appear while others are surprisingly missing. We have identified those “missing VC firms”. That is VC firms whose deal activity may suggest a more frequent collaboration with SWFs. These are active VC firms such as Bessemer Venture Partners (ranked 17th by historical VC deals but only 53rd as an SWF VC co-investor) or Intel Capital (ranked 9th historically, but only 91st for SWFs). Other super active venture firms such as accelerators Y Combinator, 500 Startups or SOSV and Crowdcube do not partner with SWFs for other reasons: their focus on very early stages, including concepts and angel rounds, made their tickets too small for institutional investors, including SWFs.

As said, we have also identified less historically active VC players that are frequently partnering with SWFs. Among these “unusual” partners of SWFs, we identify Tencent, which ranks 9th for SWFs while 57th in historical deal activity, and DST Global which ranks 7th for SWFs but is only the 318th most active VC firm in the historical table. Others, such as Fidelity, Baillie Gifford, and Dragoneer Investment Group are surprisingly active among SWFs while having much unfrequent VC activity track record. One explanation can be simply the fact that SWFs join forces with less traditional VC players as they explore together into the unchartered VC territory. The alternative explanation can be simply time. For instance, DST Global was founded only in 2009 and it explains why it appears at the bottom of the historical activity despite being extremely active in recent years.

The analysis of co-investors can be done the other way around. That is, which are the most frequent co-investors of the most active sovereign venture funds? This is shown in Table 2. Sequoia Capital is the most repeated partner for the 3 most active investors in our analysis. Yet, they “disappear” from the rest of the SWFs. As announced above, NEA plays a fundamental role as co-investor of the Future Fund, more than 51% of the deals tracked for Australia’s Future Fund are shared with NEA. NEA is an investment manager (private equities and venture capital) of the FF since at least 2011. This very long-run relationship may explain the proportion of deals executed in partnership with NEA. Moreover, the co-investment strategy is most probably a complement to a fruitful limited partner – general partner relationship. In recent times, sophisticated limited partners require their general partners to reserve the right to co-invest in some funds specific targets as a way to overweight positions in specific startups. Most of the NEA-FF deals took place between 2017 and 2019. All of them but one (China) targeted startups growing in the United States.

Another interesting conclusion we just mentioned is the influential position of certain asset managers like T. Rowe Price (third for the SVF), Fidelity (QIA and ADIA), or Goldman Sachs (second for QIA). Again, the long-run asset owner-manager relationship may explain these co-investments. From the deal source, club investing, or due diligence shared efforts, SWFs and asset managers are expanding the channels of interaction by joining forces in direct deals more frequently than ever.

5 Of course, we are excluding from the analysis here the SWF-SWF co-investment pattern, that exists and has been analyzed in previous reports.

CONCLUSION

SWFs are part of the venture capital revolution. After years of exploring new technologies, some SWFs can be considered now, as noted in the first chapter of this edition, as any other player in the global room. SWFs are part of the explanation of why startups stay private longer. In a feedback process, this bigger private asset class allows SWFs to identify more opportunities than ever. From the usual suspects (Temasek, GIC, and the SoftBank's Vision Fund) to the new key players (Mubadala, Future Fund QIA), we have uncovered their most frequent VC partners. We realize that SWFs do co-invest with some of the most emblematic VC firms such as Sequoia Capital, Tiger Global Management, or New Enterprise Associates. But interestingly, they are increasingly joined by asset managers and investment firms (Fidelity, Goldman Sachs) opening the VC space to potential new partners. Yet a question still needs to be answered, will all this fever for VC, with record-breaking investment figures, remain when interest rates go up? And more importantly, what would be the effect of all this frantic VC boom? Will these new companies generate welfare? Will it last? Only time will tell us.

ANNEX 1

IE Sovereign Wealth Research Ranking 2021

IE Sovereign Wealth Research Ranking 2021*

● Pre-2010 SWFs
○ **IFSWF members**

● New SWFs (2010-2021)
○ **IFSWF members**

● Countries Considering SWFs

SOVEREIGN WEALTH FUNDS	ASSETS UNDER MANAGEMENT ($bn, US dollars)	COUNTRY	ESTABLISHED
1. Government Pension Fund Global	1,298	NORWAY	1990 ●
2. China Investment Corporation	1,200	**CHINA**	**2007** ○
3. Abu Dhabi Investment Authority	829	**UAE**	**1976** ○
4. GIC	821	**SINGAPORE**	**1981** ○
5. State Administration of Foreign Exchange	813	CHINA	1997 ●
6. Kuwait Investment Authority	692	**KUWAIT**	**1953** ○
7. Hong Kong Monetary Authority	520	HONG KONG SAR (CHINA)	1993 ●
8. Public Investment Fund	500	SAUDI ARABIA	1971 ●
9. Saudi Arabian Monetary Authority	455	SAUDI ARABIA	1952 ●
10. Qatar Investment Authority	445	**QATAR**	**2005** ○

* This list includes sovereign wealth funds established as of February 2022. The IE Sovereign Wealth Research Ranking uses the most updated information available, some figures may differ from data shown in other parts of the Report. SWFs names in bold indicate full or associate members of the International Forum of Sovereign Wealth Funds.

Source: IE Sovereign Wealth Research (2022) with information obtained from funds' annual reports and websites. In their absence, we relied on estimates from Bloomberg, Reuters and Global SWF.

SOVEREIGN WEALTH FUNDS		ASSETS UNDER MANAGEMENT ($bn, US dollars)	COUNTRY	ESTABLISHED	
11.	National Social Security Fund	444.29	CHINA	2000	●
12.	Investment Corporation of Dubai	302.16	UAE	2006	●
13.	Temasek	283.00	SINGAPORE	1974	●
14.	**Mubadala Investment Company**	**243.35**	**UAE**	**2002**	○
15.	**Korea Investment Corporation**	**200.00**	**SOUTH KOREA**	**2005**	○
16.	National Wealth Fund	182.59	RUSSIA	2008	●
17.	**Future Fund**	**147.71**	**AUSTRALIA**	**2004**	○
18.	ADQ	110.00	UAE	2018	●
19.	Emirates Investment Authority	86.00	UAE	2007	●
20.	**Alaska Permanent Fund**	**81.09**	**USA - ALASKA**	**1976**	○
21.	**Libyan Investment Authority**	**68.40**	**LIBYA**	**2006**	○
22.	Texas Permanent School Fund	58.50	USA - TEXAS	1854	●
23.	Brunei Investment Agency	55.00	BRUNEI	1983	●
24.	**Samruk-Kazyna**	**45.02**	**KAZAKHSTAN**	**2008**	○
25.	**State Oil Fund of the Republic of Azerbaijan**	**44.22**	**AZERBAIJAN**	**1999**	○
26.	**Oman Investment Authority**	**42.62**	**OMAN**	**2020**	○
27.	**NZ Super Fund**	**40.54**	**NEW ZEALAND**	**2001**	○
28.	Dubai World	37.34	UAE	2006	●
29.	New Mexico State Investment Council	36.53	USA - NEW MEXICO	1958	●
30.	Dubai Holding	35.39	UAE	1997	●
31.	**Khazanah Nasional**	**30.49**	**MALAYSIA**	**1993**	○
32.	**Türkiye Wealth Fund**	**24.99**	**TURKIYE**	**2016**	○
33.	National Development Fund	21.00	IRAN	2011	●
34.	**Timor-Leste Petroleum Fund**	**17.69**	**TIMOR-LESTE**	**2005**	○

SOVEREIGN WEALTH FUNDS	ASSETS UNDER MANAGEMENT ($bn, US dollars)	COUNTRY	ESTABLISHED
35. Mumtalakat	17.67	BAHRAIN	2006
36. Alberta Heritage Savings Trust Fund	14.80	CANADA	1976
37. Ireland Strategic Investment Fund	**14.68**	**IRELAND**	**2001**
38. Russian Direct Investment Fund	**10.00**	**RUSSIA**	**2011**
39. China-Africa Development Fund	10.00	CHINA	2007
40. Indonesia Investment Authority	**10.00**	**INDONESIA**	**2020**
41. Quebec's Generations Fund	9.55	CANADA	2006
42. Permanent Wyoming Mineral Trust Fund	9.49	USA - WYOMING	1974
43. North Dakota Legacy Fund	8.74	USA – NORTH DAKOTA	2011
44. Fondo de Reserva de Pensiones	7.47	CHILE	2006
45. Heritage and Stabilization Fund	**5.58**	**TRINIDAD AND TOBAGO**	**2000**
46. National Oil Fund of Republic of Kazakhstan	4.98	KAZAKHSTAN	2000
47. National Investment and Infrastructure Fund	**4.30**	**INDIA**	**2015**
48. CDP Equity	**4.20**	**ITALY**	**2011**
49. Pula Fund	**4.09**	**BOTSWANA**	**1994**
50. Alabama Trust Fund	3.87	USA - ALABAMA	1985
51. Gulf Investment Corporation	3.54	KUWAIT	1982
52. Idaho Endowment Fund	3.28	USA - IDAHO	1969
53. Ithmar Capital	**2.91**	**MOROCCO**	**2011**
54. Fundo Soberano de Angola	**2.89**	**ANGOLA**	**2012**
55. Nigeria Sovereign Investment Authority	**2.71**	**NIGERIA**	**2011**
56. Bpifrance - SWF Partnerships	**2.68**	**FRANCE**	**2014**
57. Fondo de Estabilidad Económica y Social	2.46	CHILE	2007
58. State Capital Investment Corporation	1.63	VIETNAM	2006

SOVEREIGN WEALTH FUNDS		ASSETS UNDER MANAGEMENT ($bn, US dollars)	COUNTRY	ESTABLISHED
59.	Partnership Fund	1.56	GEORGIA	2011
60.	Louisiana Education Quality Trust Fund	1.53	USA - LOUISIANA	1986
61.	**Fondo de Ahorro de Panamá**	**1.50**	**PANAMA**	**2011**
62.	Revenue Equalization Reserve Fund	1.31	KIRIBATI	1956
63.	**Fondo Mexicano del Petróleo**	**1.07**	**MEXICO**	**2015**
64.	**FONSIS**	**1.00**	**SENEGAL**	**2012**
65.	**Palestine Investment Fund**	**0.93**	**PALESTINE**	**2003**
66.	Ghana Heritage Fund	0.82	GHANA	2011
67.	Future Generations Fund	0.73	BAHRAIN	2006
68.	**Natural Resource Fund**	**0.59**	**GUYANA**	**2019**
69.	Fondo de Ahorro y Estabilización	0.47	COLOMBIA	2011
70.	National Development and Social Fund	0.38	MALTA	2015
71.	**The Sovereign Fund of Egypt**	**0.28**	**EGYPT**	**2018**
72.	**Agaciro Development Fund**	**0.23**	**RWANDA**	**2012**
73.	**Future Heritage Fund**	**0.22**	**MONGOLIA**	**2019**
74.	**Intergenerational Trust Fund**	**0.21**	**NAURU**	**2015**
75.	**COFIDES - SOPEF**	**0.20**	**SPAIN**	**2018**
76.	Ghana Stabilization Fund	0.14	GHANA	2011
77.	West Virginia Future Fund	0.13	USA - WEST VIRGINIA	2014
78.	**National Investment Corporation**	**0.11**	**KAZAKHSTAN**	**2012**
79.	Petroleum Revenue Investment Reserve	0.09	UGANDA	2015
80.	National Fund for Hydrocarbon Reserves	0.09	MAURITANIA	2006
81.	Fund for Future Generations	0.08	EQUATORIAL GUINEA	2002
82.	National Wealth Fund	0.03	TURKS & CAICOS ISLANDS	2017

SOVEREIGN WEALTH FUNDS	ASSETS UNDER MANAGEMENT ($bn, US dollars)	COUNTRY	ESTABLISHED
83. Fonds Gabonais d'Investissements Stratégiques	**0.02**	**GABON**	**1998**
84. Fondo para la Estabilización Macroeconómica	0.003	VENEZUELA	1998
85. Welwitschia Fund	0.003	NAMIBIA	2021
86. Fonds de Stabilisation des Recettes Budgétaires et Réserves pour Générations Futures	0.002	DEMOCRATIC REP. OF THE CONGO	2005
87. Fondo de Estabilización Fiscal	0.001	PERU	1999
88. Northwest Territories Heritage Fund	0.000	CANADA	2012
89. Permanent Fund for Future Generation	N/A	SÃO TOMÉ E PRÍNCIPE	2004
90. National Investment Fund	**N/A**	**CYPRUS**	**2019**
91. Oil Revenue Stabilization Fund	N/A	SOUTH SUDAN	2008
92. Turkmenistan Stabilization Fund	N/A	TURKMENISTAN	2008
93. Zimbabwe Sovereign Wealth Fund	N/A	ZIMBABWE	2014
94. Papua New Guinea SWF	N/A	PAPUA NEW GUINEA	2011
95. Savings and Stabilization Fund	N/A	SURINAME	2017
96. Fund for Israel Citizens	N/A	ISRAEL	2014
97. Fonds Souverain de Djibouti	N/A	DJIBOUTI	2020
98. Ethiopian Investment Holdings (EIH)	N/A	ETHIOPIA	2021
Total Assets under Management	**$10.39 trillion**		

POTENTIAL NEW FUNDS**

SOVEREIGN WEALTH FUNDS	COUNTRY
99. **South Africa**	SOUTH AFRICA
100. **Lebanon**	LEBANON
101. **Kenya**	KENYA
102. **Mozambique**	MOZAMBIQUE
103. **Bahamas**	BAHAMAS
104. **Romania**	ROMANIA
105. **Japan**	JAPAN
106. **Mauritius**	MAURITIUS
107. **Zambia**	ZAMBIA
108. **Tanzania**	TANZANIA
109. **Liberia**	LIBERIA
110. **Saskatchewan**	CANADA
111. **Bangladesh**	BANGLADESH
112. **New Caledonia**	NEW CALEDONIA
113. **United Kingdom**	UNITED KINGDOM
114. **Investment and Development Fund**	MACAU SAR
115. **Philippines**	PHILIPPINES
116. **Taiwan**	TAIWAN
117. **Mongolia**	MONGOLIA
118. **Jordan**	JORDAN

**These 20 funds were not established when this edition went to press. The establishment is currently discussed.

2

ANNEX 2

Sovereign wealth funds in Spain: A record year

Javier Capapé
Adjunct Professor and Director, Sovereign Wealth Research, Center for the Governance of Change, IE University

ANNEX 2
SOVEREIGN WEALTH FUNDS IN SPAIN 2021: A RECORD YEAR

Sovereign wealth funds accelerate their commitment to Spain and its companies. From October 2020 to December 2021, sovereign wealth funds have invested in 12 Spanish companies, worth more than €2.8 billion, a record investment volume only surpassed by years 2011 and 2009 in the historical series, when Mubadala (then IPIC) took control of Cepsa. This boost to sovereign investment in 2021 has two names of its own: GIC, one of Singapore's two sovereign wealth funds, and a prominent emirate, Abu Dhabi.

SOVEREIGN WEALTH FUNDS IN SPAIN IN 2021? GIC AND OTHERS

GIC is one of the most active SWFs in the world, by the number of executed deals, and it was by large the most active SWF in Spain in the period 2020-2021. GIC has a historical exposure to Spain. Among GIC's most outstanding investments are the stakes in Cellnex (as of June 2021 it controlled 7% of the shares, a package valued €2 billion), GMP (GIC controls 33% of the property-owning real estate group of the Montoro family), and Allfunds (it is co-owner with Hellman & Friedman of this wealthtech company which hosts the global largest fund distribution network).

In the summer of 2021, GIC joined the Acciona Energía's IPO. This transaction aligns with the Singapore fund's commitment to alternative energies to oil and natural gas as part of its portfolio decarbonization strategy. The IPO placed on the market shares worth more than €1.5 billion, making it the most important IPO in Spain since the Aena's IPO in 2015.

Acciona Energía, majority controlled by Acciona, its parent company, was born with an installed capacity of 11.2GW and aims to reach 20GW by 2025. The company is present in 16 countries providing GIC with a diversified international exposure. The shares that Acciona Energía has placed represent less than 20% of its share capital, so future share sales could see the arrival of new institutional funds, including SWFs, as they continue their sustainability transition.

In line with this commitment to renewable energy, GIC granted in May 2021 a loan of €300 to Forestalia, the Aragón-based company founded in 2011, which operates renewable energy projects with an installed and development capacity of 6GW, both in wind energy and in solar and biomass.

The interest of international institutions in Spanish renewable companies is profound. And among the investors base, we find a heterogeneous group that includes Canadian pension funds such as Caisse de Depot Caisse de dépôt et placement du Québec (CDPQ), Alberta Investment Management Corporation (AIMCo), or Cubico (the joint venture of Ontario Teachers' Pension Plan and PSP Investments), global alternative asset managers (such as Brookfield, KKR or Macquarie) and the numerous banks providing project finance. The list includes China Three Gorges, the giant China's state-owned enterprise, which already owns 23 wind farms and 14 photovoltaic plants in Spain.

GIC remains our central character in another key transaction in Spain. In November 2021, the Committee for the Control of Foreign Investments in the United States (CFIUS) authorized GIC's purchase of Biomat, Grifol's fully-owned US subsidiary. The €881 million investment means taking a minority stake in Biomat, which has almost 300 plasma centers in the United States. Thus, GIC and Grifols become strategic allies.

Grifols was in the spotlight in last year's report, following the signing in February 2020 of an agreement of intent with PIF, Saudi Arabia's sovereign wealth fund. The agreement included plans to develop a network of plasma collection centers, a treatment center, and a purification plant in the Kingdom. Although this agreement has not yet crystallized in investment, it does demonstrate the interest of SWFs in establishing long-term alliances with key companies in the healthcare sector. In the case of Grifols, the alliance can allow the development of treatments and products derived from plasma, called blood products, a segment where it is a European leader and the largest global producer. Embarked on an expansion plan, the Spanish pharmaceutical company acquired its German rival Biotest for €2 billion (including debt) and has continued the purchases of plasma collection centers in the United States, investing €505 million in the United States in 2021. Joining forces with GIC could provide long-term financial support for the sector-leading Spanish company.

We continue with GIC's analysis by focusing on a sector on the rise: data centers real estate. In 2019, GIC established an alliance with Equinix, the leading global operator of data center infrastructure. Two years later this alliance has been reinforced with the increase of the committed capital to $6.9 billion, of which GIC controls 80%. The 2021 expansion will enable the construction of 32 hyperscale data centers (thousands of servers connected at high speed) around the world. Two of these hyperscale data centers will be in Madrid, valued at about €230 million. These data centers allow large cloud information managers and storers (Amazon Web Services, Microsoft Azure, Google Cloud Platform, or IBM Cloud) to perform their information storage and management service.

The growth of information shared and stored in the cloud has grown by 65% since the pandemic began. Teleworking and video calling, the rise of video games, the implementation of the metaverse or heavy computing workload (such as genome sequencing, 3D or virtual reality representation, big data analysis, etc.), represent an increasing demand for an infrastructure that is here to stay. And sovereign wealth funds, which have already anticipated the transformation in consumers' behavior, acquiring substantial portfolios of industrial warehouses that make e-commerce possible, are also positioned in this buoyant new asset class and to acquire the assets that will sustain the digital economy of the 21st century.

Precisely in logistics-real estate made its latest investment P3 Spain Logistics Parks, the SOCIMI 93%-owned by GIC. P3 starred in one of the most significant transactions in the sector by acquiring the Pulsar portfolio from KKR and financial partners. The purchase reached €108 million and allows P3 to expand its logistics capacity by another 110,000 square meters, becoming one of the most important players in Spain.

Last but not least, an Abu Dhabi sovereign wealth fund (it has not been disclosed which, although given the characteristics of the deal it could either be Abu Dhabi Investment Authority or Mubadala) invested together with other global investors linked to CBRE more than €1 billion to take control of Healthcare Activos.

Following the transaction, all the platform's assets will be consolidated under the umbrella of Healthcare Activos Yield, the SOCIMI listed on the Paris' Euronext Access. Healthcare Activos is the investment platform with the largest implementation in the healthcare real estate sector in Spain. Healthcare Activos, launched in 2016 and supported by Oaktree Capital Management and Altamar Capital Partners, controls a portfolio of 48 assets, including hospitals, clinics, and nursing homes, valued at almost €600 million. Following the investment, the SOCIMI plans to double its assets in the coming years and accelerate international expansion with investments in Portugal and entry into new markets such as Germany and Italy. The aging population is one of the long-term investments theses most considered by sovereign wealth funds. According to Eurostat, the population over 65 will grow from 21% in 2020 to 30% in 2050, while the weight of the population over 80 will practically double from the current 5.9% to 11.3% in the same period. The social and economic changes stemming from the demographic structural transformation bring new investment opportunities that sovereign wealth funds, with an eye on the long run, are ready to bet on.

Mubadala also played an indirect role in Spain in the sector of nursing homes. As a result of its alliance with CDC International Capital (now part of the French public bank Bpifrance), Mubadala has participated in the capital increase of DomusVi in July 2021. DomusVi is the largest group in the geriatric sector in Spain and France and third in Europe.

Mubadala starred too in another relevant transaction this year. It consolidated a portfolio co-held with Amerra Capital of four fish producers in Greece and Spain. As a result of this consolidation, Avramar was born in 2021. A Castellón de la Plana-based organization that produces 70,000 tons of fish, becoming the leading aquaculture company in the Mediterranean. Agriculture and food, as reflected in another chapter in this report, is an SWF credible long-term investment thesis too.

SOPEF: THREE NEW COMPANIES, TWO NEW SECTORS

In addition to GIC's dazzling activity, the increasing presence of Mubadala and the targeting of the elderly sector, this year, we highlight Sopef's targets again. The joint Spanish-Omani sovereign wealth fund of Cofides and the Oman Investment Authority continues its investment period. Sopef has acquired minority stakes in three new companies: Uriach, Logalty, and Llusar. With tickets that regularly do not exceed €20 million, Sopef has entered new sectors such as technology (Logalty) and pharmaceuticals (Uriach) while committing again to the agricultural and food sector (Llusar). Closed in December 2020, the first investment was made in Llusar, a Castellón family business that produces and markets citrus fruits (mainly oranges and clementines). With almost 1,200 hectares spread between Spain and South Africa, Llusar exports more than 85% of its production.

The second deal of the period involved a minority position in Logalty. The firm, established in 2005, is a technology company in the legal tech sector, which provides digital certified contracting, digital certified communications and identification services. Logalty serves the largest Spanish financial sector players including banking, insurance, and consumer credit. Founded by lawyers, the company has reached 49 million electronic signatures, with a positive impact on the environment, eliminating paper, printing, and storage of any non-electronic signature. The legaltech sector is receiving increasing attention from global investment houses. In 2021, it surpassed €1 billion, doubling the record figures of 2020, in companies that digitize and automate numerous legal processes including electronic signatures, virtual notaries, or customer relationship management.

Finally, Sopef decided to add the pharmaceutical sector to its portfolio with the entry into Uriach in September 2021. Thus, Sopef acquires a minority stake in this Catalan pharmaceutical company with sales in more than 70 countries. With the sale of its generics division, third-party products, and new molecule research, Uriach intends to focus its efforts on the over-the-counter drug business, where it owns already leading drugs in science-based sleep aids or physiotherapy creams. With this acquisition, Sopef gets exposure to five different sectors: agribusiness, infrastructure, industrial, technological, and life sciences. Sopef is expected to close its investment period in 2022, with the arrival of 2 or 3 new portfolio companies.

RELEVANT SWF DIVESTMENTS.
Sovereign wealth funds also take advantage of market developments to cash out, particularly now when multiple SWFs are launching asset recycling strategies. In this sense, Mubadala and Trafigura sold all their shares of Matsa (Minas de Aguas Teñidas) to Sandfire, an Australian listed company. Mubadala acquired the Huelva company in 2015 together with Trafigura, a Singaporean company leader in logistics and commodity trading, for a total amount of €894 million. The sale closed in September 2021, exceeded €1.6 billion, practically doubling the initial investment. Matsa, linked to the copper market, whose prices climbed more than 20% in 2021, has seen its valuation rebound in recent months. Mubadala has not wanted to miss this opportunity to cash out and exit after a successful investment of 6 years in the Huelva mining company.

Another fund that has cashed out in this same period is Abu Dhabi Investment Authority. The Emirati fund invested in Cellnex partnering with the Benetton family, a week before GIC did so in October 2018. By then the share price of this Spanish telecommunications giant was around 16 euros. The sale has occurred sometime between December 2020 and June 2021, probably around the capital increase in March, with an average share price very close to 50 euros in this period, which implies a 200% revaluation. Probably a good time to go out and cash out after successful participation in the leading wireless telecommunication infrastructure company in Europe.

Authors:

Patrick J. Schena, PhD
Professor of Finance, Hult International School of Business & Adjunct Assistant Professor, The Fletcher School, Tufts University & Co-Head, SovereigNET

Jorge Fernández Vidal
Investment Director, Liechtenstein Group & Adjunct Professor, IE University

Javier Capapé, PhD (Editor)
Adjunct Professor and Director, Sovereign Wealth Research, Center for the Governance of Change, IE University

Adrián Blanco, PhD
Head, Funding Department and LATAM Desk, ICEX-Invest in Spain

Javier Bernal
Research Assistant, ICEX

Analysis, Coordination & Contact
Javier Capapé javier.capape@ie.edu
Carlos Luca de Tena carlos.lucadetena@ie.edu
Alberto Sanz alberto.sanz@icex.es
Adrián Blanco adrian.blanco@icex.es

Design and infographics:
Susana Millán smillangarcia@gmail.com
Covadonga Fernández covafesteban@gmail.com

Sovereign Wealth Research Fellows (IE University)

Carla Ortega, Bachelor in PLE 2022
Ángel Intriago, Master Business Analytics & Big Data 2022
Carolina Buonomo, IMBA 2022
Camilo Gómez, MIF 2022
Ishita Baid, MIF 2022

Institutions

SOVEREIGN WEALTH RESEARCH - IE CENTER FOR THE GOVERNANCE OF CHANGE
www.ie.edu/cgc/

The Sovereign Wealth Research at the IE CGC is a research program focused on sovereign wealth. The program has proven experience and international recognition. The SWR helps to better understand the critical role of sovereign wealth funds and the transformative position they play on technology disruption, sustainable finance, economic development and corporate governance. The program produces annual reports, peer-reviewed papers in top academic journals, training programs, closed-door seminars, and open conversation spaces with sovereign wealth stakeholders.

The Center for the Governance of Change (CGC) is an applied-research, educational institution based at IE University that studies the political, economic, and societal implications of the current technological revolution and advances solutions to overcome its unwanted effects. The CGC produces pioneering impact-oriented research that cuts across disciplines and methodologies to unveil the complexity of emerging technologies such as Artificial Intelligence, Big Data, Blockchain, and Robotics, and explore its potential threats and contributions to society. Based at IE University, home of one of the top five business schools in the world according to The Economist, Forbes and The Financial Times.

ICEX
www.icex.es

ICEX Spain Trade and Investment is a public corporation at the national level whose mission involves promoting the internationalization of Spanish com- panies to support their competitiveness and add va- lue to the economy as a whole, as well as attracting foreign investment to Spain. Its vision is a) to serve as a window of internationalization for Spanish com- panies, by collaborating with strategic partners, b) to provide high added-value services, meeting cus- tomers' needs, and c) to attract top-quality foreign investment, helping investors to enter Spain and set up activities here. ICEX Spain Trade and Investment renders its services through a network of 31 Pro- vincial and Regional Divisions in Spain along with almost 100 Economic and Trade Offices around the world. It also boasts 16 Business Centers worldwide, offering Spanish companies temporary infrastructu- re and acting as incubators for internationalization.

ICEX – INVEST IN SPAIN
www.investinspain.org

Within ICEX, Invest in Spain Division's fulfills its mission with four lines of action: a) Attracting new foreign direct investment projects, especially involving countries, sectors and businesses that show greatest growth potential in Spain, b) Positioning of Spain as an internationalized country boasting extremely competitive resources, business center and international investment as well as being a global platform for access to third markets, c) Promoting an improved business climate and regulatory environ- ment, thereby facilitating business activity in Spain, d) Facilitating collaboration between foreign inves- tors and Spanish companies for the development and expansion of activities in our country.

UNIVERSITY
CENTER FOR THE GOVERNANCE OF CHANGE

GOBIERNO DE ESPAÑA
MINISTERIO DE INDUSTRIA, COMERCIO Y TURISMO

ICEX

INVEST IN SPAIN