

Financing of the digital ecosystem: The “disruptive” role of sovereign wealth funds... Reconsidered

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Xiaomi, Uber, Flipkart, Spotify are all members of the so-called “Billion Dollar Club”¹ and all funded by sovereign wealth funds (SWFs). While such investments offer great fodder for headlines and “clickbait”, an analysis of the role SWFs as investors in the digital economy reveals instead a complex path of engagement through a variety of direct and indirect structures that have extended to the “Unicorns”. The digital investment patterns of SWFs can best be described as concentrated, opportunistic, scale-sensitive, and, arguably, disruptive. The informed observer of SWFs will see the apparent irony in this use of this term.

The acceleration in the introduction of new technologies globally has been the source of considerable scrutiny, particularly so for their transformational influence. McKinsey, among others, offers a definition of *disruptive*² impact as that which systematically transforms the way people live and work, creating new opportunities or shifting surpluses for businesses, that effects rapid rate of change in price/performance, while offering discontinuous capability improvements, and that extends broadly across industries with the potential to massively affect existing revenue streams, profit margins, and capital investments, and, at the level of the state, to accelerate national growth or change the comparative advantage of nations.

More focused still are the impacts of digitalization, which have been advanced by the proliferation of network capacity, expanding bandwidth, even faster processing, and the vast creativity of entrepreneurs and innovators. Perhaps what is most unique about digitalization is that it knows and respects no sector bounds, but rather extends across traditional industries – banking, retail, transportation, healthcare and beyond – with the potential to upend extant strategies, business models, and operating plans. The effects are both immediate and long-term, challenging firms and investors to carefully evaluate the drivers, penetration rates, market linkages, and eventual profit impacts of a digital advance.

From the strategic vantage point of the long-term investor, it is SWFs, whose liability profile, degree of risk aversion, and mandate permit leveraging long horizons (e.g. wealth versus stabilization funds), that are best positioned to seek out the benefits of investing counter-cyclically to minimize aggregate transaction costs and to access structural risk premia (e.g. liquidity premium). However, “digital” as an investment thesis, requires the additional capacity to correctly evaluate secular or broad macro trends, such as long-term

growth cycles, demographic shifts, and specifically the resultant – indeed disruptive – impacts of technological change.³

Thus, turning from themes that once portrayed SWF investments as disruptive to markets and economies, we examine SWF investment in the disruptive technologies and processes that are destabilizing to traditional industries in the spirit of Schumpeterian change. Our analysis proceeds first with defining the “digital landscape”, then dissects SWF investment across the digital ecosystem. Our focus is on the drivers, trends and models that have defined SWF investment in digital assets - both as return-seeking and as a hedge against disruptive impacts to their investments in traditional sectors. The story that unfolds in these few pages should be read as a subplot in the broader narrative of SWF investment today that reflects in part the extent of their growth and maturity. Key markers include alternative asset classes, direct investing, disintermediation of traditional partners, and the building of professional capacity.

Defining “Digital”: Scale, Scope, and a Staggering Rate of Change

Whether e-commerce, e-business, internet economy, more broadly e-economy, or simply digital, the scope of the “sector” that defines the digital ecosystem is open to wide interpretation. A baseline definition might be that offered by the OECD: “the full range of our economic, social and cultural activities supported by the Internet and related information and communications technologies”.⁴ A coincident framework, useful as a start, conceives of the digital economy as three discrete but inter-connected components: infrastructure, electronic business processes (i.e. the means of commerce), and electronic - online – transactions.⁵ Our slightly modified definition takes into consideration the participation of governments and non-profits in this “economy”.

For our purposes, infrastructure represents the core of assets used to support electronic business processes and to conduct electronic commerce. It includes variously hardware and software, telecommunication networks – whether fixed line, mobile, or satellite, support services across platforms, as well as human capital used in electronic businesses and e-commerce.⁶ We view e-business processes as any business or service delivery function that organizations conduct over electronic networks. Organizations, as

¹ The Billion Dollar Club or, in a separate guise, the Unicorns are startup companies (many in the software industry) valued at \$1 billion or more by public or private markets.

² “Disruptive Technologies: Advances That Will Transform Life, Business, and the Global Economy”, McKinsey Global Institute, May 2103, accessed at http://www.mckinsey.com/insights/business_technology/disruptive_technologies

³ See “The Future of Long-term Investing”, Work Economic Forum, 2011 accessed at http://www3.weforum.org/docs/WEF_FutureLongTermInvesting_Report_2011.pdf

⁴ “Measuring the Internet Economy: A Contribution to the Research Agenda”, OECD Digital Economy Papers, No. 226, OECD Publishing, p 6 accessible at <http://dx.doi.org/10.1787/5k439jg6r8jf-en>

⁵ Thomas L. Mesenbourg, “Measuring the Digital Economy”, US Census Bureau, p 2 accessed at <https://www.census.gov/econ/estats/papers/umdigital.pdf>

⁶ Ibid., p 3

noted, include both for-profit and nonprofit entities, including governments, across a broad range of internally and externally facing processes.⁷ Finally, the logical completion of such processes - at the base on the digital economy - are billions of transactions for goods or services.

The Boston Consulting Group posits that the digital economy is in the third of three phases of evolution (the first being dot-com era followed by Web 2.0), characterized by the emergence of “hyperscaling”.⁸ However beyond scale, the scope and rate of change across the global digital ecosystem are staggering. According to BCG and the World Economic Forum⁹ there are approximately 2.5 billion connected people today (about one third of the world’s population) with the number expected to increase to 4 billion by 2020. Such dramatic projections are informed in part by the volume of mobile Internet traffic, which increased from 8 exabytes¹⁰ to 1,000 EB per year between 2005 and 2015 and supports the even equally startling forecast that the number of connected devices will increase from 5 billion in 2010 to 50 billion by 2020. Within the G-20 alone the number of mobile broadband connections increased from 167 million in 2005 to 2,107 million by 2015, as total Internet-based economic activity in the bloc approaches \$4.2 trillion or about 5% of GDP. Digital is growing at over 10% per year, i.e. considerably faster than the economy as a whole. In emerging markets growth is even faster at between 12-25% annually. With annual investment in digital infrastructure by communication service providers alone amounting to about \$300 billion, the scope of future investment to sustain expected growth in both developed and emerging economies, though varying by region, will be extensive.

Geographically then where has the digital ecosystem grown most extensive? BCG, Accenture, and Planet eBiz, an initiative of Fletcher School, each have indexed - as static annual snapshots - the digital economy based on a wide variety of variables designed to capture key dimensions of the buildout.¹¹ The Planet eBiz Digital Evolution Index (DEI), for example, is derived from four broad drivers: supply conditions (such as access, fulfillment and transaction

infrastructure); demand conditions (such as consumer behavior and financial, Internet, social media awareness); innovation (including entrepreneurial, technological and financial supporting subsystems and the presence of a startup culture); and institutions (such as government effectiveness and its role in business and legal and regulatory support for digital processes). Across all three indexes a picture of digital readiness emerges consistent with economic development trends. Among the most digitally robust are the economies of the US, UK, Germany, the Netherlands, Sweden, Finland, Denmark, Australia, Japan, South Korea, Singapore, and Hong Kong.

In addition to providing a static ranking, the DEI also maps the five-year rate of change in its annual measure to derive a “momentum” or trend measure (See Chart 1). Here importantly ordinal rankings become inverted reflecting a steady “catch up” across the measures of the index by key countries primarily in developing Asia and Latin America. Among these (by degree of change) are China, Malaysia, Thailand, South Africa, Mexico, Columbia, Vietnam, Chile, the Philippines, India, and Brazil.

SWFs and the Financing of the Digital Ecosystem

At the outset it is useful to establish that SWF investment in “digital” occurs through a variety of platforms: public equities, private equity (PE) funds, private equity separate mandates, joint ventures, wholly-owned private equity subsidiaries, and directly as lead or co-investors. Our scope here excludes the first and so concentrates on SWFs that invest in illiquid, alternative, or real assets either directly or indirectly through limited partnerships or joint ventures. Generally this will exclude SWFs that have a liquidity imperative, such as stabilization funds, and thus comes to rest primarily on development and multigenerational funds. Furthermore, we observe that among this cohort are the largest funds that have the capacity and scale to invest directly – whether as leads or co-investors - subject of course to having a mandate that includes investing in pre-IPO deals. They are estimated to hold over US\$ 3 trillion of AUM.¹²

Our analysis will suggest that SWF participation in the digital ecosystem can best be described as dual-tracked. Funds have been investing in technologies that form the infrastructure of the digital economy – the digital backbone – since the early 2000’s. However, the period from 2013 to 2014 represents a watershed, as the volume and scale of investment across the digital ecosystem expanded exponentially. Furthermore, even the most superficial of

⁷ Ibid., p 4

⁸ See Philip Evans and Patrick Forth, “Borges’ Map: Navigating a World of Digital Disruption”, The Boston Consulting Group, 2015 accessed at <http://www.digitaldisrupt.bcgperspectives.com>

⁹ Regarding the metrics cited in this section, see “Delivering Digital Infrastructure: Advancing the Internet Economy”, World Economic Forum in collaboration with the Boston Consulting Group, 2014 accessed at http://www3.weforum.org/docs/WEF_TC_DeliveringDigitalInfrastructure_InternetEconomy_Report_2014.pdf

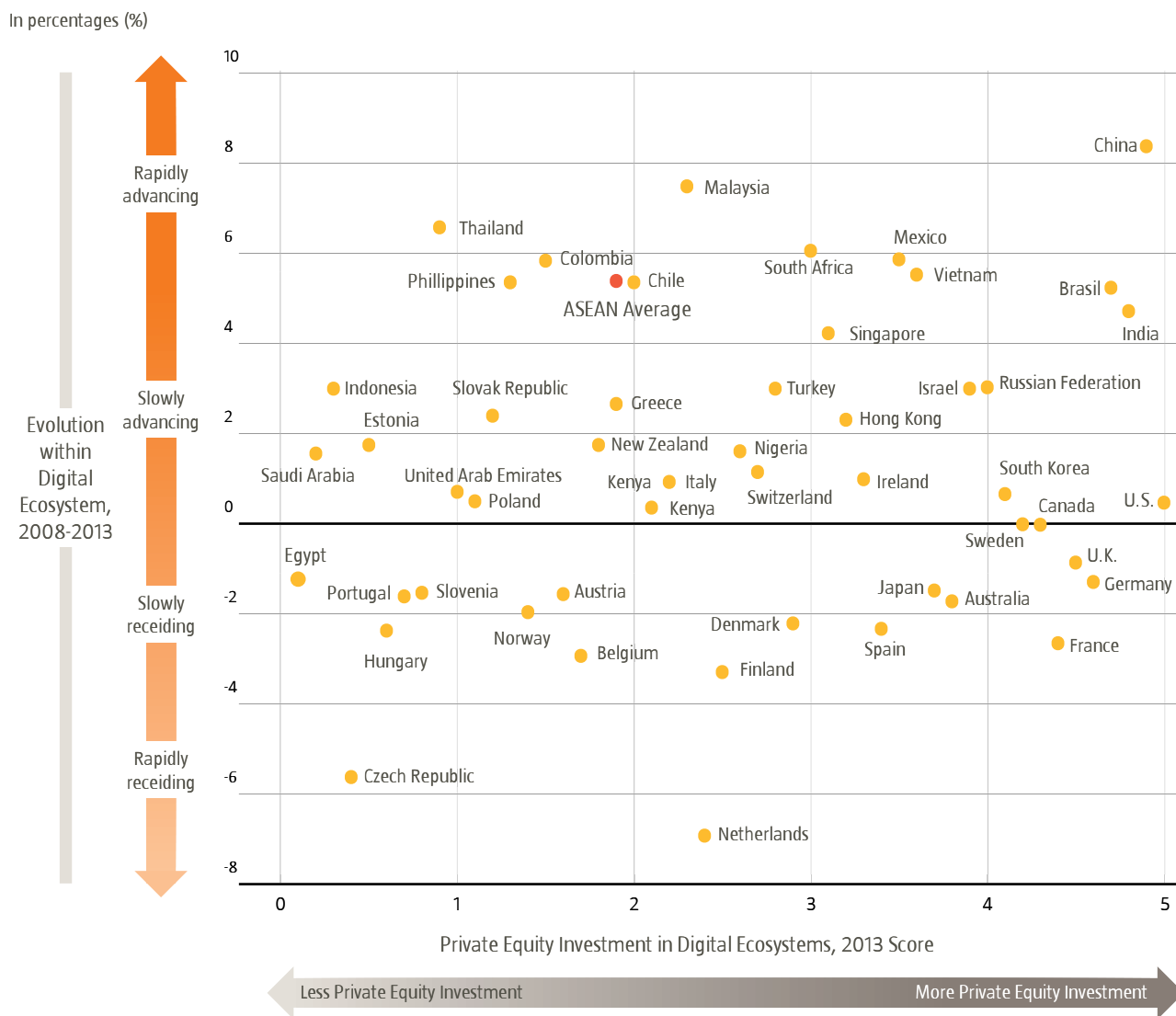
¹⁰ 1 exabytes = 10006 bytes

¹¹ The specific indexes – with associated references - include the BCG e-intensity index (https://www.bcgperspectives.com/content/interactive/telecommunications_media_entertainment_bcg_e_intensity_index/), the Accenture Digital Density Index (http://www.accenture.com/us-en/landing-pages/Pages/digital-density-index-ad.aspx?c=str_usbdidgenpsgs&n=Digital_Density_-_US&KW_ID=shq2e4dTV_dc%7Cpcrid%7C67371557125), and the Planet eBiz Digital Evolution Index (<http://fletcher.tufts.edu/eBiz/Index>).

¹² “The Future of Long-term Investing”, World Economic Forum, 2011.

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Chart 1
Digitalization and investments in Digital Ecosystems



Sources: Dow Jones VentureSource and EMPEA

reviews will attribute this dramatic shift to a handful of SWFs with the mandate and capacity to invest directly *in scale*.¹³ Among these, the Singaporean SWFs have been the most active direct investors in

digital assets. What remains hidden from our clear view is the indirect participation of a wider cohort of funds investing indirectly through private equity limited partnerships.

¹³ See for example “Singapore’s Investment Funds Blaze eCommerce Trail, Financial Times, 17 August 2014

That SWFs are significant investors in private equity partnerships, particularly the largest globally – Advent, Bain, Blackstone, Carlyle, TPG, etc – has been well-documented elsewhere.¹⁴ In fact, the larger the fund by assets then the higher the probability that it will be invested in private equity as an asset class.¹⁵ Furthermore, and directly relevant to the present discussion, private equity firms have been active investors across the digital landscape. As a benchmark, we estimate that approximately \$250 billion in private equity has been invested in the global digital ecosystem between 2009 to 2014, marked by a dramatic acceleration in 2014 when some \$94 billion was committed.¹⁶

Geographically, the US continues to garner the majority of private equity investment in the digital ecosystem, estimated at over \$170 billion (or about 70% of the total) between 2009 and 2014. However it is China and India (\$22 billion and \$9 billion or 9% and 4% respectively) that follow, trailed then by the UK, Canada, Germany, Israel, and Russia. Such trends are quite consistent with those reported by Planet eBiz, which uses private equity flows as an investment proxy for the DEI.¹⁷ Also relevant is that mid- sized and smaller countries - particularly those in Latin America and Southeast Asia - remain relatively underinvested by mainstream private equity, despite rapid evolution and favorable demographics (a point to which we return in our conclusion).

Investor participation across the digital ecosystem has included both General Partners (GP) and asset owners in discrete funding rounds. The former certainly represent the vastly larger cohort. Table 1 ranks the top 10 global private equity investors in digital assets according to the aggregate value of funding rounds in which they participated. Importantly, prominent among the 10, based on scale, are GIC and Temasek (ranked eighth and ninth respectively) with each participating in rounds valued at over \$4 billion.

Similarly, among “Billion Dollar Club” of technology startups with current valuations of at least \$1 billion like patterns prevail. Based on May 2015 valuations, including several exits, the Club boasts 104 members, representing 11 countries. Investment profiles – whether by investor, size, or geography – are quite consistent with those reported above. The US as expected dominates the ranks with 64 startups (62%), including the likes of Uber, Snapchat, Palantir, and

Table 1

10 Largest private equity investors in the digital economy (2010-2014)

Ranking	Investor	City	Country
1	DST Global	Moscow	Russia
2	Tiger Global Management	New York	US
3	Sequoia Capital	Menlo Park, CA	US
4	Accel Partners	Palo Alto, CA	US
5	T. Rowe Price	Baltimore, MD	US
6	Andreessen Horowitz	Menlo Park, CA	US
7	Kleiner Perkins Caufield & Byers (KPCB)	Menlo Park, CA	US
8	GIC	Singapore	Singapore
9	Temasek Holdings	Singapore	Singapore
10	Intel Capital	Santa Clara, CA	US

Source: In-source based on CrunchBase. Ranked by aggregate value of funding rounds in which they participated.

Dropbox. China and India again follow with 16 and 7 startups (15% and 7% respectively), including JD.com, Xiaomi, Flipkart and Snapdeal. SWFs have invested in 16 such firms (or 19%). Investor rosters, across multiple rounds, include angels, venture capital firms, corporate or strategic investors, large global private equity firms, and sovereign and pension asset owners. Among SWFs Temasek has invested in 11 (13%) with GIC, Abu Dhabi Investment Council, and Qatar Investment Authority following. In most cases such investments represent late round participations, generally at a pre-IPO stage, in collaboration with other large investors and very likely as a co-investments. This we believe reflects a core strategy among many SWFs to effectively gain digital exposures: Leverage the expertise and capacity of experienced GPs, while selectively investing or co-investing in scale in seasoned deals with lower operating and liquidity risk.

With respect to direct SWF investments in the digital economy, we focused on deals between 2006 to 2014 and segmented our sample into two - 2006 to 2009 and 2010 to 2014.¹⁸ These periods seemed also to be co-incident with two distinct investing themes: Digital infrastructure and e-commerce. We identified 78 deals representing participation in rounds totaling nearly \$30 billion across a variety of sectors, including digital infrastructure, such as

¹⁴ See Diego Lopez, “The major role of Sovereign Investors in the Global Economy: A European Perspective” in ESADegeo’s “The Global Context: How Politics, Investment, and Institutions Impact European Businesses” May 2015.

¹⁵ See “2015 Preqin Sovereign Wealth Fund Review”, Preqin, 2015

¹⁶ As a source for the references in this section we make guarded use of data from the CrunchBase database.

¹⁷ Similar trends for 2014 were report by Bain Capital. See Asia-Pacific Private Equity Report 2015, Bain Capital accessed at http://www.bain.com/Images/REPORT_Bain_and_Company_Asia-Pacific_Private_Equity_Report_2015.pdf

¹⁸ All deal references in this sample are from the Fletcher Sovereign Wealth Fund Transaction Database.

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Table 2

Sovereign Wealth Funds investments in the digital economy (by sector)

Sub-industry	Deals	Value (\$m)	Average deal value (\$m)
E-Commerce	26	7,401	284.67
IT	12	1,595	132.93
Telecom	10	3,168	316.81
Media	7	4,453	636.14
Software	7	9,104	1,300.57
Education	4	1,017	254.25
Gaming	3	207	69.00
Finance	3	437	145.73
GPS	2	28	14.10
Mobile	2	1,086	543.00
Mobile App Developer	1	15	15.00
Semiconductor	1	125	125.00
Grand Total	78	28,637	367.14

Source: In-house from CrunchBase (2015) for 2006-2014 (top 10).

Table 3

Sovereign wealth funds investments in digital economy (by destination)

Country	Value	Deals	Average Deal Value
USA	13,952	22	634.20
India	5,025	10	502.50
China	4,031	18	223.96
UK	2,696	3	898.67
Canada	1,000	1	1,000.00

Source: In-house from CrunchBase (2015) for 2006-2014 (top 5).

telecom, mobile, software and broadly IT, and e-commerce, e.g. retail, entertainment, transportation, payment services (see Table 2). By value based on deal size deals were concentrated (93%) in 5 countries – US, India, China, UK, and Canada, with nearly half originating in the US (see Table 3). In contrast, by count, Singapore and Brazil enter the top five. Similarly concentrated were deals by investor with Temasek (or its affiliate Vertex) and GIC invested in 69% of the deals by count – 48% by the Temasek group and 21% by GIC. Both country and SWF variables are consistent with patterns we identified earlier.

By period, between 2006 and 2009, we identify 28 investments by SWF with a total deal value of about \$6 billion. Importantly, these deals were primarily (22 by count) in sectors – telecom, software, software, IT, and media – that, we argue, constitute the core of the digital backbone. The financial crisis interrupted these flows as SWF digital investments slowed dramatically between 2008 and 2010. The period beginning especially in 2011 marked a significant shift in sector interest and flows, as well as momentum.

Between 2010 and 2014 we identify some 50 investments by SWFs discretely in the digital ecosystem with a total deal value of over \$22 billion. Deal count expanded dramatically from 3 deals in 2010 and 2011 to nine deals in 2013 then reaching 30 deals in 2014. Similarly, Temasek or Vertex and GIC dominated the investment rankings. Across the 50 transactions, 26 were discretely e-commerce, while others were in closely aligned sectors such as education, finance, payment services, and mobile. Many - not all - of investee firms were Billion Dollar Club members representing quite large scale, later stage private equity deals. Thus, there was a clear indication that sovereign investment was primarily following on the private equity lead.

Among a sampling of notable e-commerce deals undertaken by SWFs since 2010 are included the Qatar Investment Authority’s investments in Flipkart (also invested by GIC) and Uber, the Kuwait Investment Authority’s investment in Madrid-based on-line recruiting firm, Tyba, investments by the China Investment Corporation and Khazanah (and Temasek), in Alibaba, and Mubadala’s investment in music publisher EMI. We note too a 2015 Spotify round¹⁹ in which the Abu Dhabi Investment Council is reported to have participated along with Goldman Sachs and a number of private equity partners. The round is estimated at approximately \$400 million and is anticipation of both Apple’s entry into the market and an eventual Spotify IPO.

¹⁹ See for example “Spotify Could Be Worth \$8.4 billion After Fundraising”, The Telegraph accessed at <http://www.telegraph.co.uk/finance/newsbysector/mediatechnologyandtelecoms/digital-media/11529572/Spotify-to-be-worth-8.4bn-after-fundraising.html>

Sovereigns Investing Digitally: Adapting or Disintermediating the PE Model?

Whether through private equity funds, private equity separate mandates, joint ventures, wholly-owned private equity subsidiaries, and directly as lead or co-investors, the investment structures through which SWF invest digitally are varied and to some extent overlapping. Across the broad expanse of capital committed to the sector, the majority of SWFs invest indirectly and – we might argue – agnostically, i.e. primarily through the investment decisions of their general partners. Even direct investments, including co-investments – particularly those in large, later stage rounds of high profile “startups” – do not demonstrate a commitment to a coherently defined digital strategy. Fidelity Investments and Wellington Management, for example, participate in pre-IPO rounds for different strategic reasons than a sector-focused private equity fund. We observe instead that institutional investors with a thematic commitment to invest in the digital ecosystem generally exhibit three core attributes: an extended risk profile beyond simply that of illiquidity, the professional capacity to analyze and understand cross-sector impacts of disruptive technologies, and a strategic objective to exploit long-term secular growth dynamics, fundamental demographic shifts, and digitally induced disruptive business transformations.

Direct investing via a traditional private equity model is well suited to operationalize such a strategy, including model extensions such as joint ventures (JV) and subsidiaries organized and staffed specifically to undertake early stage investments. A useful example of the JV model is that between the CIC and the NPRF announced in early 2014 establishing the China Ireland Technology Growth Capital Fund (discussed elsewhere in this volume). Complementary too are investment structures that are linked to national development goals centered on the build-out of digital capacity. In this regard we note Khazanah’s expansion to Silicon Valley, which is expected to further align its investment program with Malaysia’s so-called New Economy Model (NEM). As a large shareholder of Telecom Malaysia and with telecom and media assets constituting 25% of its portfolio, Khazanah’s leadership in these sectors can have important implications for the digital evolution of the Malaysian economy.²⁰

As with mainstream private equity, so too with SWFs, the efficacy of one’s strategy and skill is ultimately expressed through performance. High-profile exits have met with mixed results despite the initial success of IPOs such as Alibaba. The challenge, of course,

is that competition for deal access, particularly at the pre-IPO stage, drives up valuations and lowers eventual returns. As Fang et al. find, co-investing strategies, rather than mitigating such risk, may in fact accentuate it. Conversely, strategies that involve direct sourcing in which investors exploit proximity and informational advantages exhibit relatively better performance, especially on a fee-adjusted basis.²¹ However, such a model competes with – and potentially disintermediates – private equity limited partnerships. To illustrate, we return once again to the Singaporean funds.

Whether by volume, deal count, or reputation, both anecdote and evidence suggests that GIC and Temasek had by 2014 established themselves among the largest institutional investors in the global digital economy and consequently the digital leaders among SWFs. In doing so each maintains broad and deep relationships with general partners, which they continue to leverage for their experience and expertise. However, each has diverged, from traditional relationships, to develop competing investment platforms that permit greater flexibility, control, and scale.

The GIC, for example, maintains over 100 active PE relationships, but also holds a similar number of direct investments.²² In 2013, GIC is reported to have adopted changes to its investment model to complement ongoing reorganization and expansion to allow more nimbleness in responding to direct investment opportunities globally. The new model diverges from traditional approaches to strategic asset allocation by using factor exposures to evaluate direct, private investments against low cost tradable alternatives.²³ Complementing this, GIC has tasked its New York unit to lead an “integrated strategies” initiative. The team has benefited from GIC’s geographic expansion as it seeks improved access to information and enhanced deal flow, while itself driving a more hands-on approach to deal management. GIC expansion to Mumbai and Sao Paulo, for example, both resulted in an increase in the number and scale of direct solo rounds – including digital rounds – undertaken by GIC in those geographies.²⁴ This is consistent with GIC’s strategic objective to both source and lead deals independently through its own global network.²⁵

²⁰ See http://kperspectives.khazanah.com.my/Get_To_Know_Us-@-Khazanah_Americas_Incorporated.aspx

²¹ See for example Lily Fang, Victoria Ivashina, and Josh Lerner, “The Disintermediation of Financial Markets: Direct Investing in Private Equity”, September 2014, forthcoming in *Journal of Financial Economics*

²² See 2013-14 GIC Annual Report accessed at http://www.gic.com.sg/images/pdf/GIC_Report_2014.pdf

²³ Such an approach has been implemented by Canada Pension Plan Investment Board, members of whose executive ranks have been linked with GIC. See “Sovereign Singapore Fund Bets Big on Trophy Real Estate”, Bloomberg, 8 December 2014 accessed at <http://www.bloomberg.com/news/articles/2014-12-08/singapore-sovereign-fund-bets-big-on-trophy-real-estate>

²⁴ “Going Direct: GIC Gives Private Equity Firms Run for their Money”, Reuters, 4 Septmebr 2014 accessed at <http://www.reuters.com/article/2014/09/03/gic-privateequity-idUSL3N0QV1JX20140903>

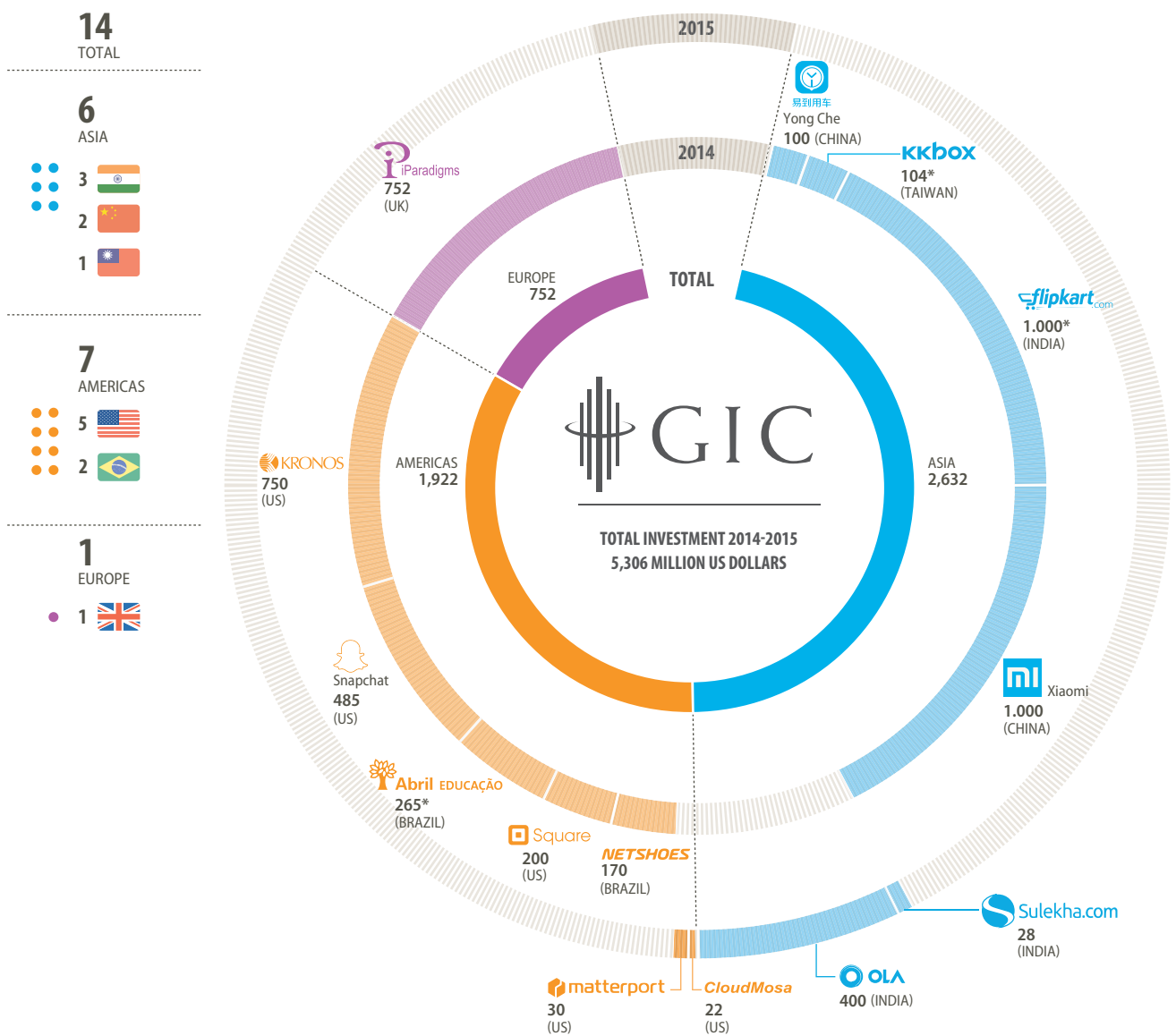
²⁵ See 2013-14 GIC Annual Report

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Infographic 6

GIC: A global investor stays close to its startups

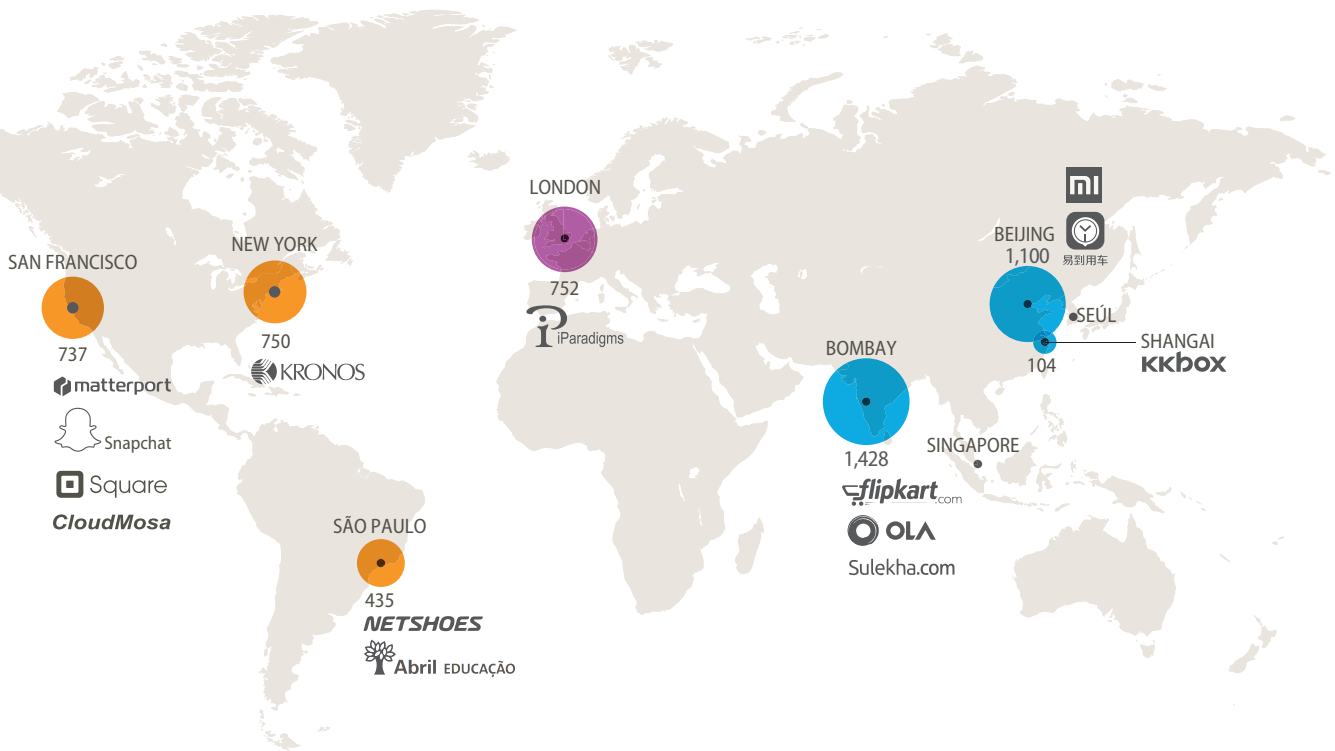
INVESTMENTS IN STARTUPS
(in millions of US dollars)



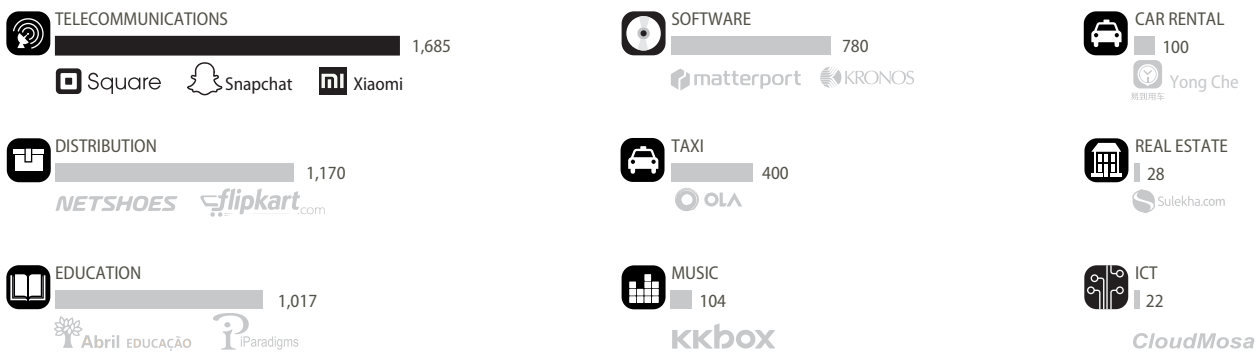
* Investments in which GIC was the sole investor

Source: GIC Annual Reports (2015).

INVESTMENTS BY OFFICE
(in millions of US dollars)



INVESTMENTS BY SECTOR
(in millions of US dollars)



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An example that serves to illustrate is GIC’s solo \$104 million investment in Taiwan streaming music service KKBOX. A direct competitor of Spotify, KKBOX has established its service among Asian listeners particularly in Taiwan, Hong Kong, and in Southeast Asia, including Singapore. The deal was arguably the largest funding of a Taiwanese early stage company in 2014 and is representative of an investment strategy that combines scale with a higher risk tolerance, but likewise requires both an understanding of and commitment to the growth dynamics of digital penetration in the East and Southeast Asia (See Infographic 6 for more details).

For its part, to similar affect Temasek employs a model that is operationalized through two parallel, but integrated programs: A direct investment program and an early stage or small and medium size (SME) enterprise program. The latter is executed through a subsidiary model centered in its Enterprise Development Group (EDG), established in 2013 with an expressed agenda to identify transformational trends and opportunities and fund and develop innovative businesses.²⁶ EDG describes itself as “an enabler across all stages of an enterprise, from early stage to disruptive business models”.²⁷

Temasek’s public representation of its direct investing in digital echoes this disruptive theme²⁸, which it portrays as a horizontal driver that cuts across traditional industries and business models, including for example financial services and transportation, but also energy and industrials. This focus, we believe, derives in part from its legacy as a sovereign development fund and its holdings of key Singaporean assets in technology and telecommunications.²⁹ With the capacity to invest in scale, Temasek’s direct investment experience reflects its preference for relatively large deals, with demonstrated operational performance, which by definition are beyond venture stage and approaching pre-IPO. Accordingly, based on our deals data, in the digital sector Temasek has directly participated in deals or rounds whose average size is approximately \$200 million. An example is Temasek’s lead of the December 2104 \$250 million funding round of Lazada Group, the on-line shopping site targeting Southeast Asia. The investment in Lazada, a Rocket Internet company, rather than its parent, is interesting and perhaps too reflective of Temasek discretely exercising its preference for sector, geography, and presumably relative value.

Owing in part to differences in scale economies between pre-IPO and venture deals, as well as in the capacity and operating skills required in pre-profit stages, global private equity exhibits a high degree of specialization. Temasek’s strategy mirrors this approach. Through EDG, it has created specialized platforms - Vertex Venture, Heliconia, and Clifford Capital - through which it invests in SMEs, including those contributing directly to the digital ecosystem.³⁰

Vertex was initially established under Singapore Technologies in 1988 and absorbed directly by Temasek in 2008 at which time it also injected \$250 million of new capital. Subsequently, Temasek injected an additional US\$325 million in 2013 and US\$165 million in 2014. It is organized as a wholly-owned subsidiary of Temasek and operates two Asia-focused funds, which invest in early to mid-stage technology companies, as well as two additional funds targeted respectively at Singaporean startups and North American opportunities.³¹ Heliconia and Clifford complement Vertex as both invest in SMEs in Singapore, the latter specifically providing project financing.

In contrast to Temasek’s direct digital deals, Vertex participates in considerably smaller rounds generally averaging between \$20 and \$50 million. Vertex’s investment in Malaysia personal transportation startup GrabTaxi serves to illustrate. GrabTaxi is reported to have raised over \$340 million in 2014 in four separate rounds as it expands across Southeast Asia. Vertex is known to have been a participant in at least the earliest of these 2014 rounds. GrabTaxi facilitates hailing taxis by linking waiting passengers with nearby taxis across all providers. In Singapore this includes not only Temasek portfolio company SMRT, Singapore’s public transport operator, but so too its competitors. Could GrabTaxi itself be a metaphor for the disruptiveness of digital’s advance for both for Singapore and Temasek? We will leave this for the reader to ponder as we turn to close.

Informing the Future of SWF Investment in the Digital Economy

Our reflections offer a view of investment in the global digital economy that is embraced by the largest SWFs across sectors, through a variety of investment structures, and at an increasingly brisk pace. At its outset, SWF investment in digital assets scaled through PE partnerships then complemented private equity by following its lead through co-investment. Temasek and GIC most

²⁶ See <http://www.temasekreview.com.sg/en/institution/seeding-future-enterprises.html>

²⁷ With respect to indirect investing, an example in technology and software venture capital specifically is Temasek’s investment in Andreessen Horowitz. See <http://www.temasekreview.com.sg/en/institution/seeding-future-enterprises.html>

²⁸ See for example <http://www.temasek.com.sg/mediacentre/speeches?detailid=22089>

²⁹ This point has previously been well-covered in these pages. See Javier Santiso, “Sovereign Wealth Funds and New Technologies”, Sovereign Wealth Funds 2013, ESADEgeo accessed at <http://www.esadegeo.com/global-economy>

³⁰ Temasek has also established additional entities with investing focus in other industries, including specifically Pavilion Energy.

³¹ See <http://www.temasekreview.com.sg/en/institution/seeding-future-enterprises.html>

prominently have further advanced this investment agenda as each has developed a thematic approach to digital investing and are actively engaged independently in sourcing and leading large digital deals.

As we look forward, drawing on our research into both the drivers of the global digital economy and the various manifestations of investments that further its progress, we have identified several unfolding patterns with potential implication for future SWF investment in the digital economy.

First, the rapidly rising adoption both of smart phones and mobile broadband internet, especially among the demographically dense but resource poor segments of emerging and frontier markets, are creating new consumer classes, and with them, new investment opportunities both to enable infrastructure to reach these consumers and in applications that cater to their needs across various business functions and processes.

Second, the highly scalable nature of digital businesses will hasten their global expansion even further into an emerging and frontier markets, while stimulating indigenous innovative models, technologies, and service delivery platforms. Scale and size drive the flow of investment. We expect that the large and attractive demographics of China and India will continue to draw investments from PE and SWF investors into those digital ecosystems both in the near to medium term. However, the potential for large digital markets to arise out of regional economic blocs such as ASEAN, with favorable socio-economic dynamics and advancing digital maturity (see Chart 1) will drive greater investor interest and flows in the medium term.

Finally, we expect sovereign flows into digital to continue to follow PE's lead. Nonetheless, among SWF's sophisticated lead investors such as Temasek and GIC, through their multi-pronged investment programs, have already seized on new market opportunities particularly in Southeast Asia and Brazil. They remain well poised to exploit the future evolution of digital themes. We anticipate that a more active and direct approach will be emulated by those funds that are able to take advantage of scale economies by building in-house capacity to exploit the disruptive forces that drive returns in the digital economy.