Digital Transformation in the Hedge Fund and Private Equity Industry

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March 2020

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Abstract

The digital transformation is disrupting the financial sector. Venture capital, private equity and hedge funds are also affected. We see more and more firms implement emerging technologies in their investment process. There are several common trends. Big Data analytics and the use of artificial intelligence in the initial stages of the investment process significantly reduce the information asymmetries and even offer more accurate predictions of the probability of success than human analysts. At the same time, emerging technologies help democratize investment decisions. Consider the ability of emerging technologies to close the expertise gap and create a level playing field for all types of investors. Moreover, technology has the potential to make the hedge fund, private equity, and venture capital industries accessible to retail investors. Crypto markets emerged only recently, but their instantaneous success highlights the demand for alternative investment assets and opportunities across different investor groups.

Keywords: artificial intelligence, big data, blockchain, crypto, hedge funds, investors, limited partnership, private equity, smart contracts, venture capital

JEL Classifications: D22, G20, G24, G30, G41, K22, L26, O16

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1 Introduction

Hedge funds and private equity play a crucial role in the financial services industry and corporate governance in both Europe and the U.S. Hedge funds, having first emerged in the 1950s as single fund investments, now number more than 6,000 fund managers globally holding more than $3 trillion in assets.[1] They are typically structured by a team of skilled professional advisers, experts in company analysis and portfolio management, offering investors a range of investment opportunities. Fund managers employ multiple strategies and use various trading instruments such as debt, equity, options, futures and foreign currencies. In recent years, hedge fund advisers have also engaged in high-risk investment strategies, including restructurings, credit derivatives, and currency trading, in order to obtain superior returns for their funds. However, a review of recent trends reveals some divergence in results by strategy.[2] Even though hedge funds take a variety of forms, they are all characterized by a number of common features such as the pursuit of absolute returns and the use of leverage to improve the return on investment.

In contrast, private equity fund advisers invest primarily in unregistered securities, holding long-term positions in non-listed companies. Likewise, they employ a wide

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[1] Preqin, 'Preqin Global Hedge Fund Report 2019' (Preqin, 2019) <https://docs.preqin.com/samples/2019-Preqin-Global-Hedge-Fund-Report-Sample-Pages.pdf> accessed 1 November 2019.

[2] "In the first half of the year, investors continued to pull assets out of Equity Long / Short strategies, while Merger Arbitrage strategies once again received inflows. Multi-Strategy had a reversal from 2018 and saw inflows, while Equity Market Neutral/Quant strategies experienced their first outflows since 2012." ibid.

range of investment strategies[3] with varying levels of liquidity. Not only do private equity funds advance capital to new and developing companies, but they also channel investment capital for management buyouts, corporate restructurings and leveraged buyouts.

The existing literature on hedge fund and private equity recognizes that the two asset classes differ in terms of investments, strategies, and fundamental terms. Similarly, the underlying structural differences have clear implications for the type of investor attracted to the different investment styles. In the past, the investment decision could be made in terms of a simple set of trade-offs. However, the increased competition in the hedge fund industry is the main factor driving the type of funds to operate and compete in the same investment markets. Naturally, it will be difficult to predict ex ante whether convergence between these two sectors will be sufficiently productive to promote efficiencies, spur innovation and foster the best institutional practices. Nevertheless, convergence can be demonstrated in terms of a number of considerations, including the contractual structure of hedge funds and private equity vehicles. For instance, both private equity funds and hedge funds are typically organised as limited partnerships.[4] However, the contractual provisions differ in a number of significant ways that are powerful enough to suggest that there is no real trend toward convergence.

In this chapter, we consider the differences by describing the terms and conditions which address fund formation and operation, fees and expenses, profit sharing and distributions, as well as corporate governance. The contractual features that

[3] This means finding the right strategic path in the pursuit of value creation. The following are seven helpful private equity principles , "[1] It's all about value – Keep a singular focus on value creation [2] Cash is king – Scrutinize spending and manage working capital tightly [3] Time is money – make decisions to improve the business with a sense of urgency [4] Use a long-term lens – invest in a few capabilities to maximize long-term value [5] Have the right team in place – replace ineffective leaders quickly [6] Get skin in the game – Ensure that management shares in the upside and the downside, and [7] Select stretch goals – Set aggressive targets for a few vital measures." Venay Couto, Ashok Divakaran, Harry Hawkes and Deniz Caglar, 'What Private Equity has to Teach Public Companies' (PwC, 2011) <https://www.strategyand.pwc.com/gx/en/reports/value-creation-tutorial.pdf> accessed 1 November 2019.

[4] Ann Kristin Achleitner and Christoph Kaserer, 'Private Equity and Hedge Funds: A Primer 9-10' (Center for Entrepreneurial and Fin Studies, Working Paper No 2005-03, 2005) <http://ssm.com/abstract=> accessed 1 November 2019.

differentiate private equity from hedge funds show that parties are perfectly capable of structuring their particular ownership and investment instruments and the exact nature of the accountability of the fund managers without being bound to regulatory requirements. The fact that private equity funds are engaged in a public relations offensive to overcome political resistance, thereby attributing an important role to industry groups, suggests that they have ample incentives to contract into effective information duties, stringent distribution procedures and investor protections.

No matter how appealing the prospects of convergence, the move toward convergence is not without significant concerns. First, can both types of funds combine different investment styles without making it more difficult for investors to obtain the same level of investment returns? Second, the transition toward financial convergence of hedge funds and private equity can be blocked if hedge fund investors object to the valuations of illiquid securities based on subjective, and not actual, market trading. Third, the creation of 'side pockets' in a hedge fund to account for an illiquid security cannot be isolated from the costs of accounting for the two streams of capital.

These criticisms suggest that convergence is not a natural or desirable outcome. However, in the medium to long term, many industry observers expect some form of hybrid structure to become the industry norm.

This Chapter is organised as follows. Section 2 examines the traditional structure and investment strategies of hedge funds and private equity and highlights the respective benefits and costs of the two types of funds. Section 3 reviews the activities of hedge funds, concentrating on the increasingly important role they play in corporate governance and corporate control. We then consider the variety of investments made by private equity partnerships. Section 4 compares the contractual structure of private equity and hedge funds, describing the terms and conditions of fund formation and operation, and the contractual features that distinguish the two types of funds. Section 5 discusses the future of hedge funds and private equity funds in light of the digital transformation. Section 6 concludes.

2 Hedge Funds Versus Private Equity

In this section, we begin by reviewing the differences between private equity and hedge funds. We then discuss to the extent to which the two fund types are converging. We augment this discussion with an analysis of the benefits and costs of private equity and hedge fund style investments. We conclude this section by discussing whether additional regulation is likely to meaningfully improve investor protection in relation to the industries' reliance on contractual mechanisms and best practice norms.

Note that private equity can be distinguished from hedge funds in terms of their investment strategies, lock-up periods, and the liquidity of their portfolios (see Table 1). Moreover, given their indefinite life, private equity fund managers have incentives to take large illiquid positions in the non-listed securities of private companies. Investments made by private equity funds take place during the first three to five years of the fund, which is followed by a holding period which averages between five to seven years in which few new investments are made. Unlike private equity, the shorter lock-in period of hedge funds and their more flexible structure explains the dominance of highly liquid, short-term investments which allows investors easier access to the withdrawal of their investment funds.[5] Despite these differences, it is becoming more obvious that private equity and hedge funds are converging in a number of important ways.

Table 1: Hedge Funds v. Private Equity Funds

	Traditional Hedge Fund	**Traditional Private Equity**
Investment strategies	▪ Investment in liquid securities that can be marked-to-market easily ▪ Pursue alpha generating strategies (risk arbitrage)	▪ Investment in illiquid equity stakes, for example stakes in private companies ▪ Add value for the fund through screening
Fund structure	▪ Typically, an LP	▪ Typically, an LP
Management Vehicle	▪ LLC or Corporation	▪ LLC or Corporation

[5] Robert T. Slee, *Private Capital Markets: Valuation, Capitalization, and Transfer of Private Business Interests*, (2nd edn, Wiley, 2011) 393.

Other fund terms	▪ Upfront investment (100% at subscription date) ▪ No lock-up periods; investors can access or exit the fund periodically ▪ Perpetual ▪ Management fees are typically 1% of NAV of the fund and paid quarterly ▪ Incentive fee: 20%, paid periodically, no clawbacks	▪ Commitment upfront plus drawings over time ▪ Investors typically do not have withdrawal rights and are locked-up for multiple years ▪ Term ▪ Management fee is typically 2% of committed capital and paid quarterly ▪ Incentive fee: 20%, paid upon realization of profits, subject to clawbacks

At first glance, one noticeable incidence of convergence is the growth of hedge funds and private equity managers pursuing similar assets and investment strategies to secure superior market returns.[6] When hedge fund advisers are dissatisfied with traditional strategies and unable to obtain their rates of return, they have moved quickly to adopt those strategies usually employed by private equity funds, such as corporate restructuring and buyouts, to achieve better value on their investments. This is partly due to the overcrowding of the hedge fund marketplace. This has led to clashes with traditional private equity funds in the past. A noteworthy example is the bidding war between one of the largest private equity firms, Kohlberg Kravis Roberts & Co, and hedge fund Cerberus Capital Management for the acquisition of Toys 'R Us.[7]

Thus, the recent emergence of hedge funds competing with private equity firms for target companies to take private is further confirmation that funds are harder to distinguish. There are a number of factors that account for this trend. First, the increased number of funds and new capital flowing into private-equity and hedge-funds makes it harder for advisers to produce premium returns. Second, debt continues to be relatively abundant worldwide and at relatively attractive rates. Third, hedge funds and buyout

[6] Mike Lo Parrino, 'At the Tipping Point: Disruption and the Pace of Change in the Alternative Asset Management Industry' EY 12th Annual Global Alternative Fund and Investor Survey (2018) <https://www.ey.com/Publication/vwLUAssets/ey-2018-global-alternative-fund-survey/$FILE/ey-2018-global-alternative-fund-survey.pdf> accessed 1 November 2019.

[7] Joseph Pereira and Dennis K. Bermans, 'KKR Group to Buy All of Toys 'R' Us' (The Wall Street Journal, 17 March 2005) <https://www.wsj.com/articles/SB111103595420582128> accessed 1 November 2019.

funds are increasingly seeking the same cost savings and synergies that strategic buyers have always achieved to justify their higher multiples. Effectively, these trends have blurred the differences between the two fund types.

A good example of this blurring and a sign of convergence occurred in the 2014 bidding war between Elliot Management and Thoma Bravo for the networking equipment maker Riverbed Technology. The loss to the private equity consortium spearheaded by Thoma Bravo was the decisive blow in the strategic shift at Elliot to develop their own private equity strategy.[8] Four years later in 2018, Elliot began to reap the benefits in its shift in strategy, starting with the $1.6 billion purchase of software company Gigamon in late 2017, followed by its $5.7 billion[9] deal in November 2018 for Athenahealth, alongside Veritas Capital, and subsequently, the $4.4 billion[10] acquisition of Travelport with Siris Capital.

This convergence has caused hedge funds to incorporate private equity type features into their fund structures, reducing investor flexibility through ‘side pockets’ (investments in illiquid stakes, which are accounted for in terms of administrative fees and incentive fees, separately from the fund), ‘gates’ (caps on the amount of annual withdrawals from the fund by investor to manage the liquidity risk) and ‘lock-ups’ (investors cannot withdraw from the fund within a certain period). Of course, one can doubt whether these strategies generate solutions for all of the problems associated with hedge funds and provide investors with diverse investment opportunities. As long as management and performance fees are based on striking a net asset value of the fund, hedge fund investors are willing to pay the fees. However, investors are more likely to challenge performance payments to an adviser that has invested in illiquid securities that may not have an easily ascertainable market value. Private equity funds have

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[8] Lindasy Fortado and Arash Massoudi, ‘Activist Elliott Embraces Private Equity Strategy’ (Financial Times, 3 January 2019) <https://www.ft.com/content/75eadbba-03a7-11e9-99df-6183d3002ee1> accessed 1 November 2019.

[9] Eric Platt, Mark Vandevelde and James Fontanella-Khan, ‘Elliott and Veritas Team up to Buy Athenahealth for $5.7bn’ (Financial Times, 12 November 2018) <https://www.ft.com/content/9090ef78-e619-11e8-8a85-04b8afea6ea3> accessed 1 November 2019.

[10] Arash Massoudi and Josh Spero, ‘Activist Investor Elliot to Buy Travelport in $4.4 billion deal’ (Financial Times, 10 December 2019) <https://www.ft.com/content/3ed98fb6-fc79-11e8-ac00-57a2a826423e> accessed 1 November 2019.

addressed this concern through distributions based solely on realized events or the use of clawback provisions that mandate funds to return performance fees if the fund subsequently finds itself in a loss position. However, these strategies to manage valuation risk have been resisted, so far, by the hedge fund industry.[11]

Hedge funds, like private equity funds, provide markets and investors with substantial benefits. Since these funds tend to be engaged in extensive market research before taking significant trading positions, they enhance liquidity and contribute to market efficiency. Yet, regulators are concerned about the lack of understanding and regulatory mechanisms to protect possible downsides of hedge funds investing strategies. Hedge funds are also shrouded in obscurity, at least from the perspective of their investors.[12] The fact that hedge funds pursue aggressive short selling techniques in order to make profit on overvalued stock just adds to the negative reputation of these funds. When they sell short, they sell borrowed shares under the expectation that they will be able to buy the shares back in the market at a lower price. Obviously, this phenomenon gives hedge funds an incentive to actively drive down the stock price by voting the borrowed shares in value-reducing ways.

This so-called 'empty voting' strategy of decoupling voting rights from economic ownership has recently added a new dimension to the corporate governance discussion.[13] Questions arise about the role of hedge funds in relation to management and other shareholders and creditors. Unlike earlier periods, the new activist investors are more directly engaged in investment fund management. These funds not only endeavour to deliver superior returns by diligent research and insightful analysis, but

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[11] Clawback a Global Guide (Freshfields Bruckhaus Deringer, 2017) <https://communications.freshfields.com/files/uploads/documents/marcus%20s/Clawback.pdf> accessed 11 November 2019.

[12] There is evidence of arbitrage opportunities as seen in bank's decisions on foreign expansion as a result of "regulatory gaps in activity restriction, capital regulation, supervisory independence and strength, external audit, disclosure transparency, and loan classification." Joel F. Houston, Chen Lin & Yue Ma, 'Regulatory Arbitrage and International Bank Flows' 67 *Journal of Finance* 1845, 1846-7 (2012).

[13] Henry T. C. Hu, and Bernard S. Black, 'Hedge Funds, Insiders, and the Decoupling of Economic and Voting Ownership: Empty Voting and Hidden (Morphable) Ownership' 13 *Journal of Corporate Finance* 343-367 (2007); European Corporate Governance Institute - Law Working Paper No. 56/2006 <https://ssrn.com/abstract=874098> accessed 1 November 2019.

also by actively reshaping a portfolio firm's business policy and strategy. Many argue that the investment style of these funds fits into the current corporate governance movement of shareholder activism.[14] Proponents urge regulators to adopt a 'hands-off' approach, pointing to the overall increase in share price and performance of firms associated with hedge funds. Others are of the opinion that it would be overly costly if activist shareholders were too much involved in the daily management of the firm, in particular, if they hold more votes than economic ownership.[15] They point to the fact that funds' activism is mainly directed toward short-term payoffs and argue that the transfer of effective control to a team of specialists (i.e., the board of management) will add to efficiency and long-term wealth creation. Complaints by managers and shareholder groups encourage policymakers to consider increasing regulation and supervision over collective investment pools and their actions.

A new empirical literature, however, is emerging in the US that shows hedge funds being long-term investors in some industries, like their peers in private equity, waiting long periods to cash-in on their investment.[16] Indeed, this mixed picture about the costs and benefits of private equity, on the one hand, and hedge funds, on the other, suggests that questions remain about whether more detailed regulation and supervision of funds is necessary.[17] Given the contractual mechanisms that prevail in the governance of both private equity and hedge funds, an initial hands-off approach might be warranted.

Moreover, private equity and hedge funds are evolving into more transparent investment vehicles. Firstly, institutional investors, demanding better risk management,

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[14] Stephen Taub, ' SEC to Address Empty Voting' (Institutional Investor 27 July 2010) <https://www.institutionalinvestor.com/article/b150qg2zl5904b/sec-to-address-empty-voting> accessed 11 November 2019.

[15] Bill George and Jay W. Lorsch, 'How to Outsmart Activist Investors' (May 2014) Harvard Business Review <https://hbr.org/2014/05/how-to-outsmart-activist-investors> accessed 11 November 2019.

[16] Lindsay Fortado and Arash Massoudi, 'Activist Elliott Embraces Private Equity Strategy' (Financial Times, 3 January 2019) <https://www.ft.com/content/75eadbba-03a7-11e9-99df-6183d3002ee1> accessed 1 November 2019.

[17] Colleen Honigsberg, 'Hedge Fund Regulation and Fund Governance: Evidence on the Effects of Mandatory Disclosure Rules' 57 *Journal of Accounting Research* 845 (2019). <https://ssrn.com/abstract=3463936> accessed 1 November 2019.

[17] supra note 18.

have encouraged equity funds to adopt better valuation techniques and controls. Secondly, buy-out groups attempt to improve their reputation and image by joining respectable industry bodies, like the British Venture Capital Association[18], or initiating the establishment of such a group in their respective countries, such as the Private Equity Council in the U.S. The purpose of these groups is to conduct research and, more importantly, provide information about the industry to policymakers, investors and other interested parties. Lastly, in search for more stable capital, private equity funds and recently also hedge funds increasingly raise or are planning to raise money by listing funds on private markets[19] as investment opportunities diminish in public markets.[20] By floating shares or units of a fund, advisors voluntarily subject themselves to regulatory supervision. The contractual nature of private equity and hedge funds in combination with the trend towards self-regulation by industry groups suggests that sophisticated players in private equity are capable of disciplining opportunistic behaviour by fund managers and advisors. In order to enhance capital market efficiency and transparency, policymakers and governmental supervisors should work closely together with private industry bodies. Such an approach ensures that possible rules and regulations are in line with best practices and standards applied in the world of both private equity and hedge funds.

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[18] James Taylor, 'US Buyout Groups Join BVCA' (Private Equity International, 22 February 2007) < https://www.privateequityinternational.com/us-buyout-groups-join-bvca/> accessed 1 November 2019.

[19] Steve Taub, 'Hedge Fund Firms Ramp Up Private Investing' (Institutional Investor, 26 April 2019) <https://www.institutionalinvestor.com/article/b1f4r997t0wgtr/Hedge-Fund-Firms-Ramp-Up-Private-Investing> accessed 1 November 2019.

[20] Kate Rooney, 'Investors, 'Starved for Returns' Flood Private Markets in Search of High-Growth Opportunities' (CNBC, 12 August 2019) <https://www.cnbc.com/2019/08/12/investors-starved-for-returns-flood-private-markets.html> accessed 3 November 2019.

3 Hedge Funds and Private Equity Activities

3.1 Hedge Funds

A number of hedge funds have adopted an investment strategy to accumulate large positions in publicly listed companies, using their new ownership positions to engage in the monitoring of management. This group of activist funds diverge from traditional value investors by challenging reluctant management teams that resist their advice. Activist managers make direct interventions in corporate governance by criticizing business plans and governance practices of their target companies. Typically, they confront management teams by demanding action, whether by force or persuasion, to enhance their goal of maximising shareholder value. As a consequence, fund managers are often locked into long-term battles with a target firm's management. Depending on their response, fund managers may increase their stake in the target firm or recruit allies in order to achieve their governance goals. Once committed to a course of action, the funds form a powerful incentive for managers to increase firm value. If a target company, for example, is mismanaged or underperforming, these funds can use their capital in a focused and leveraged way so as to initiate new, different, and potentially more effective business strategies. Hedge fund activism has recently led to a large number of mergers and corporate restructurings, dividend recapitalizations, and the replacement of incumbent management and board members.

This can be illustrated by case in the U.S. where the investment management firm, Elliot Management Corporation, one of the largest activist funds in the world, announced that it had taken a $3.2 billion stake in the telecom giant AT&T. Surprisingly, this significant stake is slightly over 1% and would not give Elliott any operational control over AT&T. In fact, the three largest owners of AT&T are the mutual fund firms Vanguard, BlackRock and State Street which hold a collective 16% of AT&T's outstanding shares, making Elliott the sixth-largest institutional owner. However, Elliott is the only one known for activist tactics. The corporation which is run by billionaire investor Paul Singer is best known for a more than a decade-long campaign against Argentina, which resulted in a $4.653 billion agreement over a sovereign debt default dispute. The fourteen-year legal saga included the seizure of one of Argentina's naval ships that was docked in a port in Ghana, as the government tried to hold off settling with the creditors.[21]

Elliott, was founded in 1977 by Singer and invests across strategies, including public equity, commodities, real estate, direct lending and distressed debt. It currently manages two multi-strategy investment funds with approximately $38 billion of assets under management. It is one of the oldest funds of its kind under continuous management. According to data from Lazard, Elliott accounted for 9% of all activist campaigns launched in 2018, investing approximately $4.3 billion in twenty-two new campaigns with targets in the U.S., UK, Portugal, France, Italy, Israel, South Korea, Japan and Germany.[22] Since hedge funds typically have quarterly or monthly liquidity they do not engage in private equity because, having assets tied up in a buyout could be problematic in the event investors request redemptions. In order to make it through the lifecycle of a buyout, private equity funds will generally have longer lock-up periods of at least 10 years. However, Elliott's lockups are shorter than typical private equity. Currently managing about $35 billion it maintains a portion of its assets in illiquid strategies such as real estate, distressed debt or private equity.[23]

On September 9, 2019, Elliot sent a letter[24] to the board of directors of AT&T calling into question its share-price underperformance, M&A strategy and operational

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[21] Daniel Bases, Hugh Bronstein and Richard Lough, 'Argentina, Creditors Settle 14 Years After Default for $4 Billion' (Reuters, 29 February 2016) <https://www.reuters.com/article/uk-argentina-debt/argentina-creditors-settle-14-years-after-default-for-4-6-billion-idUKKCN0W22N7> accessed 1 November 2019.

[22] Lazard's Shareholder Advisory Group, '2018 Review of Shareholder Activism' (January 2019) <https://www.lazard.com/media/450805/lazards-2018-review-of-shareholder-activism.pdf> accessed 1 November 2019.

[23] Lindsay Fortado and Arash Massoudi, 'Activist Elliott Embraces Private Equity Strategy' (Financial Times, 3 January 2019) <https://www.ft.com/content/75eadbba-03a7-11e9-99df-6183d3002ee1> accessed 1 November 2019.

[24] The letter mentions five key points: "[1] AT&T's returns have been disappointing to shareholders for a long time. [2] AT&T's merger integration and operational setbacks are responsible for the underperformance. [3] AT&T has 'world-class' assets trading at a historic discount. [4] AT&T can 'unlock significant value' by improving management and operational performance. [5] These steps will create giant gains for shareholders." 'Elliott Management Send Letter to Board of Directors of AT&T' (Business Wire, 9 September 2019)

performance which has been on the decline. The four-part 'Activating AT&T Plan'[25] seeks to improve its business to at least $60 per share by the end of 2021 (which would represent a 65%+ upside on its share price on September 9, 2019) through increased strategic focus, improved operational efficiency, disciplined capital allocation and enhanced oversight. The letter highlights the consistent underperformance for AT&T's Total Shareholder Return ('TSR,' stock price plus dividends) over the past ten years. As a result of its lackluster performance it fell below the S&P 500's TSR by well over 100 percentage points, and in 2015 it was dropped from the Dow Jones Industrial Average – an index which included AT&T and its predecessors since 1939. This came as a huge blow for its shareholders and the millions of both current and former employees who received shares in AT&T as part of their remuneration or pension.

The activist hedge fund points to AT&T's M&A strategy that saw a series of three deals over the last decade totaling nearly $200 billion and blamed it for contributing to its share price and operational underperformance. Recently, large companies have chosen not to build conglomerates yet, this is exactly what AT&T did by pushing into several new markets. It began in March 2011 when they attempted and failed in their $39 billion bid to take over T-Mobile USA from Deutsche Telekom. The plan backfired after being reviewed by The Federal Communications Commission (FCC) and the US Antitrust Division of the Department of Justice (DoJ). At the time T-Mobile was a struggling fourth-place competitor behind AT&T, Verizon and Sprint. However, the situation improved for T-Mobile when AT&T had to pay the largest break-up fee of all time to Deutsche Telekom in the amount of $4 billion in settlement fees for the non-completion of the merger. This meant that $3 billion in cash and $1 billion worth in spectrum and network sharing agreements was paid to the number-four US wireless carrier. T-Mobile would go on to flourish (at the time of writing, the T-Mobile-Sprint

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<https://www.businesswire.com/news/home/20190909005482/en/Elliott-Management-Sends-Letter-Board-Directors-ATT> accessed 1 November 2019.

[25] ibid.

merger was approved by FCC in a 3-2 vote)[26] and introduced a number of disruptive initiatives in the wireless industry.[27]

The next large deal was in 2014 when AT&T announced its $67 billion acquisition of DirecTV. The deal made AT&T-DirecTV the second largest provider of television subscribers behind Comcast-Time Warner Cable. The effort to break into this market was too little too late as it occurred at a time when millions of satellite subscribers left the service after the closing of the deal in 2015.

The third and most significant merger was in 2016 with AT&T's $109 billion acquisition of Time Warner. The merger helped AT&T to diversify its business beyond wireless phone and internet services. However, there are questions about the rationale behind this 'vertical merger' which places two different kinds of business under the same roof.[28] AT&T's acquisition of Time Warner is one of the largest deals of its kind to date. The company will now be responsible for approximately $180 billion in debt, which represents a 12% increase from AT&T's prior obligations.[29]

Jesse Cohn, Elliott's portfolio manager called AT&T CEO Stephenson the night before the letter was due to be made public to alert the company. About six weeks after the letter was sent, AT&T reached a 'truce' to end hostilities with activist investor Elliott Management. The deal is structured around a 'three-year action plan' which will see it sell upwards of $5-$10 billions of assets and reorganise its board. On October 28, 2019, Elliott released a statement supporting the multi-faceted approach to creating shareholder value. The plans included, [1] significantly enhanced operational efficiency with meaningful margin expansion; [2] full review of the portfolio and no more major

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[26] Sarah Krouse, 'T-Mobile-Sprint Merger Approved by FCC in a 3-2 Vote' (The Wall Street Journal, 5 November 2019) < https://www.wsj.com/articles/fcc-approves-t-mobile-sprint-merger-in-a-3-2-split-vote-11572981020> accessed 5 November 2019.

[27] David Goldman, 'AT&T Kills $39 Billion Bid for T-Mobile' (CNN Money, 19 December 2011) <https://money.cnn.com/2011/12/19/technology/att_tmobile_dead/index.htm> accessed 5 November 2019.

[28] Brian Stelter, 'AT&T Acquires Time Warner in Media Mega-Deal' (CNN Business, 23 October 2016) < https://money.cnn.com/2016/10/22/media/att-time-warner/> accessed 3 November 2019.

[29]Thomas Franck, 'AT&T Shares Rally After Activist Elliott Management Takes $3.2 Billion Stake, Sees Stock Worth $60' (CNBC 9 September 2019) < https://www.cnbc.com/2019/09/09/att-shares-jump-after-activist-elliot-management-takes-stake-sees-shares-nearly-doubling.html> accessed 3 November 2019.

acquisitions; [3] optimized and shareholder-friendly capital allocation; [4] the addition of two new directors; [5] clarification of leadership best practices including, that upon CEO transition there will be separation of Chairman and CEO roles and an evaluation of all potential CEO candidates; and [6] a commitment to achieve a 2022 EPS of $4.50 - $4.80 per share.[30] Elliott's $3.2 billion stake in AT&T has become one of the industry's most ambitious campaigns due AT&T's market capitalization of $270 billion, but also due to the demands for change found in a letter to the board of AT&T.

3.2 Private Equity

In 2018, the global private equity (PE) industry continued to make deals, find exits and raise capital at record breaking pace. According to a recent Preqin Global Hedge Fund Report, the industry reached a record level of assets under management at $3.62 trillion in Q3 2018 before falling to $3.53 trillion as of November 2018.[31] After what looked like a turbulent 2018, which saw hedge fund assets under management take a dive for the first time in the last ten years, the industry seems to have recovered from the declines in Q4 2018.[32]

Private equity is often associated with starting and developing companies that are unable to attract debt financing to support and finance their high-growth and (often) technology-driven businesses. For instance, in the case of not yet revealed or unproven technologies, the lack of liquid assets and the central importance of human capital make bank finance unsuitable for such companies. Because future revenue streams are highly indefinable, access to debt financing through, for instance, asset backed securitization transactions remains a major obstacle for such firms. When debt finance is unavailable, entrepreneurs have the option of starting up and financing a new business with equity

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[30] Stephen Spruiell, 'Elliott Management Supportive of AT&T Announcement: AT&T Announces Portfolio Review, Operational Improvements, Enhanced Capital Allocation, Board Additions and Best Practices Leadership' (Elliott Management Media Contact, 28 October 2019) <https://activatingatt.com/wp-content/uploads/2019/10/Press-Release_Elliott-Management-Supportive-of-ATT-Announcement_10282019.pdf> accessed 3 November 2019.

[31] supra note 1.

[32] Barclay's Insights Solutions Team, 'Don't Call it a Comeback: 2019 Global Hedge Fund Industry Outlook' (Barclays, 11 October 2019) <https://www.investmentbank.barclays.com/our-insights/2019-global-hedge-fund-midyear-outlook.html> accessed 1 November 2019.

or not attempting to start one at all. Many start-ups must, therefore, rely on some source of private equity investment for developing and scaling their business.

Private equity, which is defined as the investment of equity in non-listed companies, can take many forms, such as bootstrapping,[33] angel investing,[34] venture capital, management and leveraged buyouts. In the main, there are two types of private equity funds. First of all, venture capital funds have become the main funding source for high-growth start-up businesses.[35] These funds come in three variations in the U.S.: small business investment companies (SBICs),[36] traditional venture capital funds, and corporate venture capital funds.

During the 1990s, the venture capital industry grew in the U.S. with a record amount of $100 million of capital raised in 2000. However, according to recent data from PitchBook and the National Venture Capital Association, in 2018 the actual amount of money spent on private companies hit a new all-time high of approximately $131 billion across 8,949 deals.[37]

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[33] Dell, founded with the aim to sell IBM-compatible computers directly to customers who were reluctant to pay computer-store prices, is a typical example of a successful bootstrap. Michael Dell started the company with his personal money and savings from friends and relatives. Yet, given the high risk involved in this method of funding, successful bootstraps are rare in the world of venture financing. See, for example, Amar Bhide, 'Bootstrap Finance: The Art of Start-ups' (November – December 1992) *Harvard Business Review* <http://hbr.org/1992/11/bootstrap-finance-the-art-of-start-ups> accessed 3 November 2019.

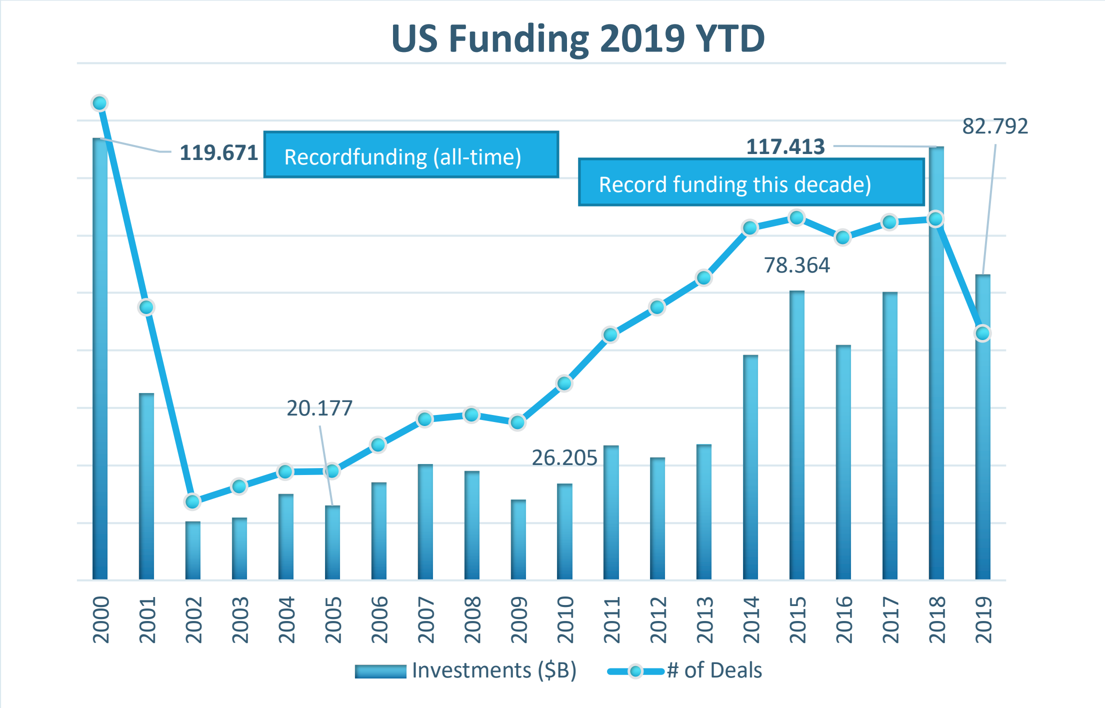
[34] High-tech start-ups can be funded with capital from wealthy, individual investors who usually make equity investments in entrepreneurial companies at the early seed-level stage. Angel investors provide a significant amount of the financing, varying from a few tens of thousands of dollars up to hundreds of thousands of dollars, each year in the U.S.

[35] Bob Zider, 'How Venture Capital Works' (November – December 1998) *Harvard Business Review* <https://hbr.org/1998/11/how-venture-capital-works> accessed 6 November 2019.

[36] Under the Small Business Administration Act of 1958, the Small Business Administration (SBA) is authorized to license SBICs to make equity and loan investments in smaller entrepreneurial firms in the U.S.

[37] Kate Rooney, 'Venture Capital Spending Hits All-time High in 2018, Eclipsing Dotcom Bubble Record' (CNBC, 10 January 2019) <https://www.cnbc.com/2019/01/09/venture-capital-spending-hit-all-time-high-in-2018-eclipsing-the-dot-com-era-record.html> accessed 1 November 2019.

Table 2: US Funding 2019 YTD[38]



With the post-boom decline in the venture capital industry, beginning in 2002, buyout funds emerged as the leading investment style with their level of investment funds increasing rapidly worldwide. In 2006, buyout funds peaked with 'mega funds' capturing the largest amount of net new capital flow.[39] The emergence of the buyout fund,[40] as the dominant investment style in this sub-sector worldwide, is attributed mainly to: 1) favourable credit market conditions; 2) robust debt supply and low interest rates; 3) changes in investor preferences; 4) a proliferation of publicly listed private equity vehicles; and 5) the increased demand by institutional investors for alternative

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[38] According to data collected from PwC and CB Insights, US funding in 2019(YTD) is strong following a record high in 2018. PwC and CB Insights 'US MoneyTree Reporting Q3 2019' (PwC 2019) <https://www.pwc.com/us/en/industries/technology/moneytree.html> accessed 1 November 2019.

[39] According to Dealogic, a firm that tracks acquisitions, the global value of private equity buyouts larger than $1 billion grew from $28 billion in 2000 to $502 billion in 2006. Felix Barber, Michael Goold, 'The Strategic Secret of Private Equity' (Harvard Business Review, 2007) <https://hbr.org/2007/09/the-strategic-secret-of-private-equity> accessed 1 November 2019.

[40] Matt Krantz, 'Private Equity Firms Spin off Cash' (USA Today, 16 March 2006) <http://billparish.com/20060316usatodayprivequity.html> accessed 1 November 2019.

asset classes.[41] To illustrate the resurrection of the large buyout, consider, for example, The Blackstone Group which set a new industry record in 2019 having raised $26 billion for Blackstone Capital Partners VIII.[42]

As larger companies, such as Intel, IBM, Alibaba Group, Facebook, Apple, Microsoft, Google, Softbank and Amazon have expanded the scope of their operations to invest in start-ups, entrepreneurs tend to exploit the opportunity to obtain not only financial, but also technical and managerial, assistance. There may be several reasons why such an alliance between a start-up and a multinational may prove fruitful for the venture. First, the start-up may well offer strategic value and synergies for the multinational's core business. Second, even though a high rate of return is usually not the investor's main objective (thereby giving more stability to the venture), having a well-performing high-growth company in the portfolio may prove to very lucrative. Third, it is generally accepted that these alliances often increase the credibility and reputation of the start-up firm.

But there are also a number of disadvantages associated with the involvement of corporate venture capital funds. In particular the complexity of the transaction and the time-consuming decision-making procedures within large firms make traditional venture capital funds a more accessible source of private equity capital financing for high-tech start-ups. Alliances with corporate investors require the negotiation and drafting of a multitude of ancillary agreements relating to the promoting, selling, licensing and developing of technology and knowledge. More importantly, corporate investors are inclined to carefully reconsider the investment and pull the plug in the event of a major downturn.

That is not to say that starting a business with capital from traditional venture capital pools is an easy task to accomplish. Venture capitalists tend to monitor and protect their investments through active participation, namely by due diligence, establishing a

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[41] Emmanuelle Henry, Stephane Chaouat, Stephan Grauke, James Cousins, 'Private Equity Alert' (European Regulatory Initiatives Affecting Private Equity Sponsors and Hedge Funds, Weil Gotshal, December 2008).

[42] The flagship vehicle overtakes Apollo Global Management's recent buyout fund, which raised $24.6 billion in 2017. PEI Staff, 'Blackstone Collects $26bn for Biggest Ever-Private Equity Fund' (Private Equity International, 17 September 2019) <https://www.privateequityinternational.com/blackstone-collects-26bn-for-biggest-ever-private-equity-fund/> accessed 1 November 2019.

relationship with the start-up businesses' managers and by sitting on their board of directors. As soon as venture capitalists are hooked and involved, entrepreneurs and other key employees should be ready to abdicate control over their company. To be sure, venture capitalists will not typically 'depose' a founder-entrepreneur by acquiring a majority of the corporation's common shares. This is usually counterproductive, as discrepancies between the venture capitalist and the entrepreneur would imply an increase in agency costs.

Allocating a substantial equity stake in the firm to the entrepreneur and other employees, which is akin to the stock option compensation system, fortifies incentives to conduct the business diligently and discourages shirking and opportunism. Instead of seeking a majority of the corporation's equity, venture capitalists usually obtain control by utilising complicated contractual mechanisms in their relationship with the entrepreneurial team and other investors. These contractual mechanisms protect the venture capitalists extensively from adverse selection and moral hazard problems. For instance, the use of staged financing and convertible preferred stock form an optimal combination which gives motivated entrepreneurs an incentive to take significant risks in order to increase firm performance while securing downside protection for venture capitalists.[43]

The success of a venture capital market is mainly attributed to a private ordering regime in which contractual mechanisms are preferably employed to mitigate agency costs and to support the efficient structuring of staged financing and the sustained level of new entrepreneurs with high capacity to achieve their commercial aims.[44] Governmental interference and oversight appears to be counterproductive. This is especially true of the organisation of venture capital funds themselves, which predominantly employ the limited partnership as the preferred vehicle to organise the venture capital fund. Recent research seems to suggest that government initiatives could crowd out the supply of venture capital. Suppose, for instance, that a tax incentive to encourage individual investors to pour money into special venture capital funds turns

[43] Joseph A. McCahery and Erik P. M. Vermeulen, *Corporate Governance of Non-listed Companies* (Oxford University Press, 2008). See Chapter 5.

[44] Ronald J. Gilson, 'Engineering a Venture Capital Market: Lessons from the American Experience' 55 *Stanford Law Review* 1068 (2003).

out, in fact, to reduce the supply of other, relatively more informed venture capital investments by institutional investors.[45]

We have seen how the main agency relationship in portfolio companies can lead to serious conflicts between the active funds and other shareholders and managers. There is a second agency relationship in the private equity market. In this context, fund managers act as agents for external investors, who choose to invest in high potential start-up firms through an intermediary rather than directly. Although this agency conflict is likely to be particularly difficult, there is a high degree of information asymmetry between the fund managers, who play an active role in the portfolio companies, and the passive investors, who are not able to monitor the prospects of each individual investment closely. To be sure, several types of sophisticated contractual governance and incentive provisions have emerged which have proved effective in limiting opportunism and controlling the level of agency risk.

By way of comparison, we look to buy-out funds which invest mainly in mature companies. The legal structure that makes the buyout market so effective also begins with the limited partnership form by which providers of private equity investment convey money (as limited partners) to the managers (the general partners) who are running the business and actively making the investments in portfolio companies. Like venture capital funds, the relationship is governed merely by contractual provisions which allow the fund managers enough time and space to take firms private and restructure them. Note, however, that there are significant differences in the organisational structure of venture capital and buyout funds. For example, buyout funds typically invest in mature companies with fairly predictable cash flows, which causes limited partners to give less leeway to the managers and to demand a minimum rate of return before profits are shared with the managers.

Until 2000, buy-outs accounted for less than 10% of total number of investments. However, in 2006 private equity funds raised $401 billion, which represented approximately 25 percent more than the $311 billion raised in 2005.[46] The statistical evidence shows that this trend seems to have continued for over a decade post-2008 as

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[45] Douglas J. Cumming and Jeffrey G. MacIntosh, ‘Crowding Out Private Equity: Canadian Evidence’ 21 *Journal of Business Venturing* 569 (2006).

[46] Julie Froud and Karel Williams, ‘Private Equity and the Culture of Value Extraction, New Political Economy’ 12 *New Political Economy* 405 (2007).

growth in real assets over the past few years was driven by 'mega funds' in the US and Europe.[47]

*Table 3: US Private Equity Deal Activity (*As of 30 September 2019)[48]*

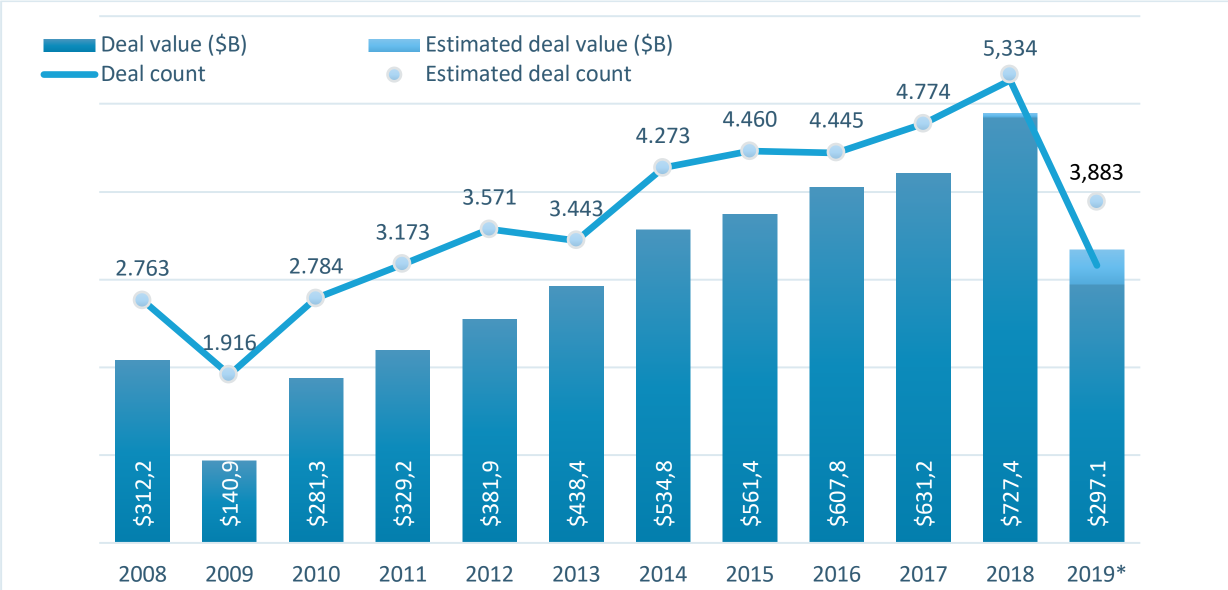
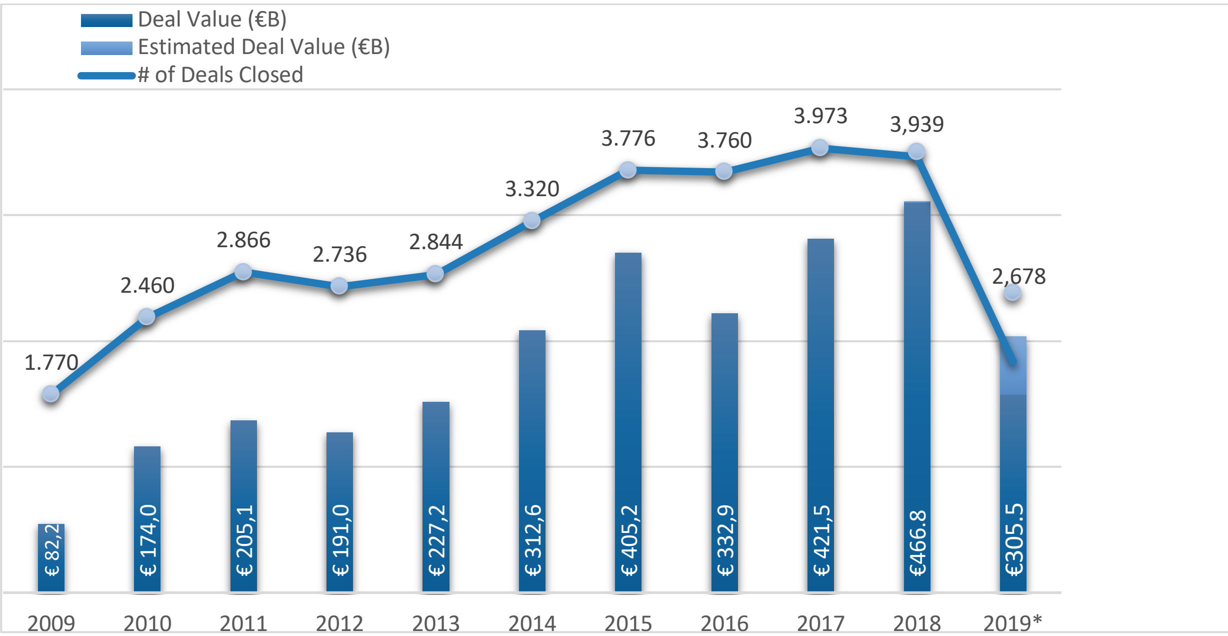


*Table 4: European PE Deal Activity (*As of 30 September)[49]*



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[47] Matt Krantz, 'Private Equity Firms Spin off Cash' (USA Today, 16 March 2006) <http://billparish.com/20060316usatodayprivequity.html> accessed 1 November 2019.

[48] Pitch Book 'US PE Breakdown – 3Q 2019' < https://pitchbook.com/news/reports/3q-2019-us-pe-breakdown> accessed 1 November 2019>

[49] Pitch Book, 'European PE Breakdown – 3Q 2019' < https://pitchbook.com/news/reports/3q-2019-european-pe-breakdown> accessed 1 November 2019.

Through the first three quarters of 2019 U.S. private equity firms raised $191 billion, which is close to how much was raised in all of 2018. Amongst the big names to complete their fundraising in the third quarter were Blackstone Group Inc with a $26 billion buyout fund and Vista Equity Partners Management LLC with a $16 billion fund.[50] According to Pitchbook data, during the same time, U.S. private equity firms also participated in 3,883 deals valued at $501.2 billion. On the other hand, U.S. private equity firms sold fewer companies from their portfolios, with buyout firms exiting 726 companies valued at $220 billion.[51] In 2018, Venture Capital exits reached $120 billion across 864 exits, a 33% increase from 2017, thanks to a rise in IPOs and buyouts.[52] For Europe, the total amount of private equity deals is on track to hit the third highest annual level to date with €51.6 billion raised across 64 funds.[53]

Unfortunately, the European private equity environment continued to slump with only €42.8 billion closed across 221 liquidity events. In 2007, the annual total in Europe was €178 billion, 41% higher than 2005.[54] Remarkably the European market is dominated by US-based buyout firms. Overall, more than half of the funds raised in the private equity sector are invested in MBO/MBIs. A clear pattern emerges from the many empirical studies that describe the LBO booms. It is worth noting that the 1980s LBOs boom was largely a US phenomenon during the 1980s. Conversely, with the current LBO wave, the centre of gravity has shifted from the US to Europe and the UK, fueled by collapse in the collateralized debt obligation markets. This should come as no surprise since the European economy has performed much better than in the 1980s.

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[50] Chibuike Oguh, 'U.S. Private Equity Fundraising Swells as Mega Funds Get Bigger' (Reuters, 10 October 2019) <https://www.reuters.com/article/us-fundraising-privateequity/u-s-private-equity-fundraising-swells-as-mega-funds-get-bigger-idUSKBN1WP1DE> accessed 6 November 2019.

[51] ibid.

[52] Kate Rooney, 'Venture Capital Spending Hits All-time High in 2018, Eclipsing Dotcom Bubble Record' (CNBC, 10 January 2019) <https://www.cnbc.com/2019/01/09/venture-capital-spending-hit-all-time-high-in-2018-eclipsing-the-dot-com-era-record.html> accessed 1 November 2019.

[53] Nizar Tarhuni, Dominick Mondesir, Nalin Patel, Masaun Nelson, 'European PE Breakdown – 3Q 2019' (Pitchbook 16 October 2019) <https://pitchbook.com/news/reports/3q-2019-european-pe-breakdown> accessed on 11 November 2019.

[54] James Mawson, 'Private Equity Levels Double in Europe' *Financial News* (29 January 2007).

What are the causes for the current expansive round in LBOs? The standard explanation for the favourable circumstances to complete deals are the easy credit terms and low interest rates which have prevailed until recently. A second explanation looks to the pressures on fund managers which prompted them to increase the allocation levels for this particular class of assets. A third explanation points to the self-interested behaviour of the managements of public companies which have responded to shareholder pressure to obtain higher prices from private equity bidders. Another key feature of the boom has been the increase in corporate governance pressures. As a result, the cost of directors and officers (D&O) liability insurance has increased substantially in the wake of Sarbanes-Oxley, due to the move of making executives personally liable for the accounting practices of their companies. In addition, we have seen more shareholder scrutiny on executive pay. Given this trend, talented managers usually receive more generous compensation packages when switching to a firm controlled by a private equity company. Finally, many laws, regulations and other measures are probably also responsible for the infrastructure to complete deals. One obvious message is that a favourable infrastructure is seen crucial for the acceleration of the private equity process.

4 The Pooled Investment Vehicle: Hedge Funds and Private Equity

In this section, we turn to examine the typical structures pooled investment vehicles, namely private equity and hedge funds. We focus on the three parties: (1) the general partner; (2) the investment adviser; and (3) the limited partners. We consider the extent to which hedge funds and private equity employ similar legal forms and contractual provisions between the GP and LPs. We note that despite some overlap in fund structure and organisation, private equity and hedge funds typically employ different trading strategies, compensation and governance arrangements, and that these differences are reflected in the main contract between the GP and the investors.[55]

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[55] PwC Asset & Wealth Management, 'Asset & Wealth Management Revolution: Embracing Exponential Change' (PwC, 30 October 2017) <https://www.pwc.com/gx/en/industries/financial-services/asset-management/publications/asset-wealth-management-revolution.html> accessed 1 November 2019.

4.1 The Limited Partnership Structure

A fund of a private equity firm, hedge fund or venture capital firm is a pooled investment. The fund can be seen as a vehicle formed to pool the capital of different investors. Contributors of these funds are institutional investors, pension funds, university endowments and other wealthy individuals. They pool their money with other so that the fund can help to spread the risk of the investment. Professional fund managers invest the capital across a wide range of different holdings. The value of the investments can go up and down depending on the returns of the different investments. Investments of pooled investment vehicle are characterised by high expected returns and high risks. There are a number of reasons to invest in pooled investment vehicles which include: (1) to spread the risks; and (2) and investors have access to markets where the money has the potential for capital growth.

In the U.S. and elsewhere, the limited partnership form is the dominant legal vehicle used in hedge funds and private equity structuring. Both fund types are usually organised as a LP, with a GP and management company, both structured as separate legal entities, and the limited partners.

As we have seen, the popularity of this form is due to its contractual nature which allows the internal and external participants to reduce opportunism and agency costs. Indeed, the limited partnership structure permits fund managers to achieve extensive control over the operation of their funds subject to minimal intrusive legal obligations. Other features, such as tax benefits, the flexibility surrounding its structure and terms, and its fixed life, contribute to its continuing viability as the business form of choice for collective investment vehicles. The LP has other important advantages as well. First, it is familiar to most investors and intermediaries, which accounts for its enduring popularity. Second, there is a risk that LLCs, operating outside the US, could be treated as a non-transparent foreign entity and taxed as a corporate body. As a consequence, some sponsors are reluctant to switch to the LLC.[56] Typically the sponsor will invest between 1% to 3% of the fund's total commitments. In order to obtain fees, the sponsor will create two entities: an LP and a management company, which is organised either

[56] Nevertheless, some sponsors are now beginning to structure their funds as a Delaware LLC since it has the same organizational flexibility and tax efficiency as the LP.

as an LLC or corporation. Moreover, the management company is either controlled by one of the principals or is a subsidiary of a bank or insurance company and, accordingly, will exercise effective control over the GP and fund manager.

The relationship between the limited partners and the general partners mainly relies on explicit contractual measures. For example, a key contractual technique is the compensation arrangement between the fund manager and the investors. Compensation derives from the two main sources. First, fund managers typically receive 20% of the profits generated by each of the funds. The second source of compensation is the management fee. To be sure, investors attempt to ensure fund managers performance by insisting on hurdle rates that climb upwards to 15%-20%, which means that profits can only be distributed after a certain threshold has been reached. Thus, from the perspective of private equity, the contractual flexibility of the limited partnership plays a central role in aligning the interests of management and investors. For instance, in order to protect the 80/20 deal, a clawback provision will be included in the agreement that provides than an overdistribution to a GP will be clawed back to the fund and then distributed to the LPs. What triggers a clawback provision?

In practice, clawbacks can be triggered when the preferred return or hurdle is not reached, and the GP obtained carried interest or if the GP has received more carried interest than the agreed 20% of cumulative net profits. Here, an example can be used to show how the clawback is intended to function. If we assume that a fund has made six investments: A to F with each purchased for $100. Also, assume that five of these investments were sold each year for $200. As a result, the GP receives a carried interest of 20% and the LP receives 80% of the cumulative profits of the investments and of course the contributed capital. But, the 6th project defaults to $0. Thus, the total net profits of the fund are $ 400 - (500 – 100 loss) or 67% for the LP’s. Yet, it was agreed that the GP would receive 20% of the net profits, i.e., $80. But the GP received $100, which triggers the clawback provision.

It is noteworthy that there a number of different approaches for structuring the clawback obligation, including the ‘pay it back now’ approach or the ‘segregated reserves’ approach. Under the first approach, the GP will immediately provide a clawback to the LPs. This method is straightforward and requires a potentially large cash contribution by a group of individual managers who may not have the financial ability to make the required contribution. In contrast, the reserve account approach places costly constraints on mangers by requiring that the cash deposited in the reserve account is invested in a safe, cash-equivalent instrument in order to satisfy the clawback obligation. At the same time, there is also a limited partner clawback which is intended to protect the GP against future claims, should the GP become the subject of a lawsuit. For the most part, the clause will include limitations on the timing or amount of the judgement.

Finally, as it happens, many LP contracts will include a preferred return provision. This is a minimum return rate which usually ranges from 5% to 10%. The idea of a preferred return is that it affects the timing of the carried interest. Such a targeted return must be met before the fund manager can share in the fund profits. Preferred returns are normally required by LP's who make commitments to new funds or funds involved in buy outs. Most priority returns have a catch-up provision, which permits a reallocation of the profits to the GP after the priority return has been distributed to the LPs.

4.2 Restrictive Covenants

In the previous section, we examined how the flexibility of the limited partnership form allows the internal and external participants to enter into contractual arrangements that align the incentives of fund managers with those of outside investors. If well structured, the limited partnership agreement can effectively reduce agency costs. In this section we consider how limited partners are permitted, despite restrictions on their managerial rights, to vote on important issues such as amendments of the partnership agreement, dissolution of the partnership agreement, extension of the fund's life, removal of a general partner, and the valuation of the portfolio. In addition, we examine how limited partners employ several contractual restrictions when structuring the partnership agreement depending on the asymmetry of information and market for investment opportunities.

In recent years, a number of law and finance scholars have studied the role and frequency of covenants in the agreements between institutional investors and professional fund managers. An early study by Gompers and Lerner[57] focuses on restrictive covenants imposed by institutional investors on fund managers in respect of the operation of the fund. They grouped the venture capital fund restrictive covenants

[57] Paul Gompers and Josh Lerner, 'The Use of Covenants: An Empirical Analysis of Venture Partnership Agreements' 39 *The Journal of Law and Economics* 463 (1996).

into three categories: (1) restrictions on management of the fund; (2) restrictions on the activities of the GP; and (3) restrictions on the types of investment.

In terms of the first category of covenant, the first restriction in this class involves limits on the size of investment in any one firm which discourages the GP, the incentives induced by carried interest, from allocating a large portion of fund in a single investment. This is similar to the restrictions on the type of behaviour that would increase the leverage of the fund and thereby amplify the risk for institutional investors. A restriction on co-investment is designed to limit the opportunism of fund managers so as to avoid one fund artificially improving the performance of another.

A second category of covenants are designed to limit the investment activities of the GP. The restriction on co-investment by fund managers is designed to limit the agency problem which might arise from selective attention to certain portfolio firms at the expense of the performance of the entire fund. The covenant is designed to limit the sale of fund interest by fund managers ensures that their commitment to the fund is not compromised.

Furthermore, the key person provisions and restrictions on additional partners is intended to ensure that management does not opportunistically hire new personnel to manage the fund in breach of their commitments made to the LPs. The third category of covenants is related to restrictions on types of investment that GPs can make. These covenants reduce or eliminate the potential for management to opportunistically alter the focus of the fund for their own concerns at the expense of investors. Restrictions include limitations on investments in venture capital, public securities, LBOs, foreign securities and other asset classes.

In the context of determining the frequency of the covenants for such funds, Gompers and Lerner found that the number and type of covenant correspond to the uncertainty, information asymmetry and agency costs in the portfolio company.

They demonstrated, moreover, that there is a positive relationship between the use of restrictions and the propensity of the fund managers to behave opportunistically. There are a number of distinct covenants that address problems relating to the management of the fund, conflict of interests, and restrictions on the type of investment the fund can make. Other factors affecting the use of restrictions are the fund’s size, the compensation system of the managers, and their reputation.

In contrast, hedge funds rely less on covenants due to the shorter lock-up periods and the fund’s liquidity. Finally, the public nature of the activities of hedge funds, particularly in the market for corporate control, tends to limit the principal-agent problems that might otherwise emerge and make covenants an attractive option.

Cumming and Johan have offered a 'quality of law' explanation for the frequency of use of investment covenants imposed by institutional investors pertaining to GP's activities relating to investment decisions, investment powers, types of investment, fund operations and limitations on liability.[58] According to Cumming and Johan, the presence of legal counsel would increase the probability of covenants. They found evidence, moreover, that the quality of the rule of law and other institutional and legal factors is positively correlated with the number of covenants relating to fund operations.

In their view, the better the legal system, as measured in the increase in the Legality Index (a weighted average of the legal index variables introduced by La Porta et al[59] as defined by Berkowitz et al[60] from 20-21(normal improvement rate for developed country) the higher the probability of an additional covenant relating to fund operation by about 1%, but an increase in the Legal Index from 10-11 (normal improvement rate for developing country) increases the probability of the presence of an extra fund operation covenant by about 2%.

The above studies emphasize how important it is to recognize the critical role of management influence in determining the management and structural characteristics of a fund, the agency problems and control issues that emerge in the investment process and the conflicts of interest that occur in times of market upheaval. LPs have high powered incentives which greatly improve their ability to focus on addressing these problems through negotiating and implementing covenants to protect LPs and ensure the GP's incentives serve investors' interests. Further improvements in the training of legal counsel that review covenants is likely to positively influence the frequency of covenants. A more complete solution would require increases in the quality of legal systems more generally, particularly in emerging and civil law jurisdictions. The world

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[58] Sofia Johan and Douglas Cumming, 'Is it the Law or the Lawyers? Investment Covenants Around the World' 12 *European Financial Management* 535 (2006).

[59] Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny, 'Law and Finance' 106 *Journal of Political Economy* 1113 (1998).

[60] Daniel Berkowitz, Katharina Pistor, Jean-Francois Richard, 'The Transplant Effect' 51 *The American Journal of Comparative Law* 163.

is changing, however, and one question that arises is the impact of the on-going digital transformation on the hedge fund and private equity industry.

5 Investing and Emerging Technologies

Emerging technologies have an increasing impact on our daily lives; they are increasingly present in our homes and workplaces. Whether it is an Amazon order executed through our personal assistant Alexa or our social media presence that determines our next career step, networked and digital technologies are a pervasive feature of contemporary life. Artificial intelligence integrated in the apps we use, the emergence of the platform economy that has redefined the way we perceive ownership and our use of assets, and new markets fueled by a crypto economy are all just examples of the shock waves that have affected the world economy as a result of technological developments. In this ever-changing and evolving landscape, every industry has to show resilience and adjust to novelties that have the potential to disrupt the status quo and transform existing ways of operating.

The financial services industry is particularly prone to such disruption for several reasons. Its inherent need to create value, 'beat the market' and realize positive returns for investors creates a strong motivation to adopt technologies that can outperform the industry acumen of skilled financiers. The ready availability of Big Data and the means to analyse this data has significantly increased. Moreover, 'hard core' economic performance metrics, other data points such as social media posts, online presence and other soft information have begun to shape the market more and more.

Increased efficiency and performance are not the only forms of disruption that financial incumbents face today. Novel 'technology-enabled' markets have emerged, creating unique investment assets that require new financial strategies and perception of value. In this section, we will explore how emerging technologies are reshaping different segments of the financial industry, specifically venture capital, private equity and hedge funds, and we will suggest that the digital transformation leaves a different footprint on each of these segments of the financial market.

5.1 Venture Capital and Digital Transformation

Venture capital firms have a close affinity to new technologies, since high tech companies form the core of their investment portfolios. It goes without saying that venture capitalists need to be tech-savvy and make well-informed predictions about their target markets. But do venture capital funds need to undergo a digital transformation as occurred in the rest of the investment industry? The answer to this question is a less straightforward.

The main objective of VCs is to screen and select a number of startup business proposals, choose the companies with greatest potential to become a 'winner' and then monitor and guide them towards an exit that will deliver above-average returns to the fund investors. In comparison with other types of investors, VCs oversee a rather small portfolio of companies and provide them with significant mentoring and strategic advice in order to realize their high-growth capabilities. Especially in advising and monitoring, VC firms rely on a personalised approach of their portfolio managers that leverage their extensive investment and industry experience, which can hardly be supplemented by any type of currently available technology. One might argue, that VC investing is to a large extent a 'people business,' as VC investors make their choices primarily on the perceived quality of the startup team and further utilise their own human capital to advise, strategise and co-create value with the founder(s). So, what role do emerging technologies play in the VC business model and what type of digital transformation may affect their operations?

5.1.1 Big Data-Powered VC Investments

Big Data is our first point of interest. The availability of vast amount of new data points enabled VCs to implement a more data-driven approach, especially in the screening and selection stage of the investment process.[61] By now, it is a VC industry standard to base their selection process on insights from a multitude of market intelligence database's mapping high-growth companies from the sectors of VCs interest. To name a few, Pitchbook, Angelist, CB Insights and others provide VC investors with an enormous amount of worldwide industry data that can serve multiple purposes.

[61] Johannes Weibl and Thomas Hess, 'Finding the Next Unicorn: When Big Data Meets Venture Capital', *Proceedings of the 52nd Hawaii International Conference on System Sciences* (Hawaii International Conference on System Sciences, 2019).

First, Big Data has an impact on deal sourcing. VCs utilise the above-mentioned platforms as extended investment networks and consequently are exposed to a greater number of investable companies that are not constrained by their localised networks or referrals from their immediate and known community. Second, the screening of candidate ventures has become significantly more data driven. Third, tracking of comparable ventures enables them to evaluate the relative competitive advantage of their portfolio or candidate companies. Fourth, VCs can also track the investment activity of other risk capital providers and potentially source co-investors or emulate the proven investment strategies of their direct competitors. Finally, the aggregate data on investment activities can uncover quintessential investment trends that can potentially alter their own investment dynamics.

Several VC firms have been vocal on the use of data analytics in their investment processes. For instance, Connectic ventures created and implemented Wendal, a data analytics platform that collects, analyses, and ranks startups, and supports them in the due diligence process speeding it up to 8 minutes.[62] Through a strong data-driven basis of their investment decisions and expedited due diligence, Connetic ventures claim to make a final investment decision within 10 days.[63] Another VC firm Follow[the]Seed, developed a novel data-powered tool, which identifies technological and business problems experienced by big corporates and subsequently searches for startups with B2B business models that could effectively address the 'pains' of mature companies, including Fortune 500 industry behemoths.[64] This 'reverse-problem-solving' method guarantees that portfolio companies focus on solutions that are demanded by the market. Simultaneously, the big corporates may serve as future customers or acquirers, exponentially increasing the chances of a successful exit transaction. For B2C-oriented startups, Follow[the]Seed implemented the so-called Raving Fans tool that utilises Big

[62] Francesco Corea, 'Data-Driven VCs: Who Is Using AI To Be A Better (And Smarter) Investor' (Forbes, 2019) <https://www.forbes.com/sites/cognitiveworld/2019/05/02/data-driven-vcs-who-is-using-ai-to-be-a-better-and-smarter-investor/#36b526c01d34> accessed 5 November 2019.

[63] 'About Us' <http://connetic.ventures/Home/About> accessed 5 November 2019.

[64] 'RPS - FollowTheSeed' <https://followtheseed.vc/rps/> accessed 6 November 2019.

Data analytics and behavioral science to identify habit-forming products and services already in the early startup stage.[65]

Besides data-analytics, VC firms have also begun to implement more complex data-driven tools such as AI-based investment managers. The pioneer in this respect is Deep Knowledge Ventures that focuses on startups in the highly challenging biotechnology sector.[66] Their data-intensive software Vital (Validating Investment Tool for Advancing Life Sciences) integrates data points from scientific literature, grants, patent applications, clinical trials and even the biographies of individual team members of candidate companies. In such a sector as biotechnology, where the failure rate of startups reaches 96%, Vital enabled DKV to identify patterns and particular indicators of failure that were hidden to the human eye of investment managers.[67]

5.1.2 Democratising VC Investing through Blockchain

In essence, blockchains are decentralised trustless databases maintained by a distributed network of computers called nodes.[68] The technology blends together other existing solutions such as peer-to-peer networks, consensus mechanisms and private-public key cryptography in order to create a novel type of a database that is not centrally governed.[69] Blockchains do not have a 'central point of failure,' since an identical database of transactions is replicated and stored by every node. The Bitcoin blockchain, for example, is currently maintained in real time by more than 9,500 nodes (computers) spread around the world.[70] The decentralised nature of blockchain provides for an unmatched integrity of accounting data and complete transparency of executed

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[65] 'RavingFans - FollowTheSeed' <https://followtheseed.vc/ravingfans/> accessed 6 November 2019.

[66] Nicky Burridge, 'Artificial Intelligence Gets a Seat in the Boardroom' (Nikkei Asian Review, 2019) <https://asia.nikkei.com/Business/Artificial-intelligence-gets-a-seat-in-the-boardroom> accessed 6 November 2019.

[67] ibid.

[68] Primavera De Filippi and Aaron Wright, *Blockchain and The Law: The Rule of Code* (Harvard University Press, 2018), 13-15

[69] ibid.

[70] 'Global Bitcoin Nodes Distribution: Bitnodes' <https://bitnodes.earn.com/> accessed 6 November 2019.

transactions. At first glance, blockchain does not appear to be a very exciting piece of technology but its unique features enable a vast number of applications in environments with high transaction costs, significant information asymmetries and lack of mutual trust. But how could the blockchain possibly transform the traditional venture capital model?

The application of blockchain to the operations of a VC fund is not immediately obvious. Nevertheless, the Blockchain industry quickly recognised the opportunity to democratise and decentralise the investment decision-making of VC funds. In doing so, a blockchain-based VC fund exploits the wisdom of a crowd and empowers its investors in selecting portfolio companies.

In 2016, German company Slock.it created a decentralised investment fund that should have operated as a DAO, decentralised autonomous organisation, where investors have the prerogative to select and decide on investments in portfolio companies. More than 11,000 individuals contributed to the DAOs initial coin offering, raising in total around $150 million worth of cryptocurrencies (at the time).[71] The funders obtained The DAO tokens, which allowed them to vote on major business transactions (similar to shareholder voting rights) but also on minute details related to the allocation of financial resources. The governance of the DAO was not only automated but completely devoid of any human interference and decentralised by design. Eventually, The DAO collapsed due to coding errors and legal controversies[72] but the theoretical model of a decentralised VC fund remained.

More recently, the Open Law platform decided to launch a next generation of DAOs that are legally fully complaint. The LAOs (Limited Liability Automated Organizations), as they are now named, operate as limited liability companies

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[71] Michèle Finck, *Blockchain Regulation and Governance in Europe* (Cambridge University Press, 2018).

[72] SEC qualified The DAO initial coin offering as an offering of unregistered securities, but since the funds were already returned to investor no further enforcement action against The DAO initiators was taken. Us Securities and Exchange Commission, 'Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO' (2017) <http://www.virtualschool.edu/mon/Economics/SmartContracts.html.> accessed 8 November 2019.

established in Delaware that are open only to a limited number of accredited investors.[73] Curated smart contracts developed and provided by Open Law facilitate governance mechanisms related to funding, voting and allocation of funds. Moreover, LAO investors may exit the fund at any time at their discretion, retrieving the unallocated part of their contribution.[74] The so-called 'rage-quitting' completely defies the principles of the traditional VC model.

As demonstrated by the examples, we may conclude that the VC industry has not been immune to digital disruption. The strategies for deal sourcing and screening have been reshaped through the use of Big Data analytics and novel technologies offering new alternatives to the traditional structure of VC funds are emerging. Nevertheless, for the moment at least, the added value that VCs bring to their portfolio companies to a large extent remains firmly in the hands of humans (See Table 2)**.**

5.2 Private Equity and Digital Transformation

As mentioned before, private equity shares many distinctive features with the venture capital industry. Both types of firms invest in private 'unlisted companies,' both heavily rely on investment managers and networks to source investee candidates, screen the investment deals and manage the portfolio of companies. Nevertheless, private equity is deemed a larger and more traditional financial sector, which is reflected in its more conservative stance on the digital transformation. While the industry is acutely aware of the potential of digital transformation, the actual implementation of novel solutions has not become a standard in the industry, at the time of writing. According to the Intertrust survey, 91% of respondents (PE Managers) believe that AI has the greatest potential to disrupt industry practices within 5 years, however 56% claim that currently the digital transformation predominantly increases efficiencies in their back offices.[75]

[73] 'The LAO: A For-Profit, Limited Liability Autonomous Organization' (Medium, 2019) <https://medium.com/openlawofficial/the-lao-a-for-profit-limited-liability-autonomous-organization-9eae89c9669c> accessed 6 November 2019.

[74] ibid.

[75] 'Over 90% of Private Equity Firms Believe AI Will Disrupt Their Sector by 2024' (Intertrust, 2019) <https://www.intertrustgroup.com/news-and-insights/press-releases/2019/private-equity-firms-believe-ai-will-disrupt-their-sector-by-2024> accessed 8 November 2019.

Similarly to the VC industry, PE managers can implement data-driven and AI-based solutions in various parts of the investment process such as deal sourcing, screening and due diligence.

For instance, Ardian, a major French private investment house with $82 billion AuM, partnered with Big Data startup Quantcube, which provides real-time predictive analytics based on massive unstructured data for short, medium and long-term applications in multiple sectors.[76] Ardian uses these predictive solutions mostly in their screening and due diligence procedures that are complemented with novel insights without necessity to become sector experts.[77] Mathias Burghardt, one of Ardians' partners, believes that the increased use of digital technology in the PE industry may actually lead to its democratisation and disintermediation, a similar development that we have observed in the VC industry.[78] Currently retail (non-professional) investors cannot invest directly into PE funds, however high quality insights provided by data analytics solutions and AI could potentially even the level playing field and minimise the expertise gap between professional and non-professional investors.

The private equity industry is currently on the waiting list of digital transformation. Several pioneers are leading the efforts that may immensely increase their competitive advantage in the sector. But the digital transformation may also lead to a revolution on the investors' side. Opening up the PE market to non-professional investors would enable PE funds to tap into novel sources of financing and give a significant liquidity boost to the industry.

5.3 Hedge Funds and Digital Transformation

Hedge funds by their very nature employ high-risk high-return investment methods, operating 'on the edge' of what is possible in the financial industry. Their risky

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[76] 'QuantCube Technology: Artificial Intelligence for Economic Intelligence' <https://www.q3-technology.com/> accessed 8 November 2019.

[77] Joe Wallen, 'How Can The European Private Equity Industry Best Embrace Artificial Intelligence?' (Forbes, 2019) <https://www.forbes.com/sites/joewalleneurope/2018/11/30/how-can-the-european-private-equity-industry-best-embrace-artificial-intelligence/#2355aae435e5> accessed 8 November 2019.

[78] ibid.

approach stimulates them to continuously evolve and deploy novel methods of generating extraordinary financial returns for their investors. It is therefore not a surprise that they have already adopted many data-powered tools, machine learning algorithms and even ventured into recently established crypto markets.

5.3.1 The Investment Edge of Alternative Data

In the past few years, hedge funds have been pouring significant funds into obtaining alternative datasets that contain non-traditional data points ranging from geospatial data, consumer transactions history, tracking of traffic information to social media and app data.[79] For instance, Goldman Sachs Asset Management used web scrapping strategy to monitor Amazon's Alexa traffic. In the process, they noticed substantial increase in visits of the HomeDepot.com website. This finding enabled them to purchase Home Depot stocks well before the higher earnings became known to the market.[80]

A recent survey of hedge fund managers documents that four out of five hedge funds combine their fundamental analysis with alternative data analytics in some capacity and more than a half claims to spend six figures on getting access to alternative datasets.[81] The value of alternative data resides in its obscurity and in unpredictable patterns that emerge once the datasets are analysed together and in the context. Simply put, the more data hedge funds obtain, the higher probability that unforeseen patterns relevant for investment decision-making emerge. However, the analytical process related to alternative data is very nascent, therefore investment managers struggle to predict, which data may eventually prove valuable. As insiders claim, hedge fund investors

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[79] Amy Whyte, 'Hedge Funds Plan to Pour More Money Into Alternative Data | Institutional Investor' (Institutional Investor, 2019) <https://www.institutionalinvestor.com/article/b1h3q9zshnsyyk/Hedge-Funds-Plan-to-Pour-More-Money-Into-Alternative-Data> accessed 6 November 2019.

[80] Justin Chan, 'Web Scraping and Hedge Funds' Alternative Data Strategy' (Data Driven Investor, 2018) <https://www.datadriveninvestor.com/2018/11/12/web-scraping-hedge-fund-strategy/> accessed 6 November 2019.

[81] supra note 75.

should be interested in how well the managers understand data exploitation.[82] Obtaining enormous amount of expensive data with hope that useful patterns will be uncovered in the process indicates a very poor analytical approach. According to ABM Amro, investment managers should always have working hypotheses that will either be confirmed or refuted by the analysis of alternative data.[83]

Extensive data sets may also produce false positive results, when machine learning models identify correlations that do not exist.[84] Moreover, using private data can turn out to be counterproductive, since markets may not be able to uncover and incorporate them into the stock price.

5.3.2 AI-Powered Trading

Using machine learning and data-driven algorithms is certainly not a novelty in the hedge fund industry. In contrast with private equity and VC funds, hedge funds have another important avenue, where AI proved to be immensely useful, specifically in trading of financial instruments, including stocks, bonds and derivatives. ‘Beating the market’ is the core objective of securities trading and early indications of potential price shifts can be uncovered by thorough analysis of all sorts of information, including the alternative data. The pre-AI analytic models use data algorithms to scrutinize historical information and identify previously unknown patterns and correlations that can lead to a superior trading strategy. Quantitative hedge funds have especially in the past years heavily invested in developing algorithmic software. However, these models still require significant human intervention.[85] Particularly when the market conditions change, quantitative analysts have to continuously recalibrate the model’s settings. The pure AI analytical models can integrate the evolving market situation and subsequently

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[82] ‘The Case for Alternative Data’ (Hedgeweek, 2019) <https://www.hedgeweek.com/2019/04/16/275039/case-alternative-data> accessed 6 November 2019.

[83] ibid.

[84] ibid.

[85] Boris Friedman, ‘The Rise of the Machines: AI Funds Are Outperforming the Hedge Fund Benchmark’ (Preqin, 2019) <https://www.preqin.com/insights/blogs/the-rise-of-the-machines-ai-funds-are-outperforming-the-hedge-fund-benchmark/26411> accessed 6 November 2019.

learn and adapt to new conditions without any human intervention.[86] According to Prequin, hedge funds with AI analytical models standardly outperform hedge funds that still employ a fundamental approach.[87] For instance, Cerebellum Capital, AI-focused hedge fund manager, clarifies that the traditional quant model is based on narrowing down the investment opportunities by testing and tuning until the very few that remain in the game are subjected to the final choice of project managers.[88] In contrast, Cerebellum offers AI-powered software which continuously evaluates different choices and strategies throughout the investment decision-making process, therefore it is more likely to capture emerging trends.[89]

5.3.3 Crypto Hedge Funds: New Digital Assets Markets

Although still not large enough to threaten stability of traditional financial markets, the rapidly growing cryptocurrency market worth around $250 billion[90] can no longer be described as insignificant. Growing interest from traditional investors caused the emergence of crypto hedge funds, specialised funds focused on investing in and trading of novel types of digital assets. In the past few years, more than 746 new crypto funds began their operations to service the exponentially growing industry.[91] Due to substantial market downturn in 2018 and 2019, many of them have already ceased their activities. Crypto hedge funds demonstrate several unorthodox features, starting with the assets they focus on. In general, crypto-assets form a considerably heterogeneous class of investment targets that range from pure digital currencies such as Bitcoin (and

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86 ibid.

87 Bernard Marr, 'The Revolutionary Way Of Using Artificial Intelligence In Hedge Funds' (Forbes, 2019) <https://www.forbes.com/sites/bernardmarr/2019/02/15/the-revolutionary-way-of-using-artificial-intelligence-in-hedge-funds-the-case-of-aidyia/#37158c4b57ca> accessed 8 November 2019.

88 'Cerebellum Capital' <http://cerebellumcapital.com/> accessed 8 November 2019.

89 ibid.

90 'Global Charts' (Coin Market Cap, 2019) <https://coinmarketcap.com/charts/> accessed 6 November 2019.

91 '#1 List of Crypto Investment Funds' <https://cryptofundresearch.com/crypto-fund-list-sample-at1?gclid=EAIaIQobChMIxMu996TW5QIVzZ13Ch2OyAhfEAAYASAAEgItvvD_BwE> accessed 6 November 2019.

its various derivatives) or Monero, to app tokens such as Ether, utility tokens such as Storj, stable coins such as Tether or MakerDao and security tokens such as Envion that to large extent resemble traditional securities. These assets can be either (i) purchased in a primary offering, colloquially known as initial coin offerings, (ii) newly created and acquired as a reward for validating network transactions (mining or staking) or (iii) purchased/sold on secondary markets called crypto exchanges.

Crypto hedge funds tend to obtain the assets both in primary offerings and by trading on the secondary markets. To some extent, funds also diversify by engaging in crypto mining, activity that is specific to crypto industry. Research shows that crypto hedge funds adopt three distinctive strategies.[92] Funds with fundamental approach invest and hold longer positions in early stage projects and simultaneously hedge the risk by investing in liquid crypto assets such as Bitcoin or Ether.[93]

The discretionary approach, on the other hand, covers a broader range of strategies including long/short, relative value, event driven, technical analysis and mining. Quantitative funds put emphasis on the most liquid crypto-assets and use market-making, trading arbitrage and low-latency trading as core strategies.[94] Due to the current limited capitalisation of the crypto-assets markets, the relative size of crypto hedge funds tends to be significantly smaller than in case of their traditional counterparts. The market survey discovered that less than 10% of funds manage $50+ million and more than 60% of funds have less than $10 million under management.[95] Nevertheless, the AuM metric follows the market value fluctuations, therefore the size of the fund mimics the value appreciation or depreciation of the underlying crypto-assets.

While still rather small, the crypto hedge fund industry has been developing novel investment approaches enabled by the unique character of crypto assets. The most appealing feature of the crypto assets is their lack of connection to the status quo on the traditional capital markets. In times of general economic downturn, crypto markets

[92] Price Waterhouse Cooper, '2019 Crypto Hedge Fund Report' (PWC, 2019) <https://www.pwc.com/gx/en/financial-services/fintech/assets/pwc-elwood-2019-annual-crypto-hedge-fund-report.pdf> accessed 8 November 2019.

[93] ibid.

[94] ibid.

[95] ibid.

could facilitate the risk diversification and thus perfectly fit into the hedging strategy of the hedge funds.

Table 5: Use of Emerging Technologies in Various Aspects of Investing

Investment Aspects	**Venture Capital**	**Private Equity**	**Hedge Funds**
Deal Sourcing	Big Data Analytics, AI	Big Data Analytics, AI	Alternative Data Analytics, AI
Screening	Big Data Analytics, AI	Big Data Analytics, AI	Big Data Analytics, AI
Due Diligence	Automated solutions, AI	Automated Solutions, AI	Automated Solutions, AI
Portfolio Management	Traditional Practices	Traditional Practices	Pre-AI and AI quantitative models
Trading	Not applicable	Not applicable	AI Investment Managers, Alternative Data Analytics
Investor Democratisation	Initial Coin Offerings Accessible to retail investors (in the blockchain context)	Traditional Practices – Accredited Investors	Traditional Practices – Accredited Investors
Investor Decision-Making	Blockchain, AI	Traditional Practices	AI Investment managers
Alternative Assets Markets	Crypto assets	Traditional assets	Crypto assets

6. Conclusion: Convergence and Diversity of Hedge Funds and Private Equity

In this chapter, we have argued that private equity and hedge funds rely on similar features of the partnership form but diverge in some important respects due to the demands made by investors. For example, the partnership's duration for private equity is usually ten to twelve years, after which the profits are distributed either in cash or in shares of portfolio companies. Hedge funds, however, have shorter lock-up periods (one to three years), confirming the emphasis on quicker, short-term investments. Individuals and institutions that invest in a limited partnership can delegate investment and monitoring decisions to the fund managers, who act as the general partner. Even though the difference between private equity funds and hedge funds is not always clear, we have shown earlier (see Table 1) that there are various ways to distinguish the two types of funds.

In fact, a clear pattern emerges. In sum, private equity funds usually invest in non-listed companies, pay management fees based on capital commitments and incentive fees only when gains are realized, maintain fixed subscription periods, grant no redemption rights but authorise distributions as investments are sold, provide for fixed fund life, establish long lock-up periods and provide extensive contractual protections whereas hedge funds mainly target publicly held corporations, use mark to market valuations as the basis for incentive fees, provide frequent fund openings throughout the life of the fund, provide redemption rights, participation by all investors in the same portfolio, 'high water mark' but no preferred returns and minimum investor rights.

Finally, we saw how the digital transformation is disrupting the sector. While venture capital, private equity and hedge funds implemented novel technologies in their investment process to various degrees, there are several common trends. Big Data analytics and use of artificial intelligence in the initial stages of the investment process significantly reduce the information asymmetries and even offer more accurate predictions of the probability of success than human analysts. At the same time, technologies may help to democratise various financial sectors due to their ability to close the expertise gap and create level playing field for all types of investors. Moreover, retail investors do not have to wait for the disruption and democratisation of traditional financial sectors. Crypto markets emerged only recently, but their instantaneous success highlights the demand for alternative investment assets and opportunities across different investor groups.

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