



Alternative investments 3.0

Digitize or jeopardize

February 2018

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Acknowledgements

This report, jointly produced by KPMG International and CREATE-Research, examines in detail the impact of digitization on the alternative investment industry.

Focusing on the two key segments most amenable to digitization — hedge funds and private equity — the report investigates how Alternative investments 3.0 will emerge, as new technology penetrates deeper into the industry value chain.

Our foremost thanks go to some 125 companies in 19 countries in all the regions, who participated in the research that makes up this report.

We would also like to offer our special thanks to those CEOs, CIOs and board directors who participated in our face-to-face structured interviews. Their insights and foresights helped to produce a clear vision of the future of their industry.

Special thanks also go to the members of the project team, editorial board and other colleagues around the world who helped us in carrying out this research, in particular Christina Farrace from KPMG International, Claire Griffin from KPMG in the Cayman Islands, Andrea Szigethy and Donna Holly from The Investment Institute, LLC, and Lisa Terrett and Dr. Elizabeth Goodhew at CREATE-Research.

“

The star of the previous era is often the last to adapt to change, the last to yield to the logic of a strategic inflection point and the one who tends to fall harder than most.”

Andy Grove,
the founder of Intel

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Survey and interview participants by geography and size of aggregate AuM

Australia

Bahamas

Bahrain

Bermuda

Brazil

Canada

Cayman Islands

Channel Islands

Denmark

Germany

Hong Kong

Isle of Man

Italy

Luxembourg

Mexico

Switzerland

The Netherlands

UK

US

Total AuM (US\$ trillions) 2.6

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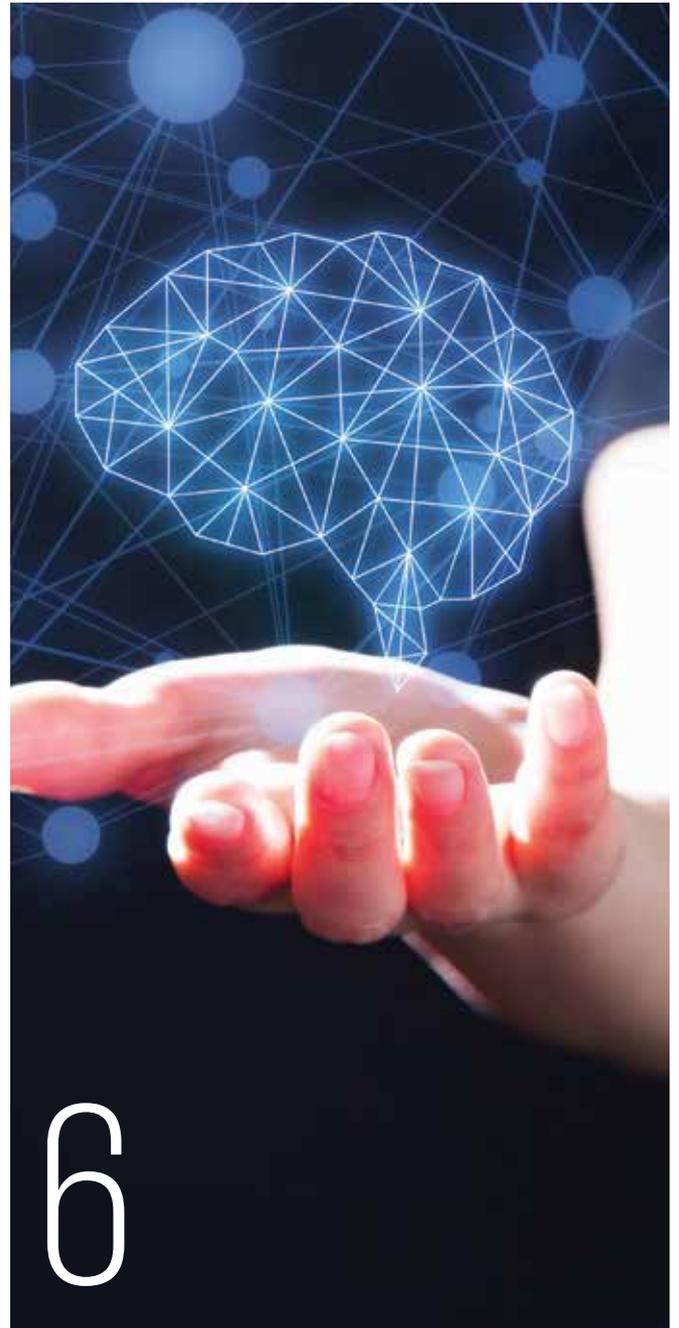
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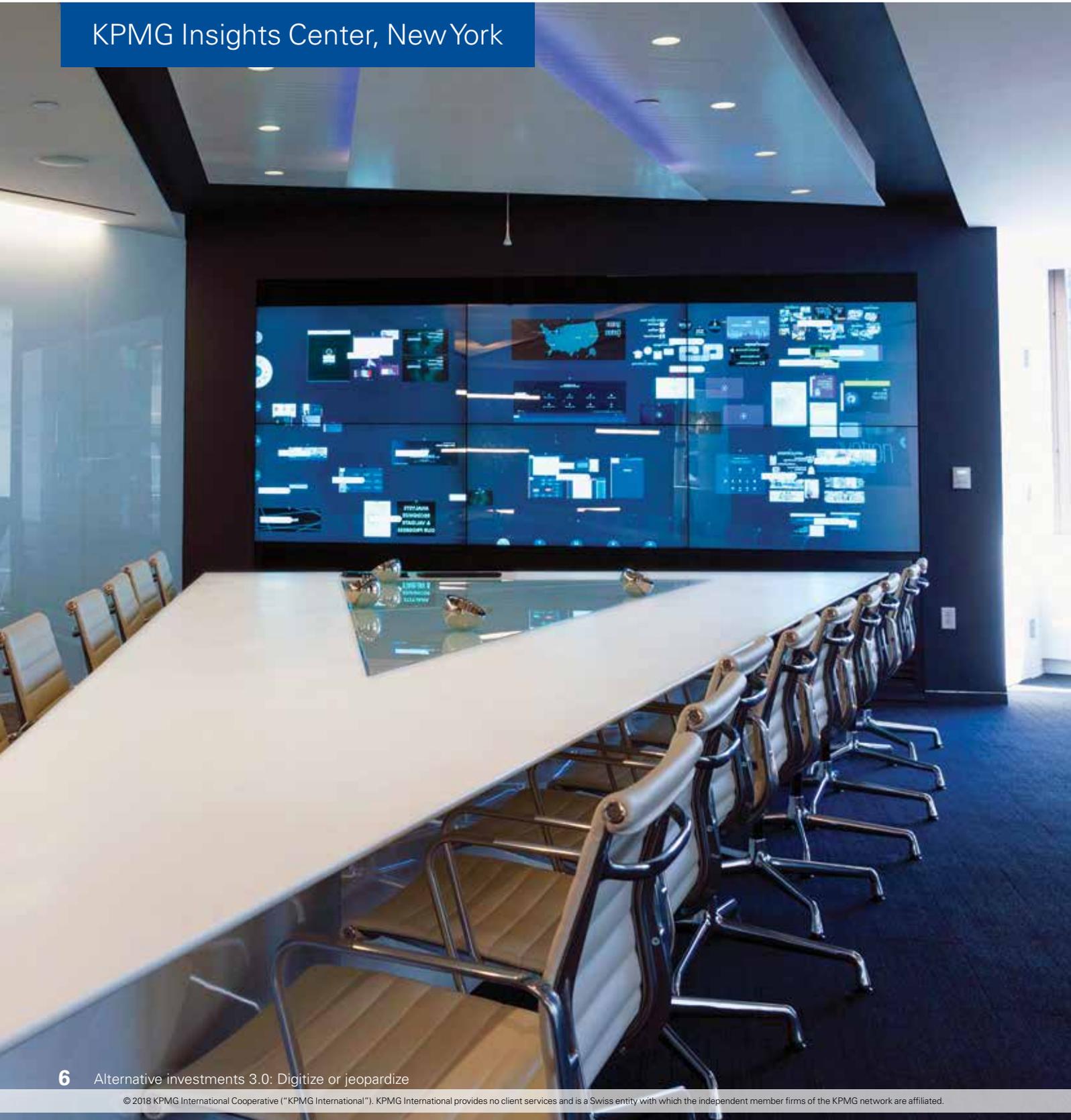
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1

Executive summary

Introduction and aims

KPMG Insights Center, New York



“One of the world’s largest hedge funds is now letting computers trade completely on their own.”

Headline on CNBC, 28 September 2017

The proverbial canary in the coal mine?

Yes, say the visionaries. They see today’s alternative investment industry as being on the cusp of radical change, led by the latest wave of cutting-edge digital innovations (Box 1.1).

No, say the skeptics. They question any narrative based on the experience of a few iconic standouts while most of their peers appear wedded to their craft heritage.

As ever, the reality is far more nuanced.

That self-learning algorithms are replacing humans in certain investment strategies is not in doubt. That digitization will be a key driver in the next wave of industry growth is not in doubt either.

However, digitization extends well beyond traditional cost-saving automation. It is also about transforming the business via new investment strategies, new sales channels, new working methods, new client experience and, above all, better investment returns.

It involves novel forms of collaboration with suppliers and clients in a reconfigured value chain, disintermediated seamlessly. It’s about realigning business models to make them future ready.

This is easier said than done in alternative investing. It is a people business *par excellence*, where disruptive change can be very costly, with no guarantee of a pay-off.

Legacy systems and legacy thinking can also be formidable barriers. The status quo is hard to challenge when profit margins are reportedly around 40 percent.

Little is known today about the situation on the ground, especially the hurdles that have to be navigated, as alternative investment managers advance into the digital age.

Focusing on the two key segments in the alternative investment industry most amenable to digitization — hedge funds and private equity — this report aims to:

- uncover the prospects for digital disruption and its dynamics
- assess the current state of adoption in the normal implementation cycle
- identify the drivers of digitization as well as its blockers
- highlight the likely impact and the factors that will differentiate winners from losers.

These issues were covered in a global survey and structured interviews with an aggregate of 125 alternative investment managers across 19 countries, with alternative assets under management of US\$2.6 trillion.

All information in this report is based on the survey and the follow-up interviews, unless stated otherwise.

Our four key findings are presented in the rest of this section.

Box 1.1: The key digital innovations



Application programming interfaces (APIs): generating new business via mobile apps and the cloud

Cognitive technology and machine learning: capabilities that facilitate alpha generation

Big data: availability of data with vastly enhanced volume, velocity and variety

Blockchain: a distributed ledger that disintermediates payments and settlements

New digital platforms: platforms that can reconfigure the producer–distributor–client relationship

Robo-advisors: algorithms that disintermediate fund distributors and facilitate Direct to Customer (D2C) business

Robotic process automation: software tools that automate labour-intensive processes

Social media: social networking to help increase brand exposure and broaden customer reach

“
Today’s alpha is tomorrow’s beta.”

Interview quote



What the internet did to the music business, digitization will do to finance. It's not about 'if' but 'when'.

Interview quote

Key findings

1 Alternatives face disruption, as digitization becomes the North Star of the industry

Like most other activities in finance, alternative investing is information intensive. Data is its lifeblood.

Digitization is thus emerging as its new 'heartland' technology, with the potential to penetrate every activity in its value chain — core and non-core alike.

Previous waves of information technology mostly automated routine manual processes to reduce costs and enhance accuracy.

The current wave, on the other hand, seeks to deliver end-to-end solutions within more joined-up businesses via speed, connectivity, insights, transparency, personalization and disintermediation.

These attributes are conducive to strong operating leverage via:

- significant information advantages from machine learning

- friction-free client experience from innovative intuitive engagement
- lower costs and competitive fee structures
- operational excellence from systems that deliver a 'single source of truth'.

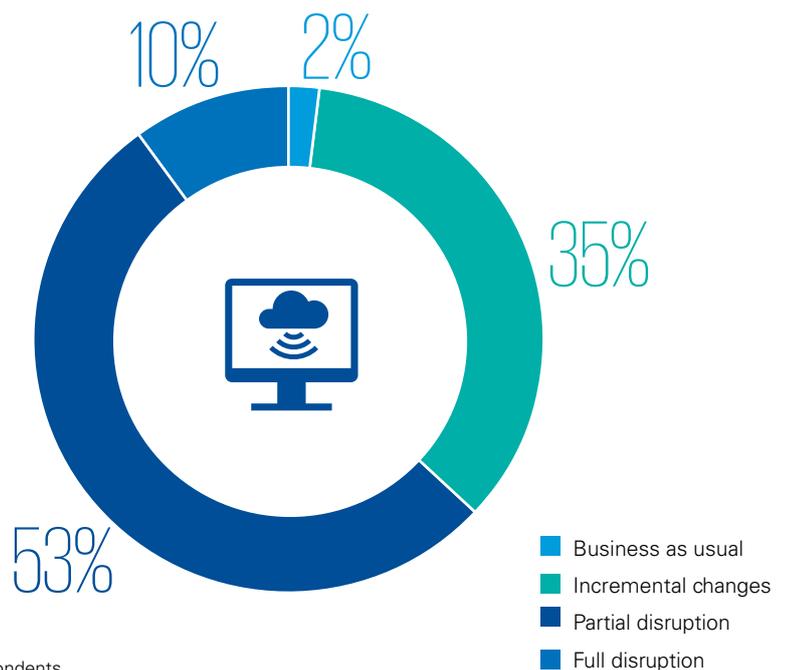
Unsurprisingly, on a 10-year view, the current business models will most likely face disruption (Figure 1.1).

a. Scale of disruption

Only 2 percent of our respondents anticipate a 'business as usual' scenario. The rest see it as a treadmill to oblivion, since digitization is now a necessity as much as a choice.

35 percent anticipate 'incremental changes'. This, in the belief that the pace of adoption will remain moderate over this period, due to the persistence of various technology and legacy issues.

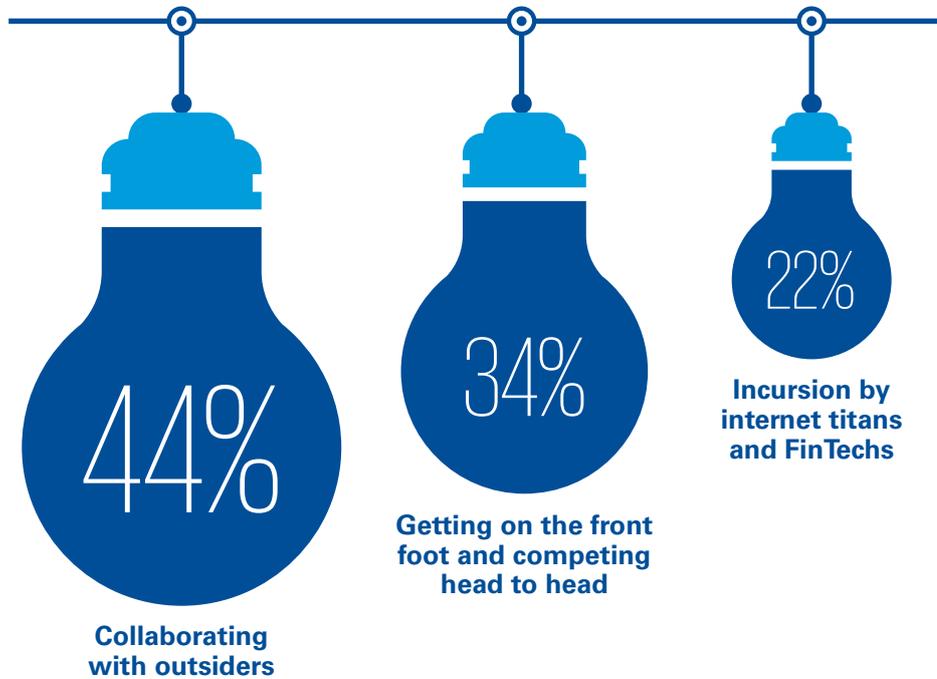
Figure 1.1 Which scenario summarizes your view on the impact of digitization on the alternative investment industry over the next 10 years?



Percentage of respondents

Source: © KPMG/CREATE-Research survey 2018

Figure 1.2 Which scenario summarizes your view on the potential sources of disruption in the alternative investment industry over the next 10 years?



Percentage of respondents
Source: © KPMG/CREATE-Research survey 2018

More importantly, among the remaining majority of respondents, 53 percent anticipate *'partial disruption'* and 10 percent *'full disruption'*.

Like its peers in other sectors, the alternative investment industry is set for a big makeover — but with one difference.

Its revolution will be evolutionary, given its nature, which enjoins managers to perform a delicate juggling act between short-term profitability and long-term survival.

Besides, the problem with a historic shift is that seldom does it appear material at the time. It only becomes consequential in hindsight.

b. Sources of disruption

That disruption is inevitable is not in doubt. But opinions differ on its potential source (Figure 1.2).

34 percent expect *internal* disruption, as alternative investment managers themselves get on the front foot and digitize their businesses in order to

pre-empt competitive threats — from both inside and outside their industry. This group included many large managers in our survey.

44 percent expect *joint* disruption, as incumbents collaborate with potential external rivals. This group includes many medium and small sized managers who want to stay in the driving seat.

22 percent expect *external* disruption, as current internet titans and FinTech start-ups venture into alternative investments, especially into areas where they have a dominant digital advantage and brand presence. This group included many medium sized managers.

'Co-opetition' — collaboration and competition — will become the norm. At this stage, fears of external threats are subdued. As yet, there is no big mass market for the internet titans to exploit. Alternative investments remain the preserve of institutional investors — for now.

“The average smartphone is replacing 15 devices for half the price.”

Interview quote

Over the next decade, however, this will reverse, due to two trends, both with the momentum of a supertanker: pension plans de-risking their portfolios owing to ageing membership; and ever more affluent mass market investors allocating to alternatives in search of uncorrelated absolute returns.

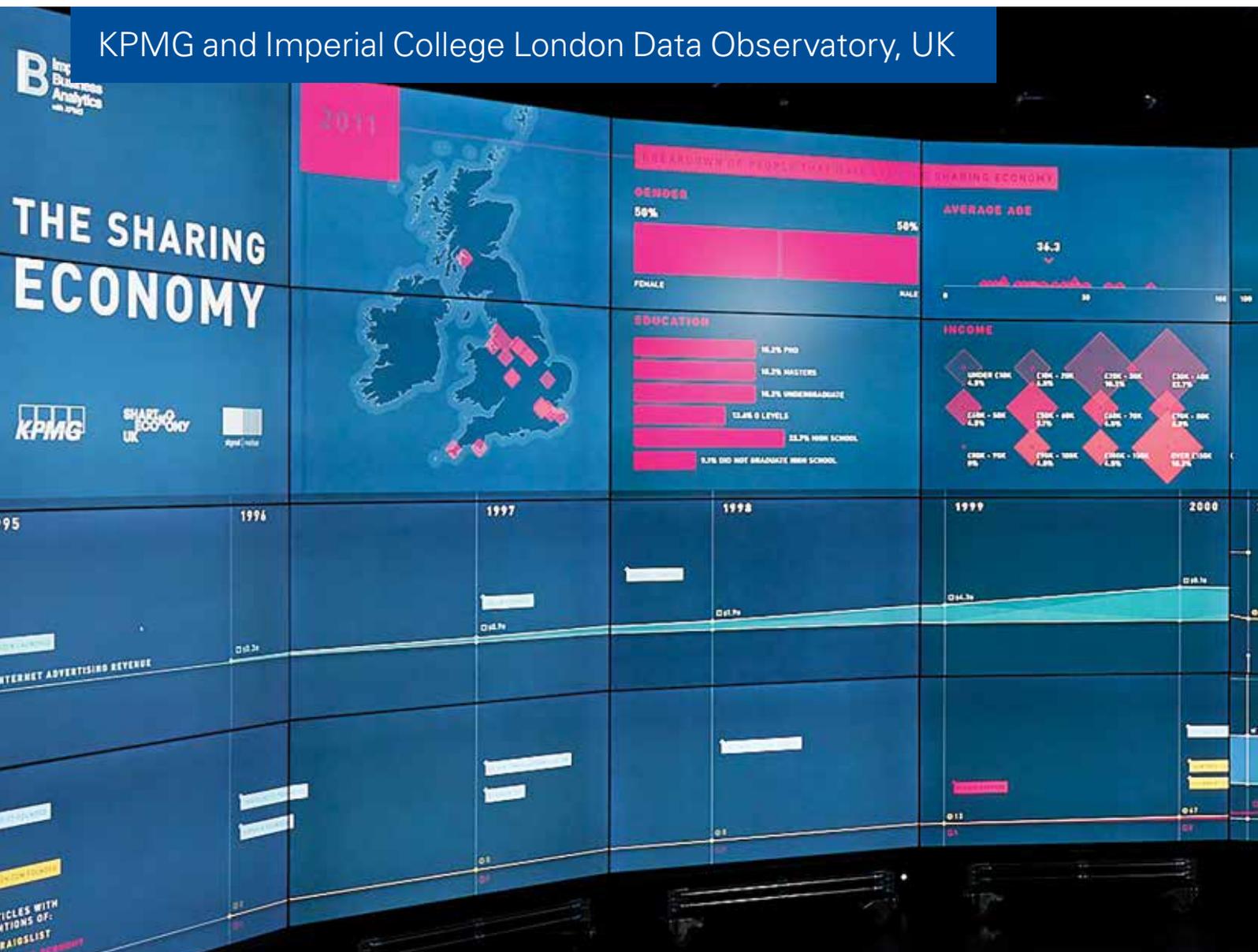
In the meantime, alternative investment managers will retain their market dominance because risk management is in their DNA. In this age of dynamic risk, investors will be unwilling to entrust their money to outsiders without a strong risk culture and a brand that underpins it.

Outsiders will, however, still make incursions into the industry via alliances and joint ventures.

FinTechs are already carving out a niche in the industry landscape, designing tools superior to the ones currently used by hedge fund and private equity managers.

For the foreseeable future, the alternative investment industry will not appear on the radar of the internet titans. Their incursion — now and in the medium term — will more likely be in plain vanilla index funds and ETFs in the long-only space. Both already have the critical mass of assets and clients that justify external disruption.

KPMG and Imperial College London Data Observatory, UK



2 Adoption of digital innovations so far has been a matter of more haste, less speed

Whereas our respondents accept that digitization of their industry is inevitable, their own approach will be marked by small steps rather than giant leaps.

a. Key drivers

Alternative investment managers are no strangers to technology.

To date, they have relied on it to industrialize a part of the business to achieve cost-effective growth. Novel approaches such as cloud computing, data warehousing and 'software-as-a-service' have been going mainstream. Three imperatives are now driving them to up the ante.

First, new cost disciplines are becoming vital, as returns have failed to match client expectations in general.

This investment climate has not been conducive to hedge funds replicating their stellar returns of the last decade. End-clients do not want to pay alpha fees for beta returns.

Second, organic growth has become the new imperative. With quantitative easing (QE) now shifting down a gear, asset price inflation is unlikely to be the main driver of AuM. Entering under-served client segments has become vital: all the more so as defined benefit pension plans

worldwide are advancing rapidly into their run-off phase with ageing membership.

The new client segments are likely to be defined contribution (DC) pension plans, high net worth investors, insurance companies and millennials — the so-called 'internet generation' — engaged in virtual teamwork at hyper speed in social media.

Millennials do not know the world without technology. They will also be the main beneficiary of the biggest wealth inheritance in human history, as the wealthy postwar baby boomers pass on. The sums involved are estimated at \$30 trillion in the US alone, according to CNBC (17 May 2017). They will emerge as a major investor group in the next decade.

Third, operating leverage has become vital. Without it, alternative investment managers will find it hard to expand their footprints in new client segments and geographies. In the past, as managers ramped up their AuM, the craft nature of the business often delivered a perverse outcome: a rising cost-income ratio from the diseconomies of scale inherent in all people-centred businesses.

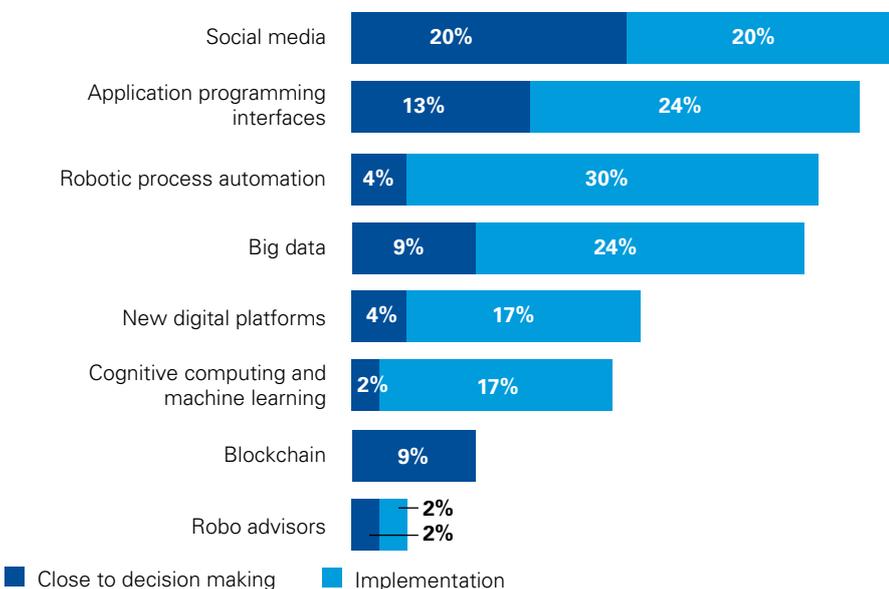
b. The adoption scorecard

Figure 1.3 sets out the current state of play by hedge fund managers.

“Big players are off the chart, followed by a long tail of potential late adopters, with no fast followers in sight currently.”

Interview quote

Figure 1.3 In which stage is your hedge fund business currently?



Percentage of respondents

Source: © KPMG/CREATE-Research survey 2018

“ At what point do the machines take over? ”

Interview quote

Our survey collected data on the three stages in the implementation cycle: *'awareness raising'*, *'close to decision making'* and *'implementation'*.

The data presented here focuses on the last two stages. Full data is given in Figure 3.1 in Section 3, which shows that more than 60 percent of our respondents are still at the *'awareness raising'* stage for every innovation. The rest have either implemented it or are close to it. So the first point to note is that digitization is a nascent phenomenon — for now.

The second point is that implementation has so far targeted the low-hanging fruit — like social media and APIs. Bolting them seamlessly onto the existing technology stack has not been so difficult.

Some managers, however, are an exception. They have a strong technology DNA that has embraced innovations like alternative data analysis and machine learning in their evolution. They are well ahead of the pack.

The third point is that progress has been slow with respect to more path-breaking innovations such as machine learning and blockchain. It has also been slow with respect to robo-advisors mainly because hedge funds are principally engaged in B2B far removed from mass market clients.

We return to the rationale underpinning these results after presenting the results for private equity managers (Figure 1.4).

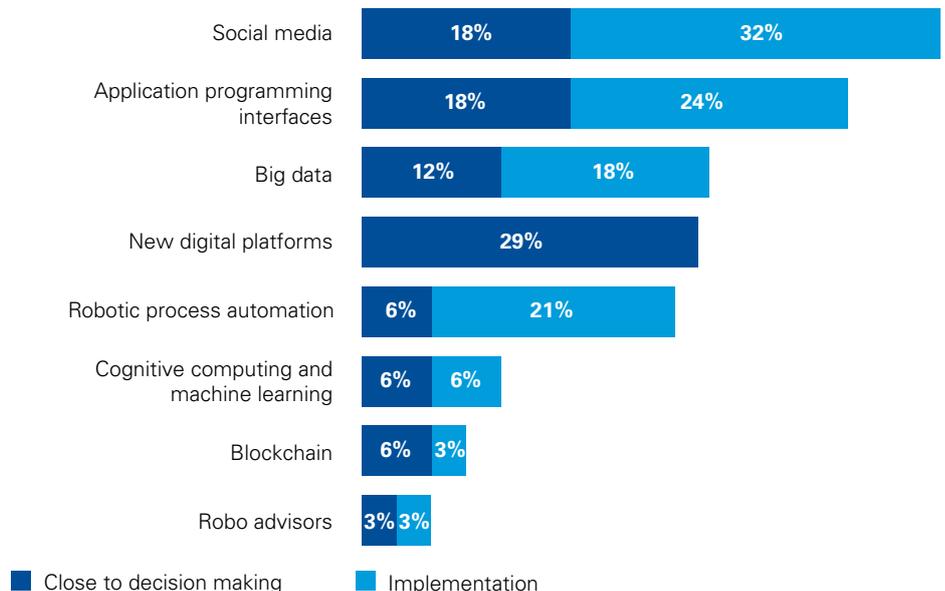
Here, on balance, the adoption picture is much the same as for hedge fund managers. The majority are still at the *'awareness raising'* stage, as shown in Figure 4.1 in Section 4.

Various functional areas have become amenable to these innovations, as described in Sections 3 and 4. Apart from cost savings, their central thrust is directed at two areas deemed especially conducive to cost-effective organic growth.

The first is the science of analytics. It is reaching new frontiers with the onset of big data and machine learning. Its four-stage progression is already delivering investible information and actionable insights, for both quantitative and discretionary managers:

- **descriptive analytics:** what happened?
- **diagnostic analytics:** why did it happen?
- **predictive analytics:** what will happen?
- **prescriptive analytics:** how do we react?

Figure 1.4 In which stage is your private equity business currently?



Percentage of respondents
Source: © KPMG/CREATE-Research survey 2018

The second avenue is client experience. It is essential for widening and deepening the investor base. As the next decade progresses, new segments will demand experience that is now common in e-commerce:

- 24/7, digital, customized, natural, seamless, intuitive and user-friendly service — all based on interactive tools and mobile capability
- educational content that is relevant and insightful enough to allow the 'what if' type scenario analysis
- zero error rate in fund accounting and reporting, with a clear explanation when fund performance deviates from its benchmark
- pre-emptive insights, akin to human telepathy, that anticipate client needs and offer solutions to problems even before they arise.

c. Factors that are slowing things down

Some of them are technology related, others are business related (Figure 5.1).

Taking them in turn, the first set includes: cyber security, legacy IT systems, the high cost of digital innovations and the opaque nature of some of the innovations. The last of these was repeatedly singled out in all our post-survey interviews. It especially relates to machine learning, which is embedded in all the digital innovations to varying degrees.

To be effective, it requires a vast trove of relevant data points — millions, if not billions. These either do not, as yet, exist or are not available in a form that easily maps onto the current generation of investment strategies.

Much of the 'big data' captured in the past 5 years does not as yet have a long enough time series nor has it been robustly validated by point-of-time cross-sectional data. The wealth of information can also create a poverty of attention. Separating signal from noise remains a daunting task.

More importantly, unlike hand-coded learning systems, self-learning machines remain a black box: few know how and

why their advanced algorithms do what they do.

Top hedge fund managers are inching closer to mastering the craft of machine learning via years of learning-by-doing and trial by experimentation. The rest are advancing in baby steps from the lower end of the learning curve.

Many of them find it hard to trust innovations that are not yet fully understood, dealing as they are with other people's money as fiduciaries. Until machine learning is accountable to its users, it will remain the preserve of the early adopters with a strong technology DNA.

The 'winner takes all' world beckons.

On the real estate side, digitization is a nascent phenomenon. Its main impact will come as the Internet of Things gains traction. Besides, the current generation of buildings are hard to re-wire, as digitization requires a large measure of standardization. Real estate firms are using advisors to help them navigate around the issue.

Turning to the business-related factors that slow things down, these include: senior executives too preoccupied with fixing immediate investment returns hit by QE; the regulatory overdrive in the wake of the 2008 crisis that has amplified headline risk; low risk appetite in corporate culture marked by the fear of failure; and the innovator's dilemma: namely, why disrupt the business model if the profit margins are healthy?

With margins hovering around 40 percent (according to our interviews), the appetite for technologies not tried and tested by time or events has been low. This is especially the case in two kinds of firms.

One of them includes those where first generation partners are approaching retirement. They want to monetize their equity without causing upheavals. The second includes those who are victims of their own success. They remain trapped into doing things the way that has worked for them in the past to the point where innovations are viewed as the latest fads.



If it ain't broke, why fix it? ”

Interview quote

“
Millennials are
'plugged in' like no
other generation.”

Interview quote

3 Alternative investing will shift up a gear, as organic growth becomes the new mantra

Fresh winds of change may well be driving the alternative investment industry into the third phase of its evolution (Figure 1.5).

Prior to the 2000s, autonomous lifestyle businesses run along craft lines dominated the alternative landscape (AI 1.0).

In the last decade, the search for uncorrelated absolute returns intensified, following the success of iconic investors such as the Harvard and Yale Foundations. The new wall of money from institutional investors ushered the industry into its second phase, where economies of scale and robust operations became fresh imperatives (AI 2.0).

The front office retained its craft nature but routine activities elsewhere in the business were increasingly automated or outsourced via a new horizontal integration. The aim was to enjoy economies of scale: unit costs fell as AuM rose.

Now the industry is transitioning to its third phase to create joined-up businesses via digital innovations that can deliver operating leverage, within strategic partnerships with the best-of-breed external service providers and FinTechs (AI 3.0).

The latest phase redefines its heritage via a new human-machine interface that combines the best of both. It also seeks to create new opportunity sets by widening the scope of the business. Above all, it reflects the transition from being a supply-led industry to being a demand-led industry.

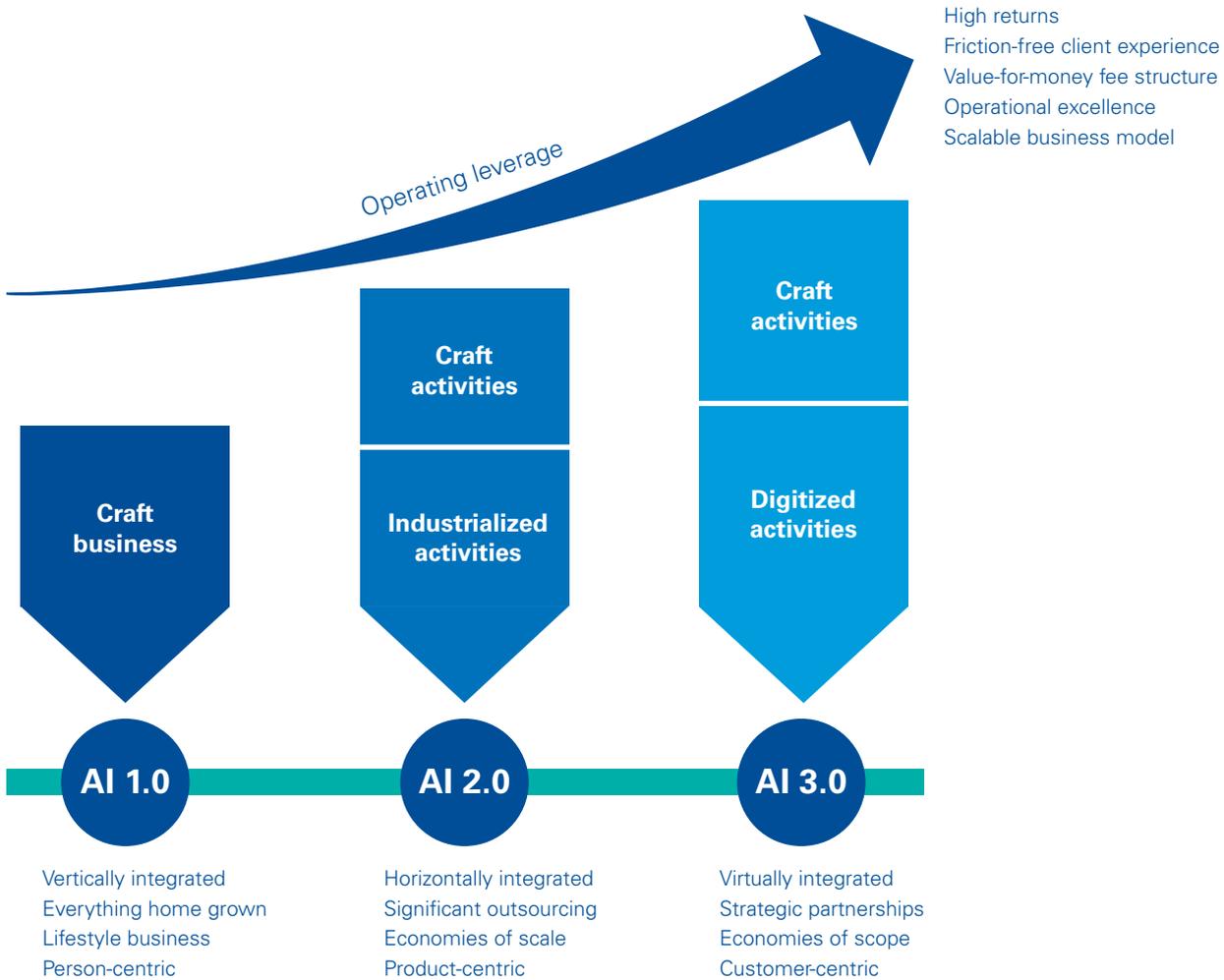
There are a number of straws in the wind that suggest that the industry may be in the early stage of this transition, according to our post-survey interviews.

First, the ultra favorable tail winds from QE are receding now, as central banks retreat. Market-led growth in assets will be in the rearview mirror. In the ensuing low-return environment, organic growth will top the agenda.



KPMG Insights Center, Hong Kong

Figure 1.5 Transitioning to a new phase to gain operating leverage while redefining its craft heritage



Source: © KPMG/CREATE-Research survey 2018

Second, cost pressures are likely to intensify. The return differential between private and public markets will continue to erode. Fees and charges will emerge as a key differentiator. Already under strain, the 2-20 fee structure will become the exception rather than the rule. It will be the preserve of only those able to deliver excess returns consistently.

Third, some of the large institutional investors will be continuing to develop an in-house capability to invest directly into hedge funds and private equity — aided and abetted in part by digitization.

Fourth, for private equity managers, competition will remain fierce, with high

asset prices, scarce opportunities and increasing 'dry powder' — unallocated capital. Likewise for hedge fund managers, alpha opportunities will diminish, as ever more managers venture into systematic strategies.

Finally, on the client side, two developments will hasten the adoption pace: the growing social acceptance of digitization and ever more demanding clients, as they become financially and digitally savvy. With their strong digital instincts, millennials want live investment information that can be displayed in ways that bring data to life, unlike fund fact sheets with dry data. Uncorrelated absolute returns will

remain the name of the game. It will be at the center of a digital brand, alongside client experience and client advocacy.

Hence, in business models, the center of gravity will shift from product centricity to client centricity. Managers with cutting-edge technology, a deep talent pool, good performance, respected brands and strong pricing power are likely to survive and thrive

as the alternative investment industry enters the third phase, AI 3.0.

The rest will need to find value where others can't. They will need at least one primary source of competitive advantage to survive in a Darwinian environment, as competition goes from benign to malign.

“
Technology flies
like a bird, but
business moves
like a tortoise.”

Interview quote

4 Business transformation requires digital leaders who can rewrite the traditional narrative on value creation

Business transformation is as much about leadership as about technology — if not more so. It requires digital leaders who can navigate the transition to the third phase, shown in Figure 1.5, by shedding the old mental baggage and re-anchoring the business into the new age. This is easier said than done.

For history shows that every innovation invokes shifting emotions. It is fear of the unknown that kicks in at the outset, to be replaced by the fear of being left behind, as competitors enter the fray. That tug of war between the two is ever present, with the former having an upper hand for now in alternative investing, due to two time-related gaps: perceptual and adaptational.

It takes time to see a great opportunity disguised as insoluble problems. It also takes time to adapt, when technology changes exponentially while the business changes logarithmically. Over time, the gap between the two gets bigger, as shown in Figure 6.2 in Section 6. Bridging it lies at the heart of digital leadership.

It necessitates connecting the dots between three changing contexts: industry, clients and the business.

The AuM of the global alternative investment industry will continue to grow for the foreseeable future. But growth will favor those managers able to deliver skills-based pure alpha, as distinct from commoditized alpha, based on factor investing. Systematic strategies will do well so long as

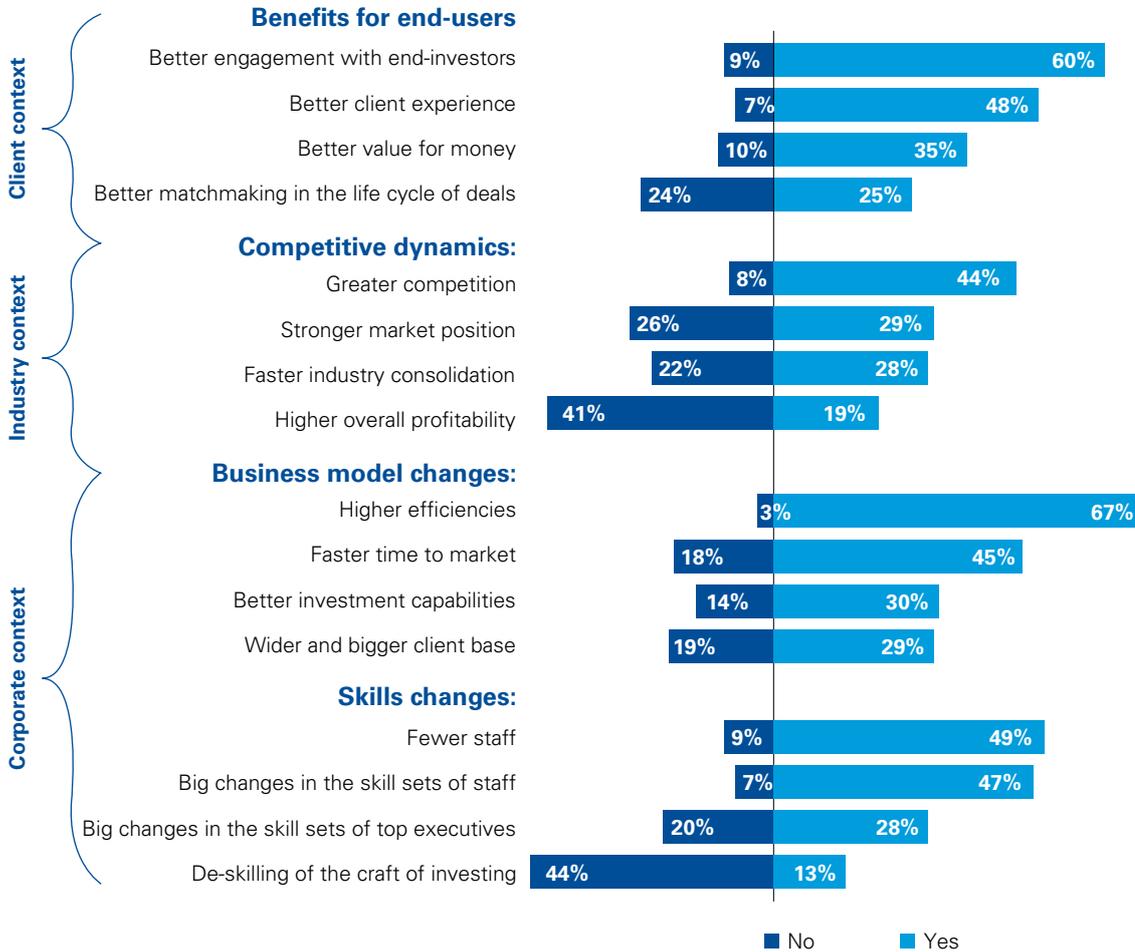
they deliver value for money superior to that provided by mega indexers now investing billions in technology. There is only a finite pool of alpha for competitors at any one time. Alpha will turn into an even bigger zero-sum game.

For their part, the new generation of clients will have different needs and risk profiles. They will be demanding a clear line of sight between returns and charges, within a meritocratic incentive structure, on top of the digital client experience.

Accordingly, alternative investment managers have to realign their businesses to meet the emerging needs. This is all the more necessary, since our survey respondents envisage three outcomes as digitization progresses over time in their industry (Figure 1.6). The outcomes are as follows.

- **Client context:** a better investment proposition — based on fees, returns, engagement and experience — will mark the shift from a product-centric to a client-centric business.
- **Industry context:** competition will intensify and profitability will erode. Those able to deliver the required proposition will do well, in what may well turn out to be a ‘winner takes all’ world.
- **Corporate context:** improvements are expected in process efficiency, time to market, investment capabilities, client base and skill sets.

Figure 1.6 What will be the overall impact of digital innovations on the alternative investment industry over time?



Note: The results above show only the percentage of 'yes' or 'no' responses.
 Source: © KPMG/CREATE-Research survey 2018

Notably, despite these improvements, overall profitability is unlikely to improve, possibly due to the 'network effect' associated with the best internet brands.

A product or service is perceived as more worthwhile the more people use it. Early adopters of digitization will clearly have an advantage, defying the old adage that 'pioneers take all the arrows'.

Hence, digital leaders have their work cut out for them.

First they should set a strategic vision that eschews sound-bite leadership. It means understanding the changing context of their business, spotting opportunities, displaying originality, crafting a credible digital strategy and promoting a can-do mindset.



Digitization only gains traction when our bosses take interest in it. They tend to let the urgent get in the way of the important.



Interview quote

The strategy should set out clear goals, their rationale, the necessary emotional buy-in from staff, the allocation of responsibilities, clear metrics and milestones, and clear accountability for outcomes. The latter should spell out for staff how the strategy will affect them, what is expected of them and what's in it for them. Digital leaders must walk the talk, show restless dissatisfaction with the status quo and challenge inertia.

Above all, digital leaders should realize that there is nothing inherent in digital innovations that guarantees success. Execution is the magic bullet. The tone at the top matters. What leaders do makes a big difference.

Second, an important part of the strategy should contemplate specific actions in five areas that are especially conducive to its success.

- Collaborate with FinTechs with innovative ideas and tools that are hard to develop in a legacy environment.
- Form strategic partnerships with the best-of-breed third party administrators, if there is no enthusiasm for creating in-house capability.
- Improve the human-machine interface to get the best out of both.
- Deepen and broaden the talent pool to have computer scientists and data specialists work alongside portfolio managers, risk specialists and client service teams.
- Develop people practices that further enhance self-regulatory behaviors and self-motivated creativity.

5

Concluding remarks

“Science discovers, technology executes and humans conform.”

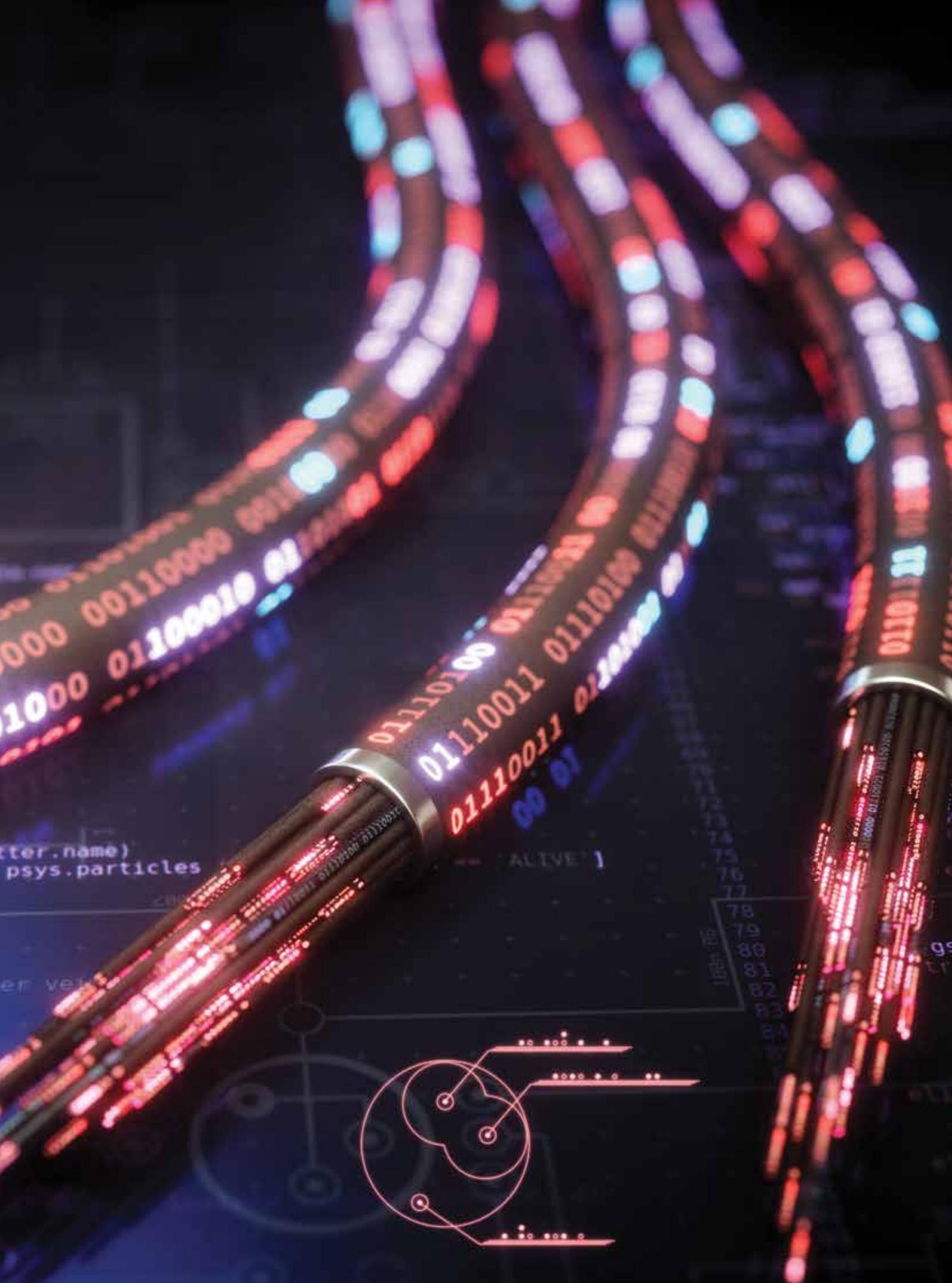
This age-old dictum means that alternative investment managers cannot afford to ignore the latest tide of innovations for long.

Indeed, our research suggests that they are already in the midst of a tectonic shift, with significant consequences over the next decade.

History shows that at the dawn of each major IT innovation, *ex ante* predictions about its adoption and impact have

invariably been proven wrong. They overestimated the adoption pace and underestimated the magnitude of the impact. The pace turned out to be slower but its eventual impact much larger.

By any measure, the industry has been highly profitable. But its members now face a stark choice: digitize or jeopardize. They must either embrace the revolution that is sweeping through their societies or risk becoming its unwitting victim.



2

Drivers of digitization

Business as usual is not an option

Sophia, Hanson Robotics



To date, alternative investment managers have invested in technology to reduce costs by automating their routine manual operations. Digitization has the potential to enhance this process to create joined-up businesses that go from being product-centric to client-centric, while delivering strong operating leverage. The implied step change will occur as future asset growth will most likely come from organic means instead of market rises, as in the recent past.

1 From process automation to business transformation

a. Current state of play

Hedge fund managers have long embraced technology in many functional areas.

For example, 'dashboard' systems are now common in compliance management, in response to the tsunami of regulation on both sides of the Atlantic in the wake of the 2008 global financial crisis. New rules on Know Your Customer (KYC) and Anti Money Laundering (AML) have given rise to a new industry — 'RegTech' — that provides a raft of end-to-end solutions in the compliance space.

Similarly, with front-office research, hedge fund managers have been accessing information from a wide variety of sources and doing extensive data crunching to support their investment process. Mifid II, for example, is changing the market for research.

In the middle and back offices too, portfolio accounting, risk management and fund administration systems have

been used widely. Systems that support investor relations have also become common. The smaller managers have outsourced most of these activities to third party fund administrators, while the rest have been building dedicated, in-house capability.

For their part, until the start of this decade, private equity managers have been less inclined to big technology spend for two related reasons.

First, their deals are highly bespoke, each with a unique complex structure. Second, private equity is a highly relationship-based business that relies on personal networks for deal flows far more than hedge funds.

However, as the decade has progressed, regulatory reporting requirements under the Dodd Frank Act in the US and the Alternative Investment Fund Managers Directive in Europe have turned the spotlight on technology infrastructure in private equity houses too.

“
Digitization makes
our business
scalable while
retaining its craft
nature.”

Interview quote



Relying on asset price inflation to drive our AuM is a high-risk venture. Markets can turn on a dime. We need more stable revenue streams.



Interview quote

This has been further reinforced by ever more stringent due diligence now undertaken by end-clients who place operational excellence high on their checklist. In fact, they now employ armies of advisors to find out why they should not invest with a particular manager. The burden of proof has shifted.

The precise nature and extent of the adoption of technology systems in hedge funds and private equity currently is a matter of detail. The substantive point is that most of them are stand-alone or, at any rate, have limited connectivity because of the differences in the chronological age of the systems. Even in a critical area like client reporting, extensive reliance on Excel spreadsheets is not uncommon.

Up until today, investment in technology aimed to industrialize the business to make it more scalable via a twin-track approach.

On the one hand, there has been rising automation of the routine processes in front, middle and back offices in order to achieve cost-effective growth. Novel approaches such as cloud computing, data warehousing and 'software-as-a-service' have been going mainstream.

On the other hand, core activities in the front and middle offices continue to work along the traditional craft line, being skills intensive and knowledge based.

The key aim behind technology spend has been to create a scalable business model by industrializing the routine labour-intensive activities or outsourcing them. Hedge funds are ahead of their private equity peers in this respect.

In the past, with business growth there often came a rising cost:income ratio — in a chain reaction. Growth created jobs, which created bureaucracy, which created complexity, which created diseconomies of scale. Technology has helped to reverse this trait, which has long been associated with all craft-based businesses.

b. Facing the future

The next step is to create more joined-up businesses as they scale, where revenue rises much faster than costs. This has been made possible by the latest advances in the 60-year evolution of information technology.

In the 1960s, the arrival of semiconductor-based microprocessors created digital data for the purpose of model building, complex calculations or general storage. In the 1970s, this evolved into mainframe computers, capable of processing ever-larger batches of data in one location. In the 1980s, this spread to distributed data processing via remotely connected mini computers. This decade also saw the arrival of personal computers. In the 1990s, the evolution continued to encompass mobile phones.

With the rise of the internet, the 2000s witnessed the proliferation of smart phones, permitting immediacy, connectivity and ubiquity.

Since then, thanks to Moore's Law, which states that the processing power of computers doubles every two years, the global economy has mushroomed into the largest digital network imaginable. The rise of quantum computing, which harnesses the power of atoms and molecules, instead of silicon chips, may well render Moore's Law obsolete.

The latest phase of digital evolution is now encompassing revolutionary technologies like blockchain, machine learning and robotic process automation. Speed, connectivity, insights, transparency and disintermediation are their hallmarks.

Indeed, they also constitute the third phase in the evolution of the alternative investment industry (Figure 1.5 in Executive Summary). They are reshaping business models in finance. Retail banks have taken the lead; alternative investment managers have taken note. The winds of change are evident.

2 The drivers of digitization

When asked to identify future drivers of digitization, nearly one in every four respondents identified seven drivers (Figure 2.1). They are presented in three clusters below.

a. New cost disciplines

Taking them in turn, 54 percent identified rising pressures on fees and charges as a key driver. These have come to the fore in this decade as investment returns have become a monetary phenomenon, influenced far more by largesse from central banks than by the state of the real economy. QE in America, Europe and Japan has distorted asset valuations and disconnected them from their fundamentals. They have also fuelled the rise of passive funds, in which securities have benefited far more from inclusion in various indices than from their intrinsic worth.

In this environment, as an industry, hedge funds — like their long-only active cousins — have not met clients'

return expectations, thus intensifying fee pressures. QE has also borrowed against future returns, ushering in a low-return environment for the foreseeable future. Fees and charges have thus become a key source of outperformance, once compounded over time.

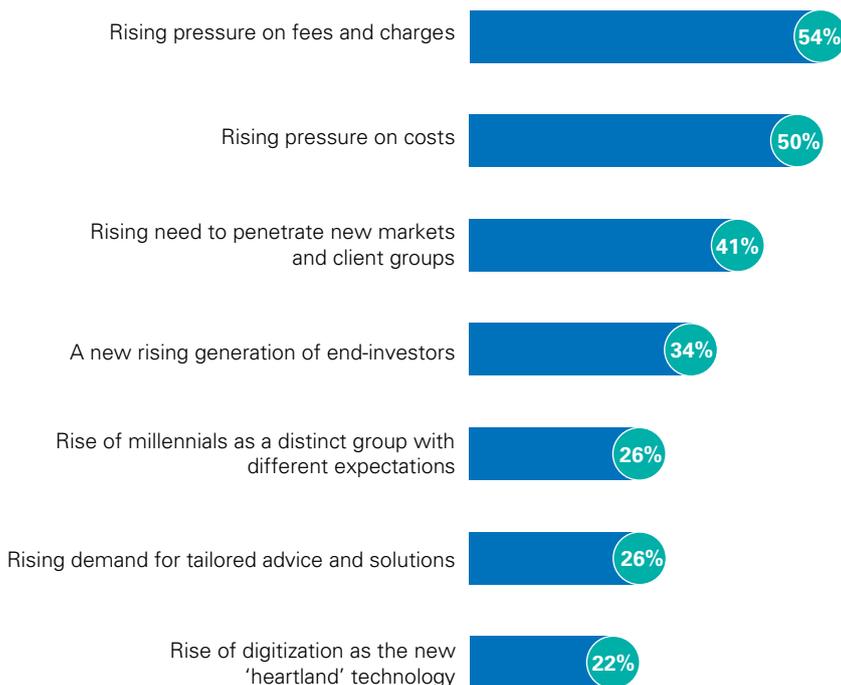
While private equity has continued to perform well, the stellar returns of yore are history. Their opportunity set has diminished with new inflows, as corroborated by the amount of 'dry powder' — unallocated capital — they hold, which reportedly stood at a record high of \$954 billion globally in September 2017, according to Preqin Private Equity Online.

In the meantime, due to regulatory pressures and the scarcity of alpha generating managers, costs have been rising and will continue to do so (as identified by 50 percent of our respondents). End-investors are becoming increasingly fee conscious, as

“
The industry has to target under-served client segments to power its next wave of growth.”

Interview quote

Figure 2.1 Which of the following structural drivers will cause your business to embrace digitization over the next 3 years?



Percentage of respondents

Source: © KPMG/CREATE-Research survey 2018



“

When central banks take away the proverbial punchbowl, asset valuations may well nosedive. We need to future-proof our business against big market-moving events.”

Interview quote

they face the low-return environment. There is every likelihood that the alternative investment sector may well be moving from being supply led to being demand led, with price becoming a key point of competition.

b. New client segments

At any rate, cost disciplines will become vital to avoid the curse of ‘profitless prosperity’, as managers scale their business by penetrating new markets and client groups (41 percent). The current bull market cannot go on indefinitely without phases of extreme volatility; especially in an era where central banks are retreating and most asset prices are reconnecting to their ‘fair value’.

So far this decade, market growth has been the main driver of AuM, according to our post-survey interviews. Organic growth is the new mantra. There is now an urgent need for the industry to enter under-served client segments such as high net worth investors, DC pension plans and insurance companies.

These segments are becoming all the more important now that defined benefit pension plans — a key preserve of alternative investment managers so far — are advancing rapidly into their run-off phase due to ageing member demographics.

Unsurprisingly, therefore, 34 percent have identified a rising generation of new end-investors as a factor, demanding more immediacy, connectivity and ubiquity. And 26 percent have identified the rise of millennials as a distinct investor group in this context.

This self-directed ‘internet generation’ is expected to be the biggest employee group in the key economies over the next 15 years. Above all, it is expected to be the beneficiary of the biggest wealth transfer in human history as their wealthy baby boomer parents pass on. Their inheritance is estimated at \$30 trillion in the US, according to CNBC estimates. Outside the US, the figure is expected to be just as high.

The new generation of investors is likely to demand tailored advice and bespoke solutions (26 percent) — in marked preference to off-the-shelf products. Some will demand product alpha: traditional excess returns over market benchmarks. Some will demand solutions alpha: returns that meet specific needs (e.g. future liabilities, school fees). Some will demand commoditized alpha: excess returns at beta risk and beta fees via smart beta.



Last, but not least, the rise of digitization as the new ‘heartland’ technology will be a driver in its own right (22 percent). It is seen as permeating every area of the investment value chain over time, as alternative investment managers navigate some of the hurdles described in Section 5.

The low ranking accorded to digitization here is indicative of an important fact: it will not be demanded for its own sake just because it is there. Rather, demand will be primarily influenced by the business benefits that it can bestow, as it diffuses across alternative investing.

c. New Darwinian forces

In our post-survey interviews, it was clear that digitization has a pre-eminent role in delivering the operating leverage that end-investors value most, as alternative investment managers seek to attract ever more dollars to scale their businesses over the rest of this decade and beyond.

This leverage is defined by four specific benefits associated with increasing scale:

- better and consistent returns via a significant information advantage over competitors
- friction-free client experience via online engagement tools that allow

clients to consume information in innovative and intuitive ways

- lower costs and a competitive fee structure that delivers value for money
- operational excellence that can stand up to stringent due diligence in a world far removed from the usual ‘check the box’ forms. The bar, when raising capital, will be ever higher, with a clear focus on technology, processes, infrastructure, talent and culture.

Without these benefits, it will be difficult for alternative investment managers to expand their footprints in different geographies and client segments. The next wave of business expansion will most likely come from organic growth.

To achieve the requisite operating leverage, business model innovation will be just as important as product innovation. The demands of the newly emerging client segments will enjoin managers to do old things better as well as doing new things; so as to remain relevant in a changing landscape.

We return to this point in Section 5, after discussing the current state of digitization in hedge funds and private equity managers, respectively, in the next two sections.



Digitization is primarily a business model innovation.”

Interview quote

3

Adoption by hedge funds

A tale of two halves



The majority of hedge fund managers are still at the nascent stages of *'awareness raising'*. The rest have already embarked on the digital journey, pragmatically bolting innovations onto existing technologies while staying within their comfort zone. A small minority are forging ahead with revolutionary innovations that offer a competitive edge via advanced analytics and a digital client experience.

1 The current scorecard

Collectively referred to as 5G (fifth generation), the latest suite of digital tools is widely predicted to have a far-reaching impact on business, markets, the economy and society over the next 20 years, just as the internet has done over the past 20 years.

Thus far, its impact has been evident in mass market industries characterized by high labor intensity, process standardization and product simplification.

Prominent pioneers like Amazon, Google and Uber have redefined their industries by rewiring customer experience, addressing unmet needs, creating new needs, or finding cheaper ways of meeting existing needs in both B2B as well as B2C segments.

These tech giants had two advantages: a clean slate start and no fear of failure. Indeed, some commentators attribute their success to the age-old principle of *'failing forward'*: take big risks, learn from early failures and go forward using that learning.

Legacy businesses, on the other hand, are forced to operate within much narrower confines for a variety of reasons connected with their history, geography, culture and regulation.

In the case of alternative investment managers, they are also dealing with other people's money, or mostly operating in the B2B segment with a much more limited client base. Anything not tested by time or events — no matter its intrinsic worth — usually takes a long time to go mainstream.

Comparing alternative investment managers with digital standouts like Apple and Amazon is not so meaningful and often comes off as naïve, feeding the cynicism that digital is more hype than real.

Hence, at the dawn of the digital age, it is better to focus on the progress so far and its likely course in the foreseeable future in the unique circumstances of each industry, as done in this section and the next.

“

In our due diligence, we use scraping analytics that extract data from websites, social media and prediction markets.”

Interview quote



We need to cultivate a new corporate DNA to embrace new technologies. Simple bolt-ons are not easy with some innovations. ”

Interview quote

Figure 3.1 provides an overview of the current state of play. The most salient point is that at least three in every five hedge fund respondents to our survey are still at the nascent stage of *'awareness raising'*: namely, the low end of the familiar learning curve. For complex tools such as blockchain, for example, the figure is 91 percent. Our post-survey interviews served to shed light on these numbers.

a. The low-hanging fruit

The first point that emerged is that implementation has focused on areas where bolting onto existing systems has been seamlessly possible as an evolutionary process, rather than starting from scratch. These are also the areas where the comfort level with the new tools has been high: they mark a natural progression in the existing technology stack.

Nearly 30 percent of respondents have implemented robotic process automation where the financial payoff thus far has been good. Directly, each robot has displaced 1.5 full-time employees in some cases. Indirectly, however, new jobs have also been created in other parts of the value chain from the resulting improvement in competitiveness.

Twenty-four percent have implemented application programming interfaces that leverage existing IT assets to generate new business because of the greater degree of comfort with the two underpinning technologies: mobile apps and cloud computing.

Twenty-four percent have implemented *'big data'*. Some are quant managers using systematic strategies; others are discretionary managers relying mostly on skills. Both work on a vastly enhanced volume, velocity and variety of data to create investible information

and actionable insights. In the process, both also use machine learning that assists the alpha generation process.

Twenty percent have implemented social media. Many among them have high net worth clients. Social media is deployed to promote brand and conduct virtual focus groups. It is also used to track *'sentiment'* indices that predict earnings surprises as much as major events like the Brexit vote. Some of these managers also have digital platforms that allow clients to access information and do portfolio simulations under different scenarios.

b. The hard stuff

However, as hedge fund managers venture further south in Figure 3.1, they find themselves in unfamiliar territory — one that has so far been the preserve of their very large peers. Indeed, two points stood out in our post-survey interviews.

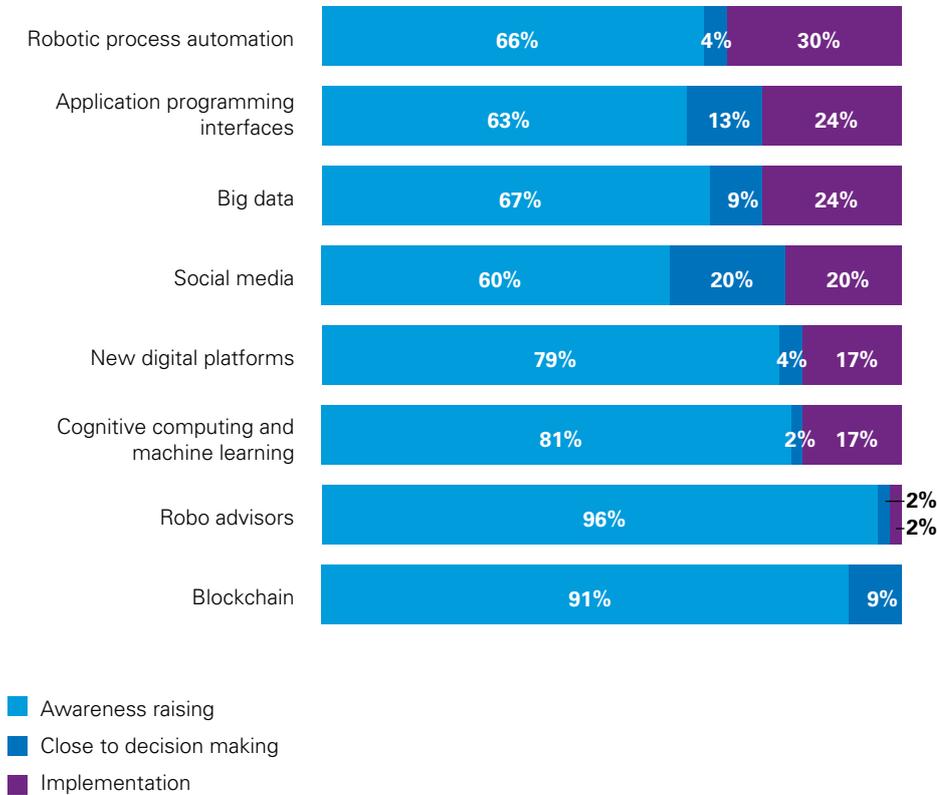
First, start-up quant managers as well as their long-established peers use state-of-the-art client digital platforms and machine learning systems.

The clean slate starts have enabled the start-ups to go for cutting-edge tools without any legacy issues.

As for the established quant managers, technology has always been at the heart of their business and their principal competitive edge. There is little fear of the unknown on their part, as their business DNA has evolved with technology.

Elsewhere, the story is different, largely because of the rising complexity of new digital tools that are taking businesses from linear time to exponential time: compressing ever more work volume and corporate changes into less and less time. They inspire awe and fear in equal measure.

Figure 3.1 With respect to each of the eight key digital innovations below, in which stage is your business currently?



Percentage of respondents
 Source: © KPMG/CREATE-Research survey 2018

Machine learning is a case in point. It is now a foundational tool that mimics the neurons in the human brain. Its power comes from looking at similar non-linear, multi-layered processing of data to detect paths out of chaos. Each successive layer feeds on the output of previous ones.

Blockchain is another foundational technology — doubtless the hottest trend in global finance today. As a distributed electronic ledger, it enables smart contracting that allows parties to bypass the intermediaries in any transaction. Its applications run exactly

as programmed, as it aims to eliminate censorship and fraud.

Financial transactions can be executed at near-zero cost in nanoseconds: infinitely faster than the blink of an eye. The chain is self-policing. It provides a system for the fast, trusted exchange of vast amounts of data without intermediaries or supervision.

However, there remain a number of regulatory issues that need to be resolved before blockchain permeates the hedge fund industry. But its adoption is not a matter of ‘if’ but ‘when’.

“
 Ten years ago, data providers were nowhere. Today, they are everywhere.”

Interview quote

2 Target functional areas

Figure 3.2 provides a snapshot of the functional areas most amenable to the digital innovations listed previously in Figure 3.1.

As we saw in that subsection, the majority of our respondents are still

at the *'awareness raising'* stage with respect to these innovations. Yet, at this early stage, they can readily see their relevance with respect to every functional area in the front, middle and back office — to varying degrees.

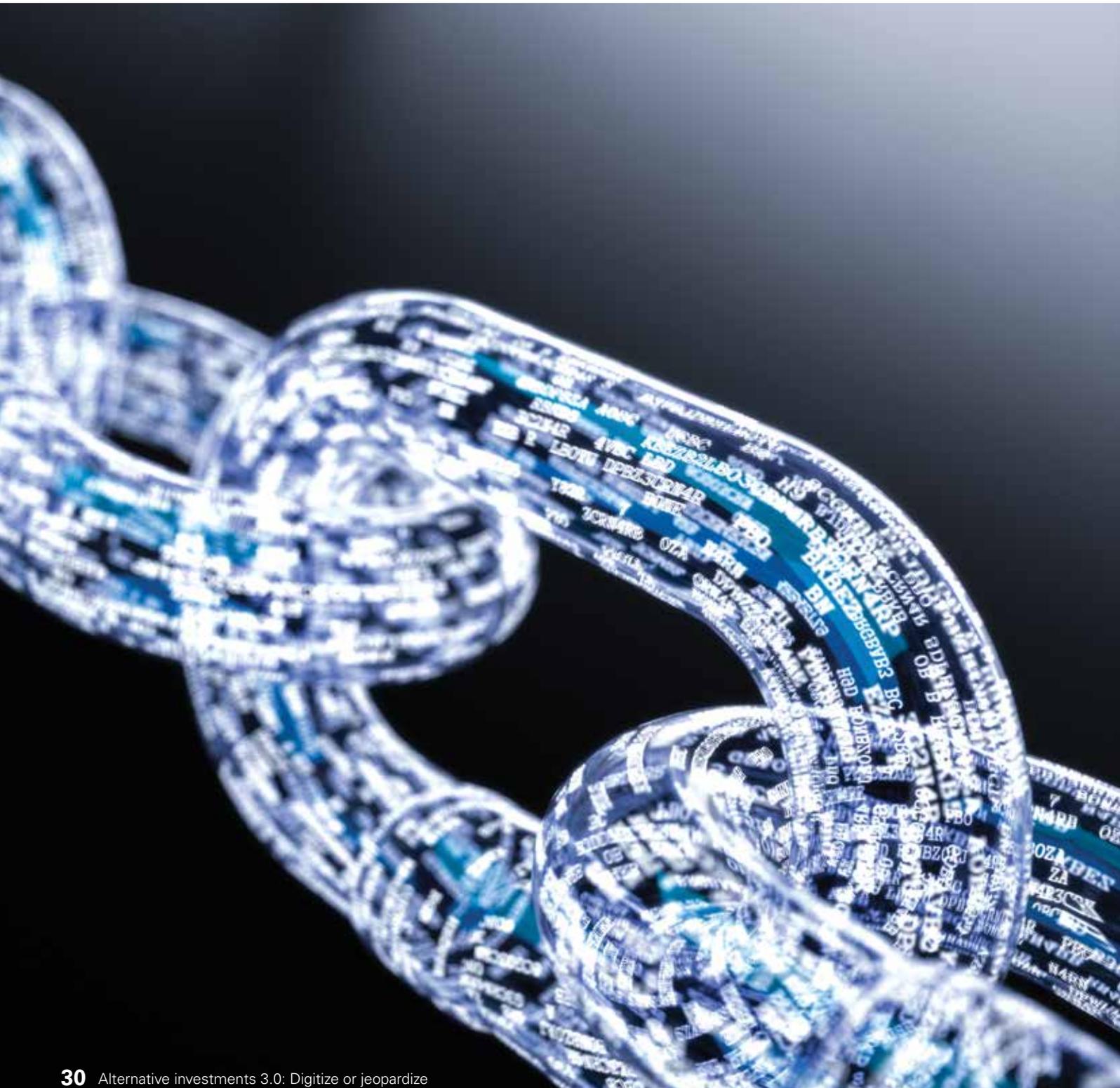
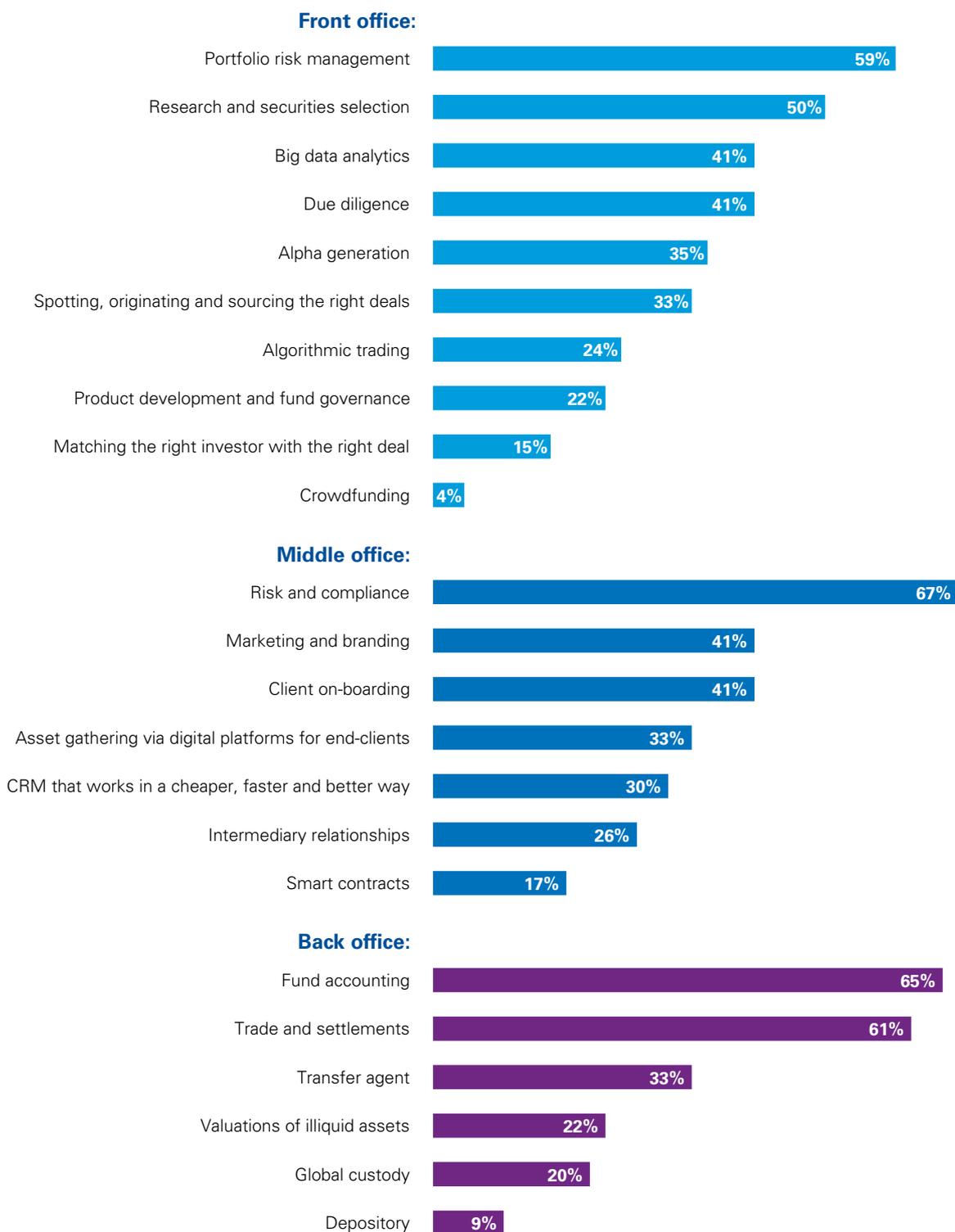


Figure 3.2 Which activities in your investment value chain are especially amenable to the newly emerging digital innovations?



Percentage of respondents

Source: © KPMG/CREATE-Research survey 2018



The search for new data is our 24-hour mission.

Interview quote

a. Front office

In the front office, nearly one in every four respondents identified seven activities — all high value added. They are:

- portfolio risk management (cited by 59 percent)
- research and securities selection (50 percent)
- big data analytics (41 percent)
- due diligence (41 percent)
- alpha generation (35 percent)
- spotting, originating and sourcing the right deals (33 percent)
- algorithmic trading (24 percent).

For hedge fund managers, the collection of relevant information has been as important as its analysis. Access to data is a commoditized process and is far less onerous than in the recent past. Reportedly, 90 percent of information available today did not exist five years ago — in structured or unstructured form. The challenge is in processing that information. Big data analytics appears as a separate line item in the above list of activities since it is also deployed in client service and back office activities.

The combination of big data and machine learning has huge potential to push the science of analytics to new frontiers.

Rather than spending hours on the mundane task of organizing data, portfolio managers are relying on customized analytics dashboards to do that, enabling them to hone their investment instincts to improve their performance and detect low-frequency/high-severity events.

At any rate, the breadth of opportunities created by advances in analytics is very significant via targeted investment insights and unprecedented speed. Advances in data analytics are combining the 'science' and the 'art' of investing. Web scraping — extracting

data from websites, social media, the satellite monitoring of parking lot traffic and credit card purchases — is becoming common. The term 'big data' is not new. What is new is its velocity, variety and volume.

For discretionary managers engaged in high-conviction investing, they provide robust data analysis, validation checks on their investment calls and red flags on the inherent risks along the investment journey.

For quant managers engaged in factor investing, for example, they provide inputs into the judgment calls on which factors to select and which data to apply, and also when to unweight, down-weight, redefine or switch off a factor. After all, factors can become over-valued as they attract new money and breach capacity ceilings.

That does not, of course, detract from the fact that assets in systematic strategies are reportedly set to grow rapidly from around 20 percent of the hedge fund universe today to 25 percent by the end of this decade — after notching up impressive returns for the past five years. Memories of the 2007 quant crash have evidently faded in the mists of time.

But there is one caveat: no technology innovation will fix a sub-par investment process. That is a matter for human control.

For the foreseeable future, and for the vast majority of hedge fund managers, digital innovations will serve to deliver inputs that improve human decision making, not displace it.

b. Middle office

In the middle office, too, at least one in every four respondents identified six areas that are especially amenable to digital innovations:

- risk and compliance (67 percent)
- marketing and branding (41 percent)
- client on-boarding (41 percent)

- asset gathering via digital platforms for end-clients (33 percent)
- CRM that works in a cheaper, faster and better way (30 percent)
- intermediary relations (26 percent).

The high score accorded to risk and compliance is unsurprising. Hedge fund managers expect regulatory creep to remain a fact of life, as governments worldwide are seeking to safeguard client interests, while encouraging them to plan for their own retirement.

The legacy of distrust caused by the Madoff scandal will take a long time to heal. Accordingly, hedge fund managers see digitization as a means of coping with ever more regulation without incurring big spend with every new item, such as MiFiD II in Europe. These and other regulations call for a 'single source of truth' for risk managers.

Two other related areas were identified in our post-survey interviews as being especially noteworthy: asset gathering via digital platforms and CRM. As central banks wind down their ultra loose monetary policies, current market valuations may well retreat to their realistic levels. Hence, organic growth is likely to be the dominant avenue for business expansion.

As we saw in Section 2, high net worth investors, millennials, DC plans and insurance companies are likely to emerge as significant client segments in the next decade. They will make new demands that will be hard to accommodate within the existing technology infrastructure in the vast majority of hedge fund houses today.

In particular, they want 'client experience' of the sort that is now common in e-commerce.

Experience of the wealth management industry reveals two emerging trends.

First, the more millennial investors interact with digital tools, the stronger their views, convictions and insights.

They want live investment information that can be accessed on their handsets anywhere, any time.

Second, millennials are also becoming increasingly self-directed in investment matters. They are likely to be among the biggest users of robo-advisor platforms offering tools that permit risk profiling, rapid enrollment, asset allocation and portfolio rebalancing. But, for the foreseeable future, the majority of millennials are likely to opt for robo-lite, blending the human touch with a bricks-and-mortar presence.

A very different generation of investors now beckons.

c. Back office

One in three respondents identified three areas that are especially amenable to digital innovations:

- fund accounting (65 percent)
- trade and settlements (61 percent)
- transfer agent (33 percent).

Blockchain is the obvious vehicle. It allows remote clients to provide immediate proof of their identity, within a distributed ledger, shared by all participants in a decentralized network. No area of the value chain is left untouched by the translation of physical data into digital.

Blockchain already rivals the internet in its revolutionary potential. Unsurprisingly, a handful of large hedge fund managers are exploring its adoption, starting with the core back office activities listed here. As we shall see in the next section, a small number of private equity managers have already implemented it, in partnership with their third party administrators.

The latter are expected to turn into strategic partners increasingly providing technology solutions on top of their traditional fund accounting services. However, many obstacles need to be overcome before then. We shall return to this point in Section 5.



You'd be amazed how manual our operations were. We've since invested in a back-office system. It has replaced 75 processes and 15 risk models. ”

Interview quote

4

Adoption by private equity

Bifurcation between the best and the rest



Like their hedge fund peers, the majority of private equity managers are still at the nascent stage of *'awareness raising'*. The rest have boldly advanced on their innovation journey in search of new opportunity sets by improving client centricity and the deal process. The next wave of innovations will also target multi-asset funds and the *'digital fitness'* of the portfolio of companies held by private equity firms.

“
Regulation is crying out for digitization.”

Interview quote

1 The current scorecard

Section 2 highlighted the seven drivers of digitization in the alternative investment industry. For private equity firms, two additional drivers also merit special mention.

The first one covers regulation on both sides of the Atlantic in the wake of the 2008 crisis. The so-called Form PF under the Dodd-Frank Act in the US is similar to the broad jurisdictional and reporting requirements under AIFMD in Europe.

Both seek to identify and manage systemic risks by demanding more data and more granularity more frequently — adding up to over 2,000 data points in total in each submission. In their due diligence exercises, prospective limited partners now focus on similar pointed questions as regulators. Headline risk is ever present and growing.

For private equity managers, the demands are all the more onerous because their investments and the underlying agreements are highly customized. Their existing systems are a mix of customized and off-the-shelf technology, backed largely by spreadsheets and manual inputs. Much of investing remains an artisan activity.

The second relevant driver relates to new sources of funds as well as their destinations. Section 2 highlighted the importance of cultivating new client segments, as ever more pension plans advance rapidly into their decumulation phase due to ageing demographics. But that is not all. Finding new investment opportunities is also a new imperative.

Currently, the global AuM of the private equity industry stands just shy of US\$3 trillion. Firms are buying more businesses than they are selling. The dry powder — unallocated capital — reportedly stood at its all-time high of US\$954 billion in September 2017, according to Prequin Private Equity Online. With asset valuations driven to sky high levels by QE, buying opportunities are dwindling — as are selling ones.

Private equity firms can neither buy enough nor sell enough to keep the deal pipeline flowing smoothly. Digitization is perceived as a part of the solution by reducing the frictional cost of doing business, discovering new opportunity sets and increasing the intrinsic worth of their assets, as we shall see below.

“Currently, the price of assets matters more than the speed of transaction. But over time, client experience will also become a key differentiator.”

Interview quote

Before then, we highlight the current state of play with respect to digital innovations (Figure 4.1).

a. Client centricity

As with hedge funds, so with private equity: the tendency has been to bolt innovations onto existing systems as a first step wherever possible.

Thirty-two percent have implemented social media to promote corporate brand, spot new investment opportunities, map social networks onto potential limited partners, perform due diligence, match the right limited partner with the right deal and reach out to influencers who can evangelize investment ideas.

Twenty-nine percent have implemented platforms that offer virtual data rooms where limited partners can access data in real time, check risk positions and do scenario analysis. The data from these platforms are also fed into the product development process. At the limited

partner end, the principal users of this innovation are high net worth investors, sovereign wealth funds and pension plans, especially those investing in multi-asset class alternatives.

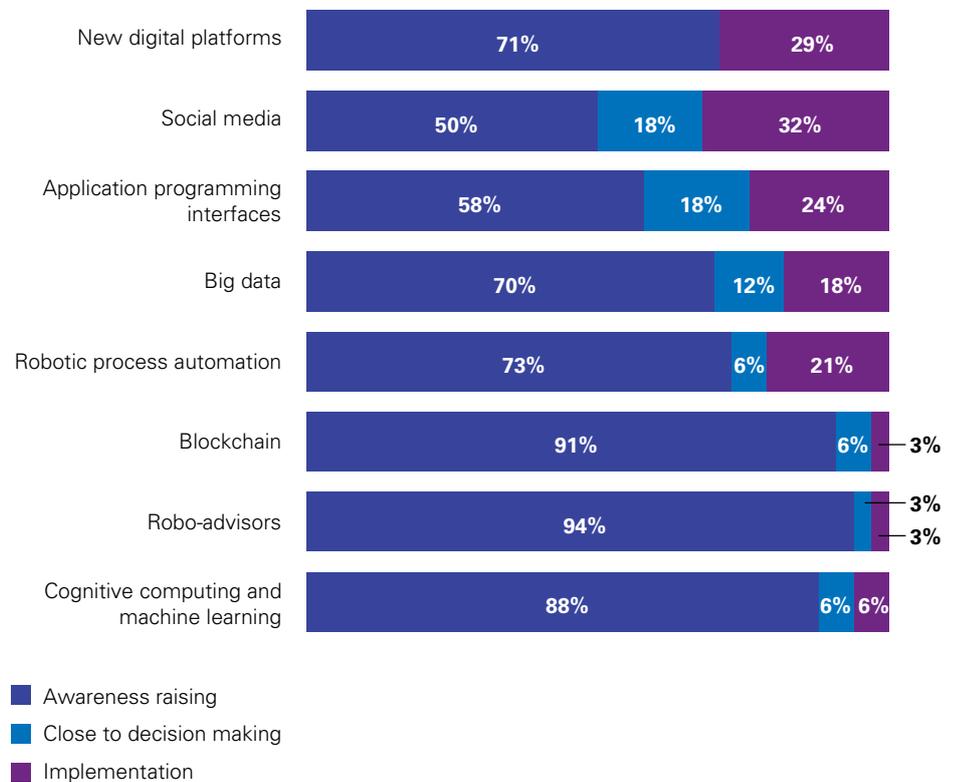
b. A cost-effective deal process

Twenty-four percent have implemented application programming interfaces that deploy existing IT assets to promote new business via mobile apps and cloud computing. They provide valuable market intelligence on potential deals and prospects.

Twenty-one percent have implemented robotic process automation that mechanizes routine mid- and back-office manual operations.

Even so, like their hedge fund peers, the majority of our respondents are still at the stage of *'awareness raising'* that clearly varies with the sophistication of innovation in question (lower half of Figure 4.1).

Figure 4.1 With respect to each of the eight key digital innovations below, in which stage is your business currently?



Percentage of respondents
Source: © KPMG/CREATE-Research survey 2018

Big data, blockchain and cognitive computing have had a lower level of adoption simply because they are less relevant in the face of the extreme customization that characterizes private equity businesses today. Additionally, some of these innovations — big data and cognitive computing — are too complex at this stage of the life cycle of the industry.

They don't lend themselves to simple bolt-ons. They require a large mature IT infrastructure that remains a rarity among the vast majority — for now.

Others, like robo-advisors, require a huge mass market client base, which also remains uncommon in private equity investing at the current stage of its evolution.

2 Target functional areas

Figure 4.2 provides a snapshot of the functional areas most amenable to the digital innovations listed previously in Figure 4.1.

Like their hedge fund peers, private equity managers have identified the relevant functional areas in their front, middle and back offices.

a. Front office

At least one in every four private equity survey respondents singled out the following areas:

- portfolio risk management (49 percent)

- big data analytics (46 percent)
- research and securities selection (40 percent)
- due diligence (40 percent)
- spotting, originating and sourcing the right deals (31 percent).

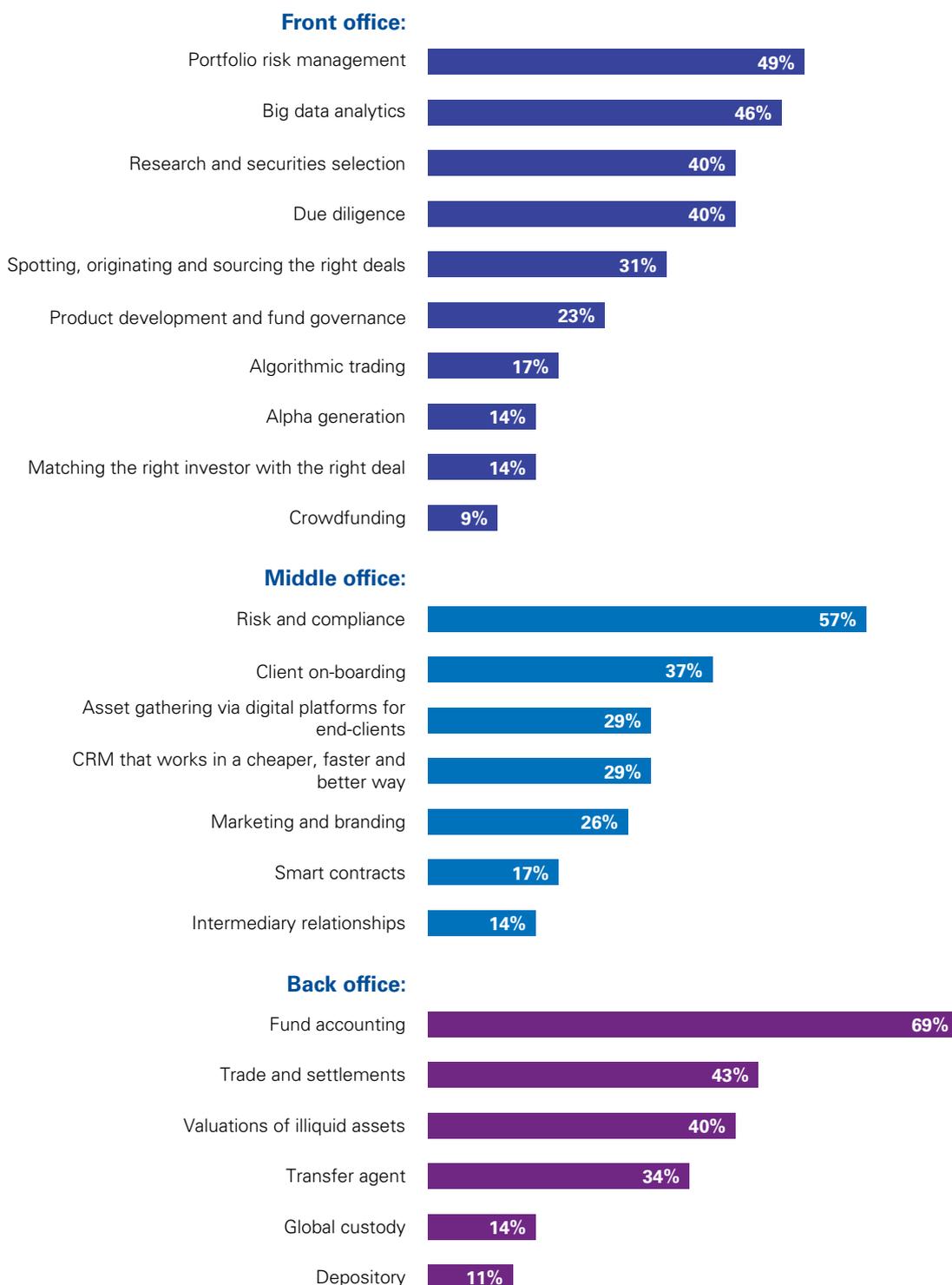
Risk management and big data top the list. The proliferation of data allows the more robust identification, management and transference of risk associated with investments. It also allows managers to widen the potential opportunity sets for new deals that exist outside their usual comfort zone.

“
The democratization of the old-style opaque private equity business has started in earnest.”

Interview quote



Figure 4.2 Which activities in your investment value chain are especially amenable to newly emerging digital innovations?



Percentage of respondents
 Source: © KPMG/CREATE-Research survey 2018

Moving on, research and securities selection is mainly cited by managers who also offer hedge funds. In this context, the points made in Section 3 about discretionary and systematic strategies apply equally here. In private equity firms, research tools are largely restricted to early-stage screening during the deal-origination process.

Finally, on the face of it, the percentage cited for spotting, originating and sourcing the right deals appears low (31 percent).

The reason is the paucity of the relevant data among external vendors, in what is very much a word-of-mouth industry.

For example, those firms investing in real assets found it difficult to get the sufficient data breakdown on land and property usage when contemplating investments outside the prime locations.

Such information either does not exist or is prohibitively expensive, coming as it does from local brokers with data monopoly.

b. Middle office

At least one in every five respondents identified the following areas as being especially amenable to digital innovations:

- business risk and compliance (57 percent)
- client on-boarding (37 percent)
- asset gathering via digital platforms (29 percent)
- CRM that works in a cheaper, faster and better way (29 percent)
- marketing and branding (26 percent).

Risk and compliance top the list. Regulatory overdrive in this decade has elevated the role of technology in scaling the business cost effectively, ensuring that it is flexible enough to cope with the dynamic nature of

risk today while being agnostic to jurisdictional requirements.

Moving on, a smooth and efficient on-boarding of clients is expected to enhance the buying experience and enhance the competitive edge.

Asset gathering via digital platforms is likely to gain traction, as private equity managers venture outside the institutional space. Some FinTechs already run platforms that do due diligence and crowdsource capital. Others are offering a suite of alternative investment funds, where clients can invest either alongside private equity funds or directly into them.

Finally, marketing, branding and CRM have been identified due to their connection with client experiences and the possible rise of digital platforms for the mass markets in the next decade.

At this stage, smart contracts are cited by only 17 percent because of the customized nature of private equity deals. The number may well rise, as the industry goes mass market over time: all the more so, if the new generation of platforms also caters for Environmental, Social and Governance (ESG) funds of special appeal to millennials.

More importantly, smart contracts are likely to become more prominent as blockchain becomes more widely adopted. They require a verifiable and unhackable system — like blockchain — that strictly emulates the logic of legal clauses in a contract.

c. Back office

At least one in every four respondents identified three activities especially amenable to digital innovations:

- fund accounting (69 percent)
- trade and settlements (43 percent)
- valuations of illiquid assets (40 percent).

“

PE firms are buying more businesses than they are selling.”

Interview quote



The biggest change will come with smart buildings and the Internet of Things. We see it as a tool of value creation in the companies in our portfolio.

Interview quote

Due diligence by prospective limited partners is following the same trajectory as regulators: getting bigger, longer and more granular.

Operational excellence in all activities in front, middle and back offices is becoming important. Digitization is especially conducive to activities that determine excellence: reporting and communication to limited partners;

3 Emerging imperatives

Going forward, the next round of digital implementation will be influenced by two imperatives that emerged in our post-survey interviews.

First, the next wave of demand for private equity in the West will see a strong rise in multi-asset funds that blend four distinct asset classes in one single vehicle: buy-outs, real assets, credit and hedge funds. The aim is to be a 'one-stop-yield-shop'. Ever more private equity houses are venturing into hedge funds. The implied diversification will further widen and deepen over time. The largest private equity houses already have the requisite brand, skills and technology to do that. For the rest, product widening and deepening in essentially people-based businesses will only be possible with a scalable model with strong operating leverage. The requisite technology already exists.

For example, current advances by FinTechs to create a whole new generation of digital credit platforms are taking off. They originate, underwrite and distribute loans to mass market corporate and private borrowers alike. We are already seeing multi-product private equity or hedge fund houses operating their own versions of lending platforms.

Second, such houses will be increasingly required to develop digital capabilities in-house to help improve the 'digital fitness' of companies they invest in. They will be seeking to improve the way they interact with their portfolio companies to accelerate their value creation. In particular, they will be moving away from merely being providers of capital and becoming strategic partners.

connecting with other players in the ecosystem of the deals; managing financing terms; and setting automatic alerts and triggers relating to so-called affirmative as well as negative covenants.

The latter two, respectively, set out the managers' financial obligations under the deal and specific prohibitions outside their designated areas of activities.

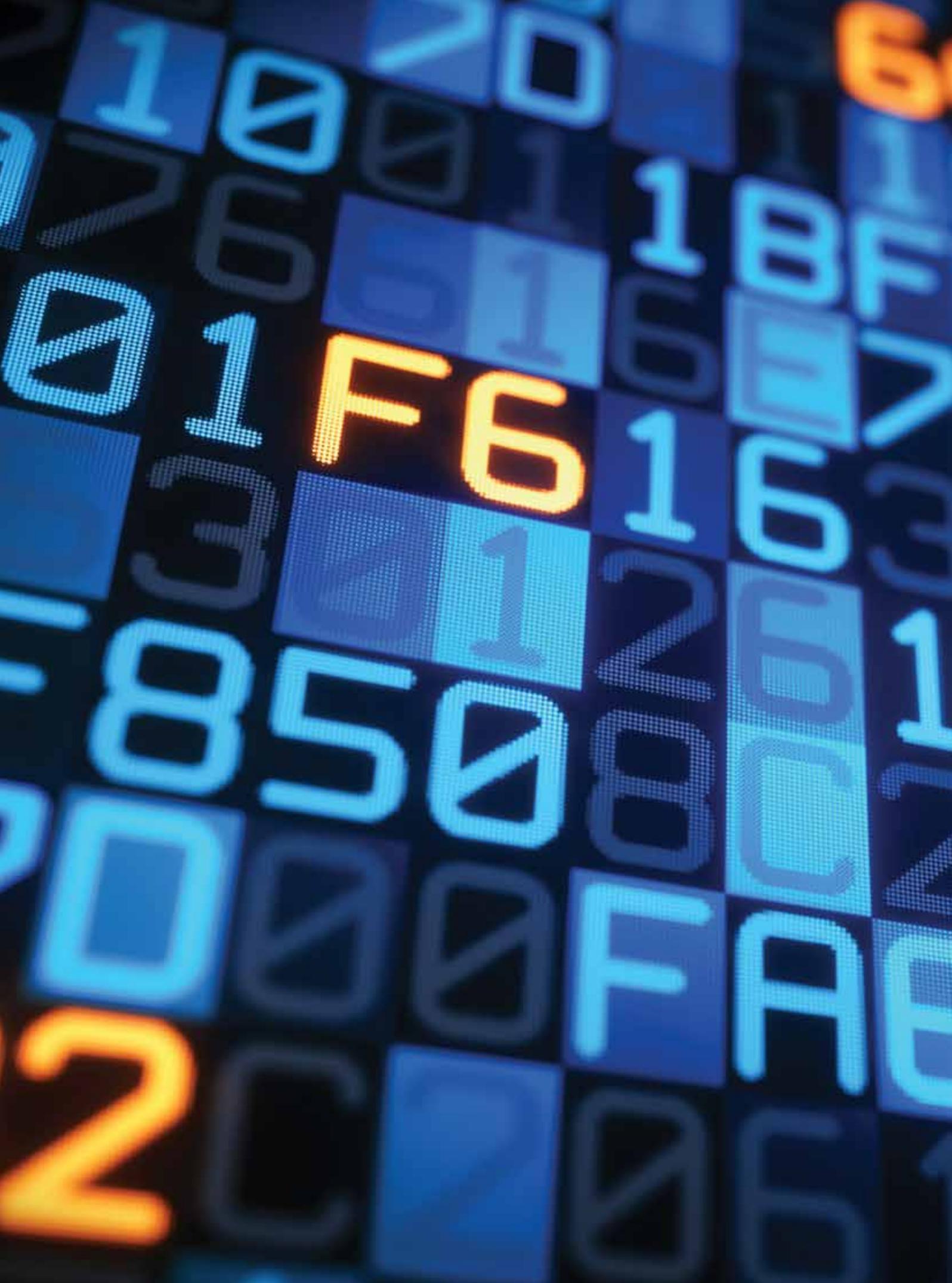
The traditional focus on the financials will no longer be enough to improve the underlying worth and resilience of their companies, especially when the manufacturing sector worldwide is advancing into the so-called '4.0 Revolution' — powered by digitization.

Corporate as well as product life cycles will be getting ever shorter. All value-added activities — such as R&D, manufacturing, product development, and sales and marketing — will have to be fundamentally recalibrated. The art of value creation will extend beyond traditional financial engineering and focus on corporate resilience. Maintaining past performance in an era of high inflows and overcrowded trades will be a tall order, in the absence of new sources of differentiation.

For example, real estate is expected to undergo transformational changes that will bring buildings into a gigantic digital network. Just as technological advances have created the notion of 'software-as-a-service', they are also set to create 'space as a service'.

Unsurprisingly, therefore, private equity managers are using digitization as a criterion in their own due diligence and investment decisions in the buy-out process.

Beyond that, they are also crafting value creation plans for their portfolio of companies, revamping the skill sets of their top executives and creating new incentive structures. Digitization holds a central role in the newly unfolding industry narrative.



History shows that each new generation of innovations raises two contrasting emotions. In the beginning, it is the fear of the unknown that *moderates* the pace of adoption. But as competitors enter the fray, it is the fear of being left behind that *accelerates* the pace. For the alternative investment industry, the tug of war between the two is ever present, with the former having the upper hand — for now.

1 Factors slowing the pace

That digital innovations have transformational potential in alternative investing is not in doubt. Nor is there any doubt about their ultimate adoption.

However, there are a number of factors that are moderating their pace. Some are inherent to the innovations at this stage of their evolution, others are related to the business. Their analysis is covered in the next two subsections, respectively.

a. Technology-related blockers

Four factors have been identified under this heading in our survey as moderating the pace of adoption over the rest of this decade (Figure 5.1):

- cyber security (58 percent)
- legacy IT systems (43 percent)
- high cost of digital innovations (42 percent)
- the opaque nature of some of the innovations (21 percent).

Our post-survey interviews shed light on these results.

Taking them in turn, cyber security and vulnerabilities have been heightened by

the combined effect of: the rising mass use of online presence, social media, mobile phones and cloud offerings. The emerging ecosystem, consisting of a vast network of digitally connected devices and entities, has already been exposed to all manner of malware attacks and cyber fraud in financial services worldwide recently.

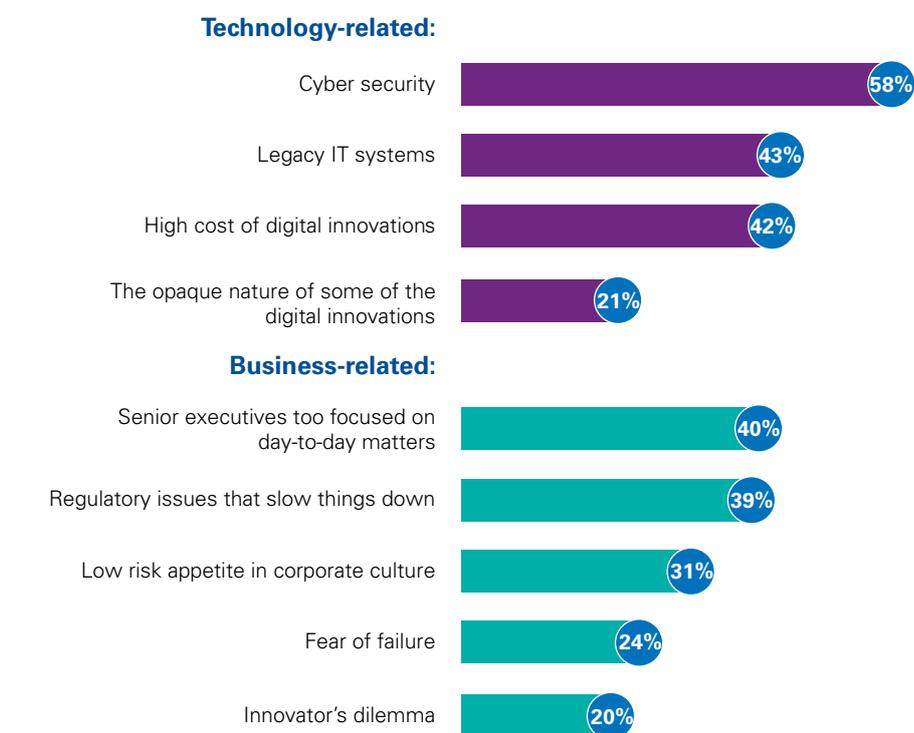
Another factor that is moderating the pace is legacy IT systems. In both hedge funds and private equity firms, systems have evolved in a piecemeal stand-alone manner as new needs arose. The resulting differences in the chronological ages of systems have prevented integration on a scale that can track data end-to-end within individual firms. Labour-intensive spreadsheets still remain an essential part of the value chain.

Part of the problem has been the high cost of digital innovations themselves and of the associated change management. Robust cost benefit analyses have proven difficult at this early stage where there are so many unknowns.

“Business model changes are less challenging when there is a burning platform. We haven’t had one yet.”

Interview quote

Figure 5.1 Which of the following factors will moderate the pace of digital innovations in your business over the rest of this decade?



Percentage of respondents
Source: © KPMG/CREATE-Research survey 2018

“
It will be another 5 years before we can trust machine learning. Remember LTCM was blown up by algos.”

Interview quote

However, far and away the most important factor moderating the pace of implementation relates to machine learning, which is embedded in all the digital innovations to varying degrees. For sure, it has a long run ahead of it, but four key issues need to be overcome.

First, machine learning needs powerful computers and a vast trove of relevant data to do its job. Market data is also limited and constantly changing to the point where future predictions of market-moving events is difficult.

Worse still, all the available data do not easily map on the particular strategies used in hedge funds and private equity. While it is true that some 90 percent of that data did not reportedly exist 5 years ago, much of it is in an unstructured format — audio, video and text. Deriving investible insights from them is not easy. In many cases, historical data have not been validated by point-of-time data. Above all, with current advances, it is not easy to separate signal from noise.

The second issue is that, at this stage, machine learning is good at predictable

paths and less good at events that have not yet happened or their wider context. Developments in the macro economy are too complicated and can easily involve corner cutting by machines if they fail to grasp their subtle meanings and behavioral nuances.

The third issue is that, as automated trading increasingly takes over, there is a corresponding rise in the risk of market contagion. A mistaken order — or an outsized one — can generate false signals for machine learning algorithms, sparking a cascading effect across the markets in less than the blink of an eye.

These self-driving systems are similar to their counterparts in the auto world: outstripping regulatory and legal frameworks as much as human capability to understand. Worse still, nobody knows how to assign liability if a self-driving algo goes haywire. Currently, software developers are likely not subject to product liability requirements in any country.

The final issue is that, unlike hand-coded learning systems, self-learning

machines are opaque to the point where few know how and why their advanced algorithms do what they do. They remain a dark black box. In marked contrast, end-clients want the human touch and clear explanation when returns fail to beat their benchmarks.

Top quant managers are inching closer to mastering the craft of machine learning to the point of relying on it completely. They have had years of experience based on learning-by-doing and trial by experimentation. They are also developing an effective machine-human interface, backed by a performance track record that raises the comfort level of their end-clients.

The rest are at the lower end of the learning curve. Their pace may well hasten, as the competitive dynamics of the industry accelerate, leaving the laggards at serious risk of falling by the wayside (see Executive Summary, Figure 1.6).

Currently, the majority of managers find it hard to place their bets on innovations not yet fully understood or trusted. Blockchain is a case in point. Standards, protocols and best practices have yet to evolve. Many solutions have yet to develop risk systems or compliance experience to underpin them, or indeed cater to yet-to-be-determined attacks from cyber malware.

The flip side is that the late adopters will have to be fast followers if they are to survive. The unfolding industry dynamics will ensure that digitization will differentiate winners from losers on a 10-year view, when 63 percent of our survey respondents anticipate 'partial' (53 percent) or 'full disruption' (10 percent) — as shown in Figure 1.1 in the Executive Summary.

b. Business-related blockers

Figure 5.1 singles out business-related blockers that moderate the adoption pace over the rest of this decade. They are:

- senior executives too focused on day-to-day matters (40 percent)
- regulatory issues that slow things down (39 percent)

- low risk appetite in corporate culture (31 percent)
- fear of failure (24 percent)
- innovator's dilemma (20 percent).

Our post-survey interviews unearthed three salient points.

First, senior executives have been too preoccupied with immediate issues in the past 5 years.

In the hedge fund space, fixing performance has been the top priority, at a time when publicly traded plain vanilla indexed funds as well as old style 60:40 balanced funds have been delivering double digit returns net of fees. QE has severely distorted market valuations and disconnected them from their fundamentals via strong price momentum.

In the private equity space, too, QE has raised two challenges: retaining good performance over public markets, and shrinking the record high 'dry powder' — unallocated capital — as we saw in Section 4.

Another factor contributing to short-term pressures is regulation. As regulators worldwide have been racing against one another to tighten their grip on the alternative investment industry, the headline risk has been amplified.

The second salient point from our interviews related to corporate culture. In most firms, there is very little appetite for technologies not tried or tested by time and events. All the more so because managers see themselves as fiduciaries, responsible for investing other people's money. Fear of failure is a major factor.

The final salient point is the ever-present innovator's dilemma: why disrupt the business if the profit margins are strong?

Our research on business models in asset management shows that the more things change, the more they stay the same, in what is an essentially cyclical industry. The rhetoric of change has invariably run ahead of reality. All the more so in houses where partners are coming up for retirement and want to monetize their equity without causing much upheaval.

“

I would be less unhappy about poor returns, if I knew the reasons. Machines can't tell me that. ”

Interview quote

“

There are too many worker bees who don't add much value.”

Interview quote

More generally, business model changes have always been as durable as the crisis that provoked them. Real sustainable change has been evident mostly among managers with a burning

platform or visionary leaders. However, as we saw in Section 2, the industry dynamics are changing. Digitization may well end up as a matter of necessity rather than choice.

2 Factors accelerating the pace

Figure 5.2 sets out the factors that will accelerate the pace of adoption over the rest of this decade. They are organized under two clusters. Each is considered separately below in the next two subsections.

a. Market-driven accelerators

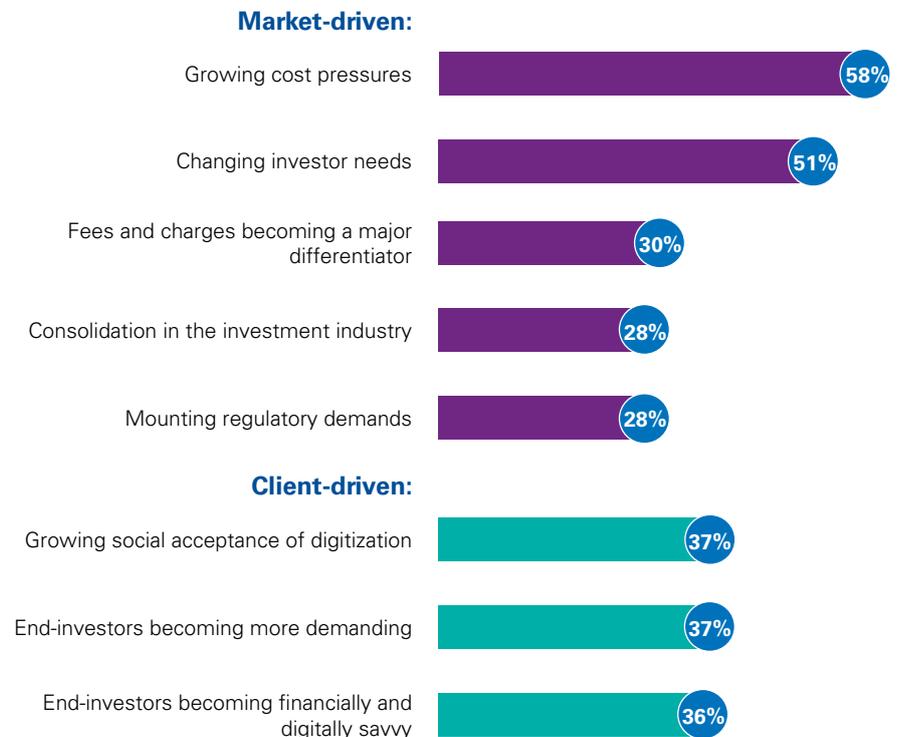
Under this heading, five items have been identified by our survey respondents:

- growing cost pressures (58 percent)
- changing investor needs (51 percent)

- fees and charges becoming a major differentiator (30 percent)
- consolidation in the investment industry (28 percent)
- mounting regulatory demands (28 percent).

Underpinning these numbers is the widely held view that the '2-20' fee structure is — and will remain — under intense pressure. As the gap in returns between private and public equity continues to narrow, only those who

Figure 5.2 Which of the following factors will accelerate the pace of digital innovations in your business over the rest of this decade?



Percentage of respondents

Source: © KPMG/CREATE-Research survey 2018

deliver high excess returns will be able to hold the line on fees.

The harsh fact is that most defined benefit pension plans worldwide are advancing into their run-off phase with two massive issues: negative cash flows due to ageing demographics and funding deficits due to sub-par returns. They are demanding hefty illiquidity premia net of fees. Some of them are also bringing investing in-house and seeking direct access to investment opportunities. They are also creating expertise in various hedge fund strategies like long-short and alternative beta.

Fee pressures will coincide with rising cost pressures as managers invest in technologies and the new talent required by it. Large houses with cutting-edge technology, a deep talent pool, respected brands and strong bargaining clout are likely to survive and thrive in the new competitive environment. Power will shift to the owners of the customer interface. The rest will need to find value where others can't. They will need to be hyper-scaled or hyper-focused. Success will most likely be tied to one primary source of competitive advantage.

Uncorrelated absolute returns will remain the name of the game. And their fee structure will increasingly demand value for money. In the expected low-return environment caused by the winding down of QE, end-clients will also demand a low base fee and a well-structured performance fee to secure a better alignment of interests.

At any rate, following the erosion of fees and its compounding effect in this decade, fees will become a differentiator in alternative investing. Cost disciplines will be central to securing organic growth.

Additionally, for private equity firms, competition will remain fierce, with high asset prices and scarce multiple arbitrage opportunities. They will need every tool they can get to screen the markets, spot opportunities and develop their portfolio companies.

Likewise, for hedge fund managers, alpha will become an even bigger zero-

sum game, as ever more managers venture into systemic strategies. They will need to be ultra innovative to create new demand, as old strategies go in and out of fashion.

In either case, to achieve operating leverage, digital innovations will become a must-have.

b. Client-driven accelerators

Under this heading, three items were identified by our survey respondents:

- growing social acceptance of digitization (37 percent)
- end-investors becoming more demanding (37 percent)
- end-investors becoming financially and digitally savvy (36 percent).

In our post-survey interviews, two points were often emphasized.

First, as a part of the buying experience, clients want a smooth on-boarding experience, now seen as the norm in e-commerce. Beyond that, they also want other functionalities.

Second, with the growing social acceptance of digitization, technology is reshaping lifestyles, with ever-rising expectations of service standards. Prominent brands are perceived to be those who seek to manage and exceed them — as Amazon and Apple have done.

Such brands have thrived on the so-called 'network effect': when a product or service is perceived as more worthwhile the more people use it. The classic example is the telephone: a growing user base increases the value to each subscriber. It also changes the industry dynamics. The arrival of hyper-connectivity is ensuring that branding is vastly more than name recognition.

In alternative investing, as the client base expands over the next decade, a digital brand will critically depend on investment performance, client experience, peer networking among end-clients and client advocacy. Clients will feature at the heart of the business. Client centricity will be another key differentiator.

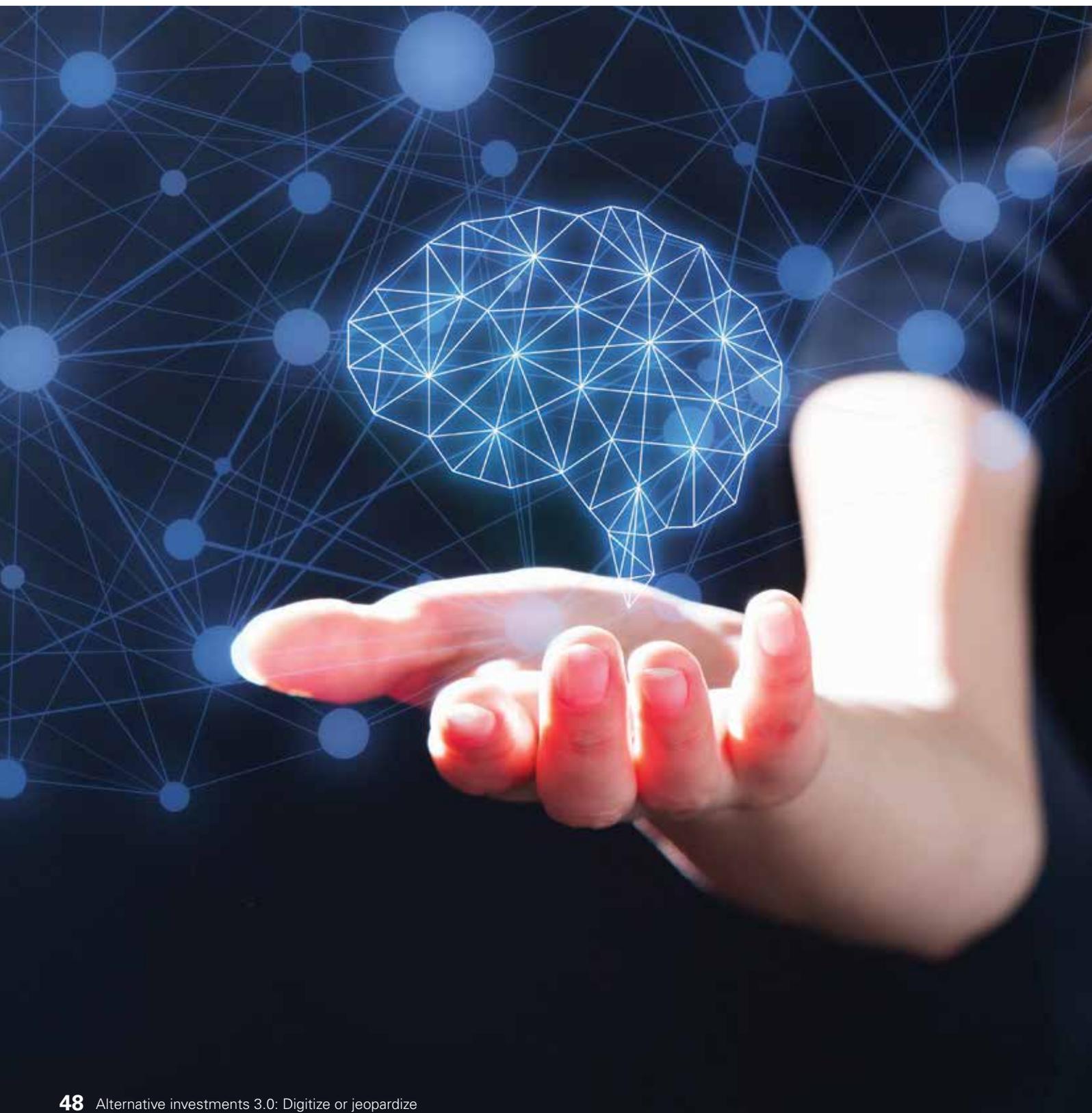
“
The 'network effect'
of digital innovations
will ensure a winner-
takes-all competition
in our industry.”

Interview quote

6

Advancing in the new age

Digital leaders make the difference



Digitization is about business transformation. That means it is as much about leadership as about technology — if not more so. Such digital leadership, in turn, is about shedding the old mental baggage and re-anchoring the business into the new age. This is easier said than done, especially when technology advances at a speed that far exceeds humans' ability to adapt. For late adopters, the gap between the two gets bigger and bigger over time with corporate inertia.

“

There are no good options, but to do nothing is the worst.”

Interview quote

1 Connecting the dots between three separate contexts

Based on the experiences of the early adopters, a credible digitization strategy needs to grasp the changing dynamic in three separate contexts and make connections between them that turn challenges into opportunities. This is an essential prerequisite for surviving and thriving in the digital age.

a. The industry context

The context of the alternative investment industry is changing — and will continue to do so.

On the positive side, the industry's AuM will continue to grow over the next 5 years, thereby increasing its share in the global AuM of the entire asset management universe (Figure 6.1, second column, top circle).

However, growth will accrue to those who are able to deliver 'pure' alpha, as distinct from 'commoditized' alpha.

The first refers to excess returns over market benchmarks based mainly on skills-based informational advantage which may or may not be backed by machine learning.

The second refers to excess returns over the chosen indices delivered by factor investing or other smart beta type strategies that attract much lower fees. In this space, long-only mega index houses are already carving out a big share. They will be the principal beneficiaries of the strong projected growth in passives and systematic strategies (Figure 6.1, second column, bottom circle).

Hence the bar on pure alpha managers will be raised. They have to deliver over and above the commoditized returns to justify their fee structure.

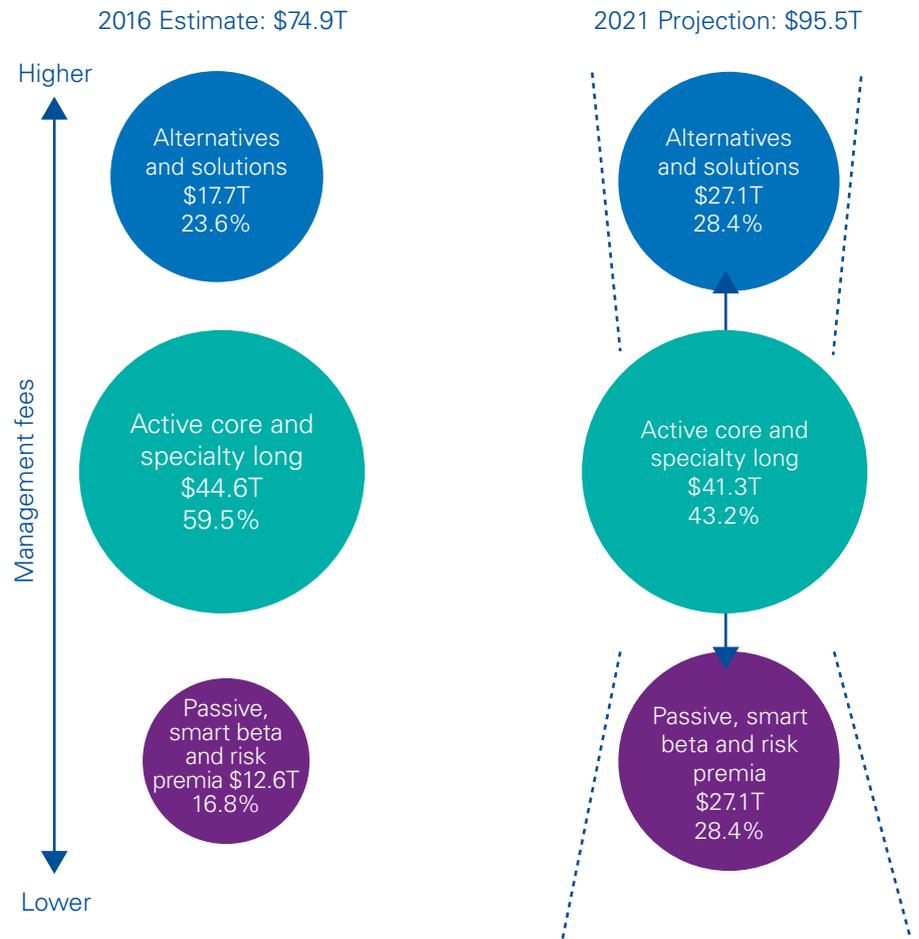
In the expected low-return environment, fees and charges will increasingly come under strain and depress margins —



The alpha–beta separation will get more pronounced with the new generation of investors.”

Interview quote

Figure 6.1 Projected asset pools by management fee tier



All figures are in US\$
Source: Citi 2016 Industry Evolution Survey

all the more so as costs continue to escalate in response to regulatory creep and talent shortages. The war for talent will intensify as alternative investment managers compete with other sectors for vital digital skills.

b. The client context

The economics of the alternative investment industry will be further undermined, as managers are obliged to grow organically by penetrating new client segments — especially insurance companies, high net worth investors and DC plans.

These emerging segments will have different risk profiles and product

needs from the current generation of institutional investors who dominate the existing client base. Product innovation will be essential.

Also essential will be a value-for-money fee structure. These nascent investor segments are already well versed in the emerging alpha–beta separation. They are also well versed in index funds and smart beta funds. Hence, alternative investment managers will have to deliver pure alpha, as previously defined, with a clear line of sight between returns and fees. Managers without a meritocratic fee structure are likely to face hard times.

Above all, these new segments will demand a strong digital client experience that is on par with what they are accustomed to in other sectors. This especially applies to millennials, as argued in Section 2.

c. The corporate context

Only a minority of alternative investment managers have been strategically repositioning their businesses, so as to connect with the changing context of their industry or client segments, according to our post-survey interviews.

Legacy IT systems, legacy thinking, day-to-day pressures and low risk appetite in corporate culture are among the contributory factors. Outwardly, they convey a sense of complacency or inertia.

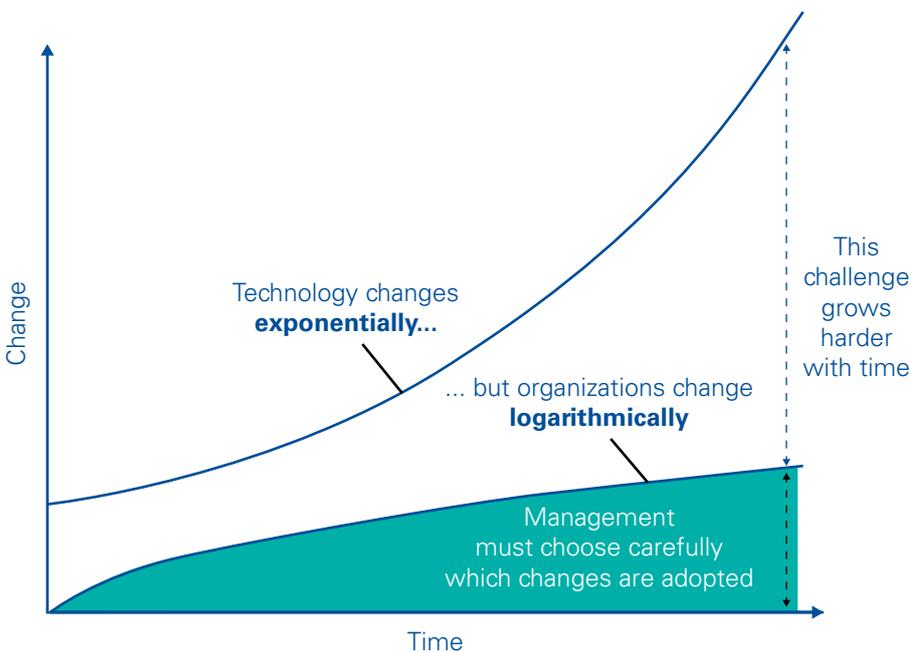
Below the surface, however, they are symptomatic of an important fact:

digital innovations are advancing at an exponential rate while management's capability to implement them only progresses at a logarithmic pace (Figure 6.2).

The challenge facing alternative investment managers as they prepare for the next decade is quintessentially simple: how do they adapt to accelerating innovations that are so disruptive in their impact.

Those who can do it are assured a place in a vibrant industry where digital-based operating leverage will be the key to success. The rest will become unwitting victims of the new Darwinian forces that will reshape their industry in the next decade — as has so vividly happened in e-commerce, the media and the music industry in this decade.

Figure 6.2 Technology flies like a bird but organizations crawl like a tortoise



Source: Building the agile business through digital transformations — Perkin & Abraham 2017

“
In the digital age,
opportunities are
often disguised as
problems.”

Interview quote

“
FinTechs have
challenged our
thinking and
helped us see our
industry through
new lenses.”

Interview quote

2 Digital leaders' to-do list

To pre-empt that fate, digital leaders in the alternative investment industry need a new agenda for a new age with a simple two-point plan. First, they need a strategic vision that galvanizes their businesses. Second, they need to kick-start it with initiatives in specific areas that convey the earnestness of their intentions and sense of resolve. Each are considered separately below.

a. Strategic vision that eschews sound bite leadership

First, digital leaders need to craft a vision for the new age where digitization will be a way of life for all businesses. They need to up the ante by connecting the dots between the identified contexts, spotting opportunities, displaying originality and promoting a strong can-do mindset.

Second, they need to set clear digital goals and their rationale, get the necessary emotional buy-in from the movers and shakers across the business, allocate responsibility, and hold people accountable for the outcomes.

Third, they need to ensure that the rationale not only highlights the business benefits, but also shows staff how the vision will affect them, what is expected of them and what's in it for them.

Fourth, they need to develop a 'stepping stone' strategy with respect to technology: going after the low-hanging fruit initially, generating early successes at each step, learning from setbacks and using that learning to move forward.

Fifth, they need to recognize that the genius of the vision is not only in its design, but also in its execution. That means that the whole organization should recognize that the future is about blending the best of the old and the new.

Staff training should focus as much on mindset changes as on technology skills.

Sixth, the vision should have clear milestones and metrics that are capable of quarterly review. One key lesson from the success of the internet giants is that progress comes in fits and starts, not linear progression. Learning from failures and successes at each stage is an essential springboard for the next.

Finally, leaders must show restless dissatisfaction with the status quo, walk the talk, ask catalytic questions and challenge inertia. They must also network with their peers in other companies and industries to learn what has worked, what hasn't and why.

History shows that corporate renewal programs in alternative investments have often been as durable as the crisis that provoked them. Mental bungee jumps have been just as frequent: rushing forward with bold fixes when problems arise, but quietly reverting to the old ways when markets turn favorable.

In summary, there is nothing inherent in new technology that guarantees success. What digital leaders do makes a big difference. Execution is the magic bullet. It needs passion, persistence and accountability.

b. Specific initiatives to kick-start the adoption process

Four sets of actions are essential.

(i) Collaborate with FinTechs

Defined as start-ups that rely heavily on the latest digital technology, FinTechs in various vertical segments in financial services (such as payments and brokerage) are making headway in alternative investments. Better, faster, leaner, cheaper and tailored: that's how FinTechs are gaining momentum.

They have seized the initiative — defining the direction, shape and pace of innovation — in every area of alternative investing.

Examples include:

- leveraging an artificial intelligence algorithm that analyzes millions of data points and the voices on the internet — structured and unstructured — to help generate alpha
- delivering sentiment data and early alerts with plug-and-play access to trading platforms
- creating new platforms for long-short strategies, currency carry trades and market patterns.

For alternative investment managers with inadequate in-house capabilities, FinTechs provide a viable alternative avenue. Unencumbered by legacy issues, they bring fresh perspectives on long-standing issues, respond to challenges around them and deliver credible solutions.

(ii) Form strategic partnerships

Alternative investment firms have a long tradition of outsourcing non-core investment activities — such as p&l, trade processing, financial statement and risk management — to administrators of hedge funds more so than private equity managers. Some of them are now tooling up to become providers of technology solutions too — as part of end-to-end service offerings.

In this, they are assisted by the 'virtualization' of technology that converts physical IT assets into virtual ones through means such as cloud computing and 'software-as-a-service'.

This allows managers of all shapes and sizes to access institutional quality technology to compete with large players in their industry.

It also allows administrators to venture beyond services that are tactically essential for their businesses, including enhanced valuations, big data and risk management. Above all, it gives administrators a high degree





Data is a minefield. We have to determine what is actually important from what is just noise.

Interview quote

of adaptability accompanied by cost effectiveness.

Their integrated platforms are moving towards a 'single view' that enables managers to make faster smarter decisions with regard to portfolio management, research and order management, among others. The platforms also allow the holistic management of everything from portfolio risk, systemic risk and infrastructure risk to cyber risk.

(iii) Improve the human-machine interface

Machine learning cannot as yet explain why it makes the trades it does. It is also not as accurate at predicting future events in areas where there are no rational patterns. If machines make mistakes and lose money, it is hard to explain to investors who want to know exactly why returns are below their benchmarks.

On the other hand, humans are highly intuitive: good at time horizon, subtle nuances around the data and the deeper meanings behind macro events. But it's impossible for them to keep up with all the research and events that impact on their returns.

Machine learning can play a powerful role in informing and influencing human judgment. But until ways are found to make it more transparent to its designers and more accountable to its users, adoption will remain piecemeal. Establishing the necessary trust will remain a matter of step-by-step improvements — as happened with mass air travel.

It would be unwise to participate in a blanket rejection of machine learning because of its limitations at this stage. The key is to make pragmatic use of it where it is likely to have maximum impact. That means augmenting human intelligence with machine intelligence in ways that deepen rather than diminish it. Augmented intelligence — as it is now known — is about combining the best of both, as managers blend quants

and fundamental investing to deliver the so-called 'quantamentals'.

(iv) Broaden and deepen the talent pool

Decision makers at all levels in the business need to be comfortable not only with technology but also with data and algorithms.

The talent pool will need to be broadened. Computer scientists, data programmers and data specialists will need to work alongside portfolio managers, risk specialists and client service teams. Large hedge fund managers are already recruiting technology talent from Silicon Valley.

The pool will also need to be deepened. Existing staff will have to acquire increased technology proficiency in their areas of work. By freeing humans from repetitive manual tasks, digitization also permits the horizontal loading of work by combining disparate functions under one job, or vertical loading by combining sequential functions. Both will entail significant forward spend on training. Such job loading ensures that humans remain the masters of technology and do not become its servants.

Attracting specialist talent will not come cheaply. Digital specialists are attracted to firms with the newest technologies. They are also job hoppers. Many want the necessary work experience to ramp up the skill sets that will allow them to launch their own start-ups.

Beyond that, three sets of employee benefits are vital in attracting, retaining and deploying talent.

First, an employer brand that generates a high degree of corporate pride. Second, an interesting job that stimulates personal commitment. Third, a balance of hard and soft rewards that promote self-regulatory behaviors and self-motivated creativity.

To, conclude, therefore, only savvy digital leadership will differentiate winners from losers, as competition goes from benign to malign.

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