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**Alternative data for investment
decisions: Today's innovation could
be tomorrow's requirement**

Deloitte Center *for*
Financial Services

Adoption

Alternative data will likely transform active investment management (IM) over the next five years, from hedge-fund management, to long-only mutual funds, and even private equity managers. Those firms that do not update their investment processes within that time frame could face strategic risks, and might very well be outmaneuvered by competitors that effectively incorporate alternative data into their securities valuation and trading signal processes.¹

In the near future, IM firms will likely use news feeds, social media, online communities, communications metadata, satellite imagery, and geospatial information—to name a few data sets—to augment their traditional processes for securities valuation as the rule, rather than the exception. These approaches may improve the confidence of their estimates or simply improve the speed of estimate generation, but change is likely coming and some innovators already seem to be embracing it. These data sets are examples of alternative data and, in this paper, we consider any nontraditional data set supporting investment decisions to be alternative data. The use of this information is often called “dark analytics.” Currently, most IM firms rely on structured data sets acquired from various information providers. These data are aggregated and loaded into proprietary quantitative models.

The lure of alternative data sets is largely the potential for an information advantage over the market with regard to investment decisions. True information advantage has occurred at various times in the history of securities markets, and alternative data seem to be just its most recent manifestation. Recall the fortunes made when the carrier pigeon was used effectively to gain an information advantage. Today's fortunes may rest on the accessibility of vast volumes of data coupled with advanced analytics that fuel the potential for information advantage, as opposed to the winged messengers of yesteryear. Speed and knowledge are advancing with the use of advanced analytics, and there will be no waiting for laggards, nor turning back.

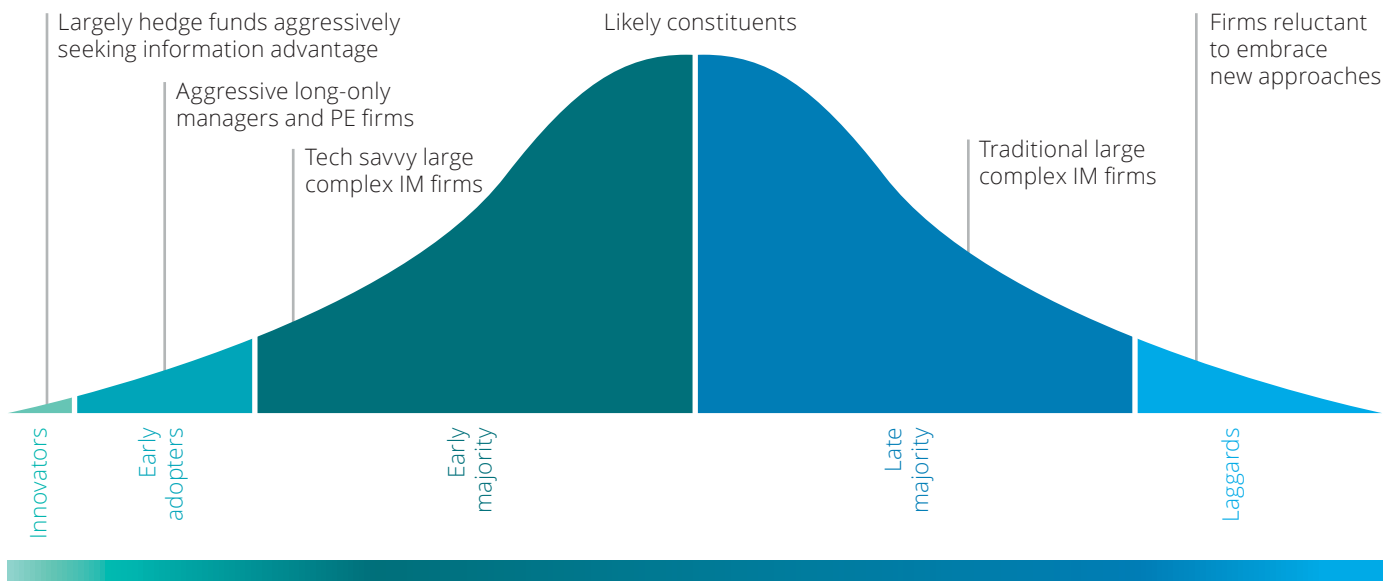
Strategic risks attack an organization's basis for competitive advantage. They challenge the thoughtful logic of priorities, threaten the long-standing competitive position, and undermine the achievement of exceptional performance. An organization's inability to spot, assess, manage, and respond to strategic risks may affect its critical assets, financial performance, or reputation.

There is a continuum of alternative data that IM firms can use to support trading decisions, from structured to unstructured data sets. Such data can be gathered from speeches, news stories, television, press releases, presentations, websites, web traffic, Internet of Things sensors, proprietary databases, and government data sets. Alternative data can be best capitalized through advanced analytical techniques such as machine learning and cognitive computing.

Such advanced technologies enable processing of large, heterogeneous, and unstructured data sets at an extremely fast rate. The adoption of alternative data, to a large extent, was driven by the development of sophisticated programs that could analyze financial news, social media sentiments, and corporate interviews rapidly—and by an explosion of data generated over

social media platforms. The first innovators to deploy alternative data methods were mostly hedge funds. Everett M. Rogers' Diffusion of Innovations Curve (Figure 1) can be viewed as a benchmark for IM firms' uptake of alternative data for alpha.² Using alternative data for an information advantage in the market has gained momentum in recent years, but seeking information advantage has been around as long as the markets themselves. A well-known application of alternative data is satellite imagery analysis of parking lots, which is replacing the old-school approach of physical foot-traffic counts with clickers. In this case, alternative data approaches are faster and more comprehensive than physical counts, leading to an information advantage over the old-school approach—even though the data sets were measuring similar consumer activities.

Figure 1
Alternative data adoption curve—Investment management constituents by phase



Innovators and early adopters faced data and model risks as data sets were sourced from nontraditional, heterogeneous sources → With large scale adoption of alternative data, early majority firms may face regulatory and talent risks → Late majority firms and laggards may face strategic risks as they defer or decline the use of alternative assets



Innovators: Hedge funds have been in the foreground of alternative data innovation. One of the quantitative hedge funds, MarketPsy Long-Short Fund LP, started to feed social-media sentiment data into its investment models as early as 2008.³ In the early days, alternative data also gained traction with academia, and in 2010, a research study by Bollen, Mao, and Zeng found indications of a relationship between Twitter mood and the Dow Jones Industrial Average (DJIA), including an 87.6 percent accuracy rate of predicting the up and down movement in the DJIA a few days later.⁴ The study inspired a top London hedge-fund manager to launch a fund based on its findings. The traffic on social media platforms started to skyrocket, which created a warehouse of new data sources. Quantitative hedge funds were ahead of the curve to view these data sources as a means to generate alpha. Moreover, in the early 2010s, only big banks and larger hedge funds could afford access to sentiment data as the annual cost of access to the full Twitter stream was as much as \$1.5 million.^{5,6}



Early adopters: Based on discussions with data vendors about their clients, prospects, and growth expectations, the IM industry is likely to be entering the early adopter phase, and the spending on alternative data by trading and asset management firms may exceed \$7 billion by 2020.⁷ There is no shortage of vendors that provide these data sets to Wall Street, and many consistently remark that their prospect base is expanding from hedge funds into larger, more complex IM firms as early adopters. Fundamental research hedge funds accelerated the alternative data trend by using alternative data as supplementary information to test their hypotheses with traders and computers working in tandem for investment decision making.



Early majority: Several leading US asset managers are setting up data science teams to leverage alternative data.⁸ These firms may be the bellwethers for the industry to cross the chasm and step into the early majority phase. Long-only funds and top registered investment companies are likely to be early majority constituents, as they allow the technology to mature before acting, but acting before facing the strategic risk. Given that there are myriad alternative data types, IM firms' alternative data choices largely depend on the trading strategy and holding period. For instance, event-driven funds may heavily utilize geospatial data associated with market-moving news events, such as a regional flood that may disrupt the supply chain of certain manufacturers. As the technology matures, finding the right match between alternative data analysis and portfolio management strategy will likely become clearer across the industry.



Late majority and laggards: Some large IM firms may postpone (or decline) using alternative data sets, due to unfamiliarity, risk, and skepticism. These firms may face strategic risks (with potentially higher impact) as they fall behind the curve. These risks are highlighted later in this paper.

The risks and rewards of alternative data for investment decisions

Initial users of specific alternative data sets may see higher advantage when it comes to investment selection. Some of the first alternative data sets to emerge are now less robust in their ability to support alpha generation, according to some data vendors. The unstructured data gathered from earnings conference calls may fall into this category. This reduced impact is likely due to proliferation, diminishing the information advantage derived from the data.



Estimating the risk and reward equation seems more of a challenge for alternative data than for other types. The risks could be higher; however, the rewards may also be greater. Information advantage can be hard to come by in current markets—and any edge, even a narrow timing advantage, may yield a more effective trading signal, algorithm, or investment model. Interestingly, alternative data usage is applicable to active strategies, and may provide actively managed portfolios an important edge over passively managed portfolios, which currently don't have a way to incorporate alternative data.

Estimating the rewards of alternative data

Information advantage is the primary driver for the adoption of alternative data. Whether the goal is outperformance versus peers or against benchmarks, alternative data are being utilized to support this goal.

To gain an information advantage with alternative data, portfolio managers will likely have to sort through many ideas to find the ones that truly add to the models that support their investment decisions. And, once identified, many signals may not persist over time and changing market conditions. Standard methods, such as running parallel models—one with alternative data and one without—may be used to test the value of

the new approach. One of the challenges unique to alternative data is that standard historical data sets may simply not exist. (Think about the ratio of positive to negative comments on social media for a ticker, and the growth pattern of the comments.) Firms that strictly adhere to a policy requiring five years of back-testing before utilization may miss the most valuable periods of alternative data sets, before proliferation decay sets in.

Talent and culture will likely enable some firms to get better results with alternative data than other firms will. For continued success, and to keep an edge on the market, firms may need to generate both unique investment ideas and alternative data sets with regularity. People will drive the creative questioning; technology will gather, process, and test the ideas. Utilizing alternative data effectively requires organizational commitment and access to specialized talent, a combination that may be harder to achieve in larger or more risk-averse firms. Utilizing alternative data to persistently improve on traditional approaches will likely require ongoing creativity.



The question is, how does a fund manager capture and retain enough value to justify an investment in alternative data?

Harvey Westbrook, Senior Manager, Deloitte & Touche LLP

Risk exposures due to early adoption of alternative data

Risk assessments are typically part of any thoughtful strategic decision; identifying risk is therefore an important step to securing organizational commitment.

The following four potential risks may likely relate to incorporating alternative data in investment selection processes.



Data risk

Alternative data may carry greater risk than traditional data, given the content of the data fields and the various ways it is sourced and handled. If the risk control processes at alternative data providers are immature, they may increase extended enterprise risk at IM firms through the incorporation of invalid or noncompliant data—thus, ultimately posing a reputational threat.

- **Data provenance risk:** This risk is related to the origin and gathering of data. In particular, managers should determine that data are procured in accordance with applicable terms and conditions from the originator of the data. Scraping websites to create data sets for sale may violate the terms and conditions of use for data on e-commerce sites.
- **Accuracy or validity risk:** Concerns that data will prove unreliable or will produce an inaccurate trading signal may nullify the value of alternative data sets. Since each alternative data set may be unique or scarce, investment teams may have difficulty finding a way to verify the accuracy of a data set. In some cases, detailed review of the procedures used to gather and manipulate the data may be an IM firm's best strategy to mitigate this risk.
- **Privacy risk:** The possibility that personally identifiable information (PII) is included in a data set is another risk to consider. Determining that data are received from a source without PII attached is a preferred process to removing PII upon receipt, as it lowers the risk level. Since some data sets in the alternative space are generated about specific online transactions or user browsing patterns, this risk should be actively and continually managed.

- **Material nonpublic information (MNPI) risk:** Guarding against the receipt and use of MNPI in a fund strategy or model is an important step in minimizing risk events for IM firms. When it comes to alternative data, what is material and what is nonpublic are both subject to interpretation. Just because data are accessible to tech-savvy Internet programmers does not mean they are public information. Likewise, the definition of material is also subject to interpretation with some firms relying on statistical testing to determine whether information is material or not. In a strange twist, if an alternative data set is thought to be too predictive of normally protected information such as quarterly revenue, then some firms are steering clear of the data.

Many alternative data suppliers are under less regulatory scrutiny than IM firms, nor do they have huge market capitalization or brand value. It is incumbent on IM firms to manage these risks to protect their assets.



Fund managers should confirm that each trading strategy and supporting data set operates without incorporating any material nonpublic information.

Prakash Santhana, Managing Director, Deloitte & Touche LLP

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Model risk

Model risk came into focus after 2008, when regulators seemed to focus attention on the controls put in place to ensure investment models are performing within the guidelines of their related investment policy statements. Investment managers should consider model risk in light of the potential for new data sources to impact investment models. As these new inputs to the decision process contribute more to the portfolio construction process, IM firms are subjecting themselves to the risks and benefits associated with alternative data.

There is risk of complication at each point of the model revision—input, implementation, and output—with alternative data impacting the model perhaps most at the input phase. In addition to the risks above, model risk includes risk that the alternative data may be incorporated in the model incorrectly, that the trading signal generated may be irregular or inconsistent under certain conditions, and that the output of the model could be improperly linked to the trading process. Strong controls around risk overall can serve to mitigate these alternative data-related risks.

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An organization may be innovative and still have robust controls around the models, data, and performance monitoring of alternative data. Controls are not there to stifle innovation, but to lower the likelihood of risk events.

Alexey Surkov, Partner, Deloitte & Touche LLP

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Regulatory risk

Since alternative data are relatively new phenomena, fund managers should be aware that regulations and accepted practices governing their use are still in the early stages of maturity. There are still open questions about acceptable practices in the areas of web-gathered information, especially for e-commerce firms. Imagine if an alternative data process enabled an IM firm to accurately and repeatedly predict revenue for a specific firm. As tempting as it may be to quickly capitalize on this information, leading practices call for a review of the process, looking for copyright, intellectual property, confidentiality, terms of use, and other potential missteps in the generation of that alternative data set. Alternative data are different enough from traditional data that IM firms should consider modifying investor disclosures about investment policy and processes. Vendors are starting to offer compliance software and procedure recommendations to support investment managers in determining that their alternative data use is regulatory-ready.⁹

The Consumer Financial Protection Bureau (CFPB) may be leading the regulatory frontier on the use of alternative data in financial services. Similar to the way that alternative data may lead to a valuation or trading signal for securities, they may also contribute to a revised credit score for potential consumer borrowers. At present the CFPB is analyzing the use of alternative data as they relate to credit decisions. The CFPB is interested in both the new data sources and the new methods being considered for supplementing the credit analysis process. The bureau's concerns range from privacy rights and transparency to discriminatory outcomes based on characteristics or behaviors.¹⁰ While investment management is significantly different than consumer lending, an important lesson for IM firms to consider is that regulators are taking note of alternative data, and the common definitions of public and private information are in transition as these new forms of data and advanced analytical techniques are being deployed in the financial services industry.

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Sentio, Inc.

A new financial data platform called Sentio Mosaic offers an interface designed to address the workflow challenges of alternative data. Launched in 2017 by Sentio, Inc., Sentio Mosaic supports the simultaneous analysis of both newer alternative data feeds and traditional sources on one visualization platform. Analysts and portfolio managers can use it to compare web tracking and social media data, search engine metrics, and other custom inputs with more traditional data from regulatory filings, earnings estimates, and industry news. Output can be downloaded into spreadsheets for further analysis or incorporated into reports.

Sentio Mosaic was developed by former hedge-fund analysts who identified a gap in the market for a workflow management tool and created a technology tool in an attempt to meet the need for speed. In the race to analyze ever-increasing types of data, the speed of analysis may be a significant driver of returns because of the time value of information. Sentio Mosaic aims to solve this problem by getting to a buy/sell decision faster.

Talent risk

In the fast-paced world of advanced analytics and alternative data, competitive edge may reside in finding creative approaches to analyzing or visualizing the data and incorporating them effectively into trading or portfolio construction. A resulting war for talent may then focus on getting to creative insights, through a combination of curiosity, data management, and advanced analytical skills. Early signs point to this trend as already being underway, with some elite data scientists joining hedge-fund teams at lucrative pay rates.¹¹ This development may be signaling the elevation of the investment-data scientist role to an investment team member, distinct from the IT support analytics group.

Loss of intellectual capital through talent turnover will likely be a future risk for investment teams, given the specialized experience that investment-data scientists and investment analysts using alternative data acquire. On the retention end of the spectrum, inadequate or delayed training for existing employees may also hamper the ability of IM firms to stay at the leading edge of alternative data utilization. Access to external talent pools may mitigate this risk. Vendors are offering services in this area that may help managers who are new to alternative data use to get started, and more experienced firms to keep pace. One such firm, Sentio (see overview at left), offers workflow tools that may be useful for analysts to blend alternative data sets with traditional data for investment research and analysis.

Risk exposure due to late adoption of alternative data

The risk impact and vulnerability for laggards may be much higher as compared to early adopters of alternative data.



Positioning risk

Markets will likely become more efficient with large-scale adoption of alternative data, but only firms with insight into the alternative data sets that are signaling price changes may see the efficiency. Firms that are following the “wait and see” approach are likely to be at an information disadvantage. They may mistakenly see alternative data-driven price changes as opportunities. This could result in strategic positioning risk as late majority firms and laggards may not be well positioned to create value for their clients.



Execution risk

Firms that choose to delay the adoption of strategic change could add to strategic execution risks. Playing catch-up likely makes the execution of an alternative data strategy harder, even though the planning stage may be easier, if only because other firms have led the way. For example, being late in line for securing scarce talent has adverse consequences. On the other hand, firms that have the right talent, capabilities, and infrastructure in place, or available for engagement, to execute the chosen strategy can stay a step ahead of the competition.



Consequence risk

The strategic consequence of not using alternative data as an input for investment decision making may present itself in the form of reputational risk. These firms may not be able to keep up with the innovation and may be outmaneuvered by their peers with the alternative data edge, which could result in a tarnished reputation and capital flight.

Advanced technologies for alpha

In 2016, 16.1 zettabytes (ZB) of data were generated globally. This statistic is forecast to grow tenfold, to 163 ZB by 2025, with most of this new data coming from end-user devices, making it largely unstructured.¹² The rapidly growing sources of alternative data can provide trading signals and help make better predictions, which could encourage investment managers to unlock the potential of alternative data with the aim of alpha generation.

Over the last few years, many IM firms have started to tap into the potential of alternative data by building big data analytics (BDA) and cognitive capabilities. These technologies enable conversion of alternative data sets (structured and unstructured) into intelligence and could replicate or augment human perceptual skills, such as reasoning and learning, to make recommendations. In 2016, securities and investment services (S&IS) firms (this includes exchanges in addition to typical IM firms) invested \$5.2 billion¹³ globally in BDA and cognitive technology solutions. US firms accounted for the lion's share of this sum with 68 percent.¹⁴ These solutions tend to represent a wide range of technology categories. The use cases within these categories may support alpha generation or other areas of the IM firm operations. Even so, firms that are investing in these categories are building capabilities that can be directed to investment decision support with alternative data.



BDA

In 2016, BDA solution vendors generated \$3.2 billion in revenue from US S&IS firms, which is twice the \$1.6 billion¹⁵ generated by S&IS firms from the rest of the world.

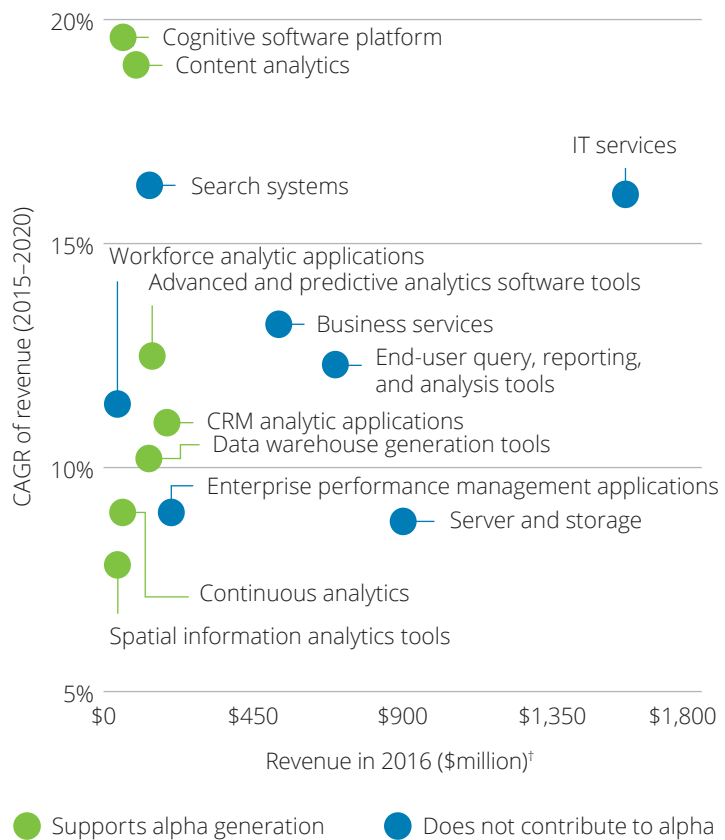
Only an approximate 15 percent¹⁶ of this revenue was originated from the group of technologies that potentially support alpha generation at the US and global levels. Between 2015 and 2020, revenue from both groups is projected to grow at a compound annual growth rate (CAGR) of 13 percent.¹⁷ The potentially alpha-generating technologies are not projected to grow faster than the peer BDA technologies.

The categories among the BDA groups that are most aligned to support alpha generation are:

- 1 **Content analytics:** Content analytics systems provide tools for recognizing, understanding, and extracting value from text. They use similar technologies to generate human readable text. Content analytics also includes language analyzers as well as text clustering and categorization tools.
- 2 **Advanced and predictive analytics software tools:** These include data mining and statistical software that use a range of techniques to create, test, and execute statistical models.
- 3 **Spatial information analytics (SIA) tools:** SIA tools include geographic information system (GIS) software and tools for data entry/conversion (surveying/COGO, aerial photo rectification, remote sensing, GPS, and others), mapping/spatial query, and business analysis.

Projects targeting alpha are currently reported to be just a small portion of BDA spending for IM firms, and the categories that can support alpha have yet to show the fastest growth—except for cognitive software platforms, which have had a very small base.

Figure 2
Global BDA solution vendors' revenue and growth rate
 Revenue (\$million) and CAGR (%) by technology category



Source: IDC Data, Deloitte Center for Financial Services Analysis, 2017
 † Total revenue generated in 2016: \$4,766 million

Cognitive technologies

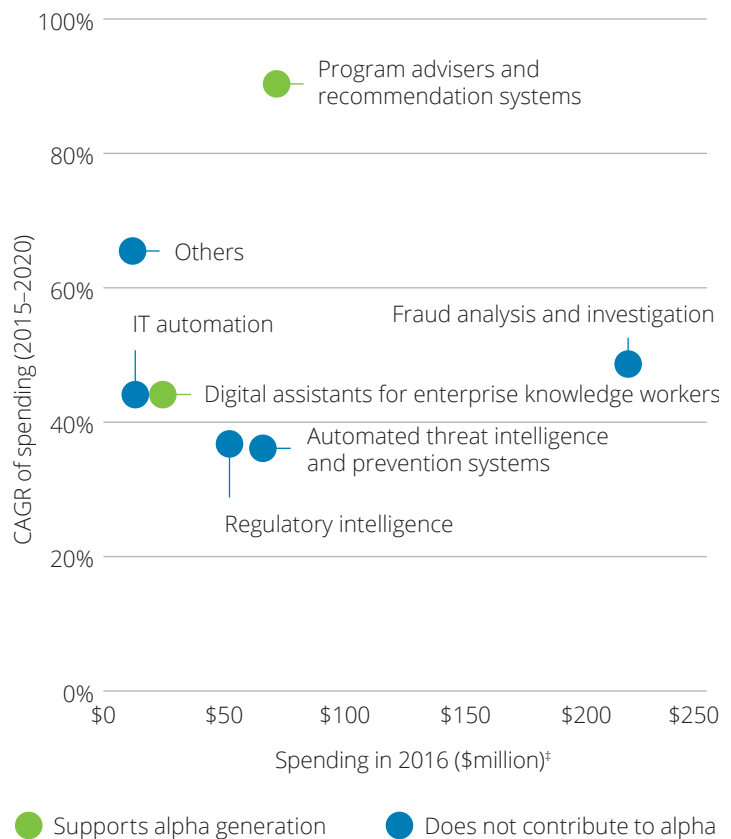
In 2016, spending by S&IS firms on cognitive technology amounted to \$446 million globally, with \$332 million of that by US firms.¹⁸

From 2015 to 2020, IDC forecasted spending on use cases potentially supporting alpha generation at US firms would double annually; however, spending by firms outside the United States on the same set of use cases is projected to grow at a less explosive CAGR of 41 percent.¹⁹ US firms appear to be ramping up cognitive technology spending at a faster pace than firms outside the US. IDC also expects spending on program advisers and recommendation systems to grow at a CAGR of 90 percent²⁰ globally over the period between 2015 and 2020. These systems, which are fed with big data, utilize cognitive computing capabilities to learn about the subject and recommend various sets of actions (including, but not limited to trading signals) based on investment goals, risk tolerance, and the current and future states of the financial market.

The rapid increase seems to correspond to the growth of digital advisory platforms (robo-advisers), while also supporting investment decision processes for IM firms. Furthermore, use cases like digital assistants to enterprise knowledge workers are not limited to only one application. Digital assistants to enterprise knowledge workers help facilitate innovation and maximize return on information assets, in addition to potentially providing intelligence to portfolio managers for investment decision making. This category of spending can be used to support the traditional analyst and portfolio management roles with insights developed from cognitive computing.

Figure 3
Global IM firms' spending on cognitive technology

Spending (\$million) and CAGR (%) by use case



Source: IDC Data, Deloitte Center for Financial Services Analysis, 2017

‡ Total spending in 2016: \$446 million

Alternative data vendor profile

Eagle Alpha Ltd.

This vendor profile was developed and based on a conversation with the founder and CEO of Eagle Alpha Ltd.

Ireland-based Eagle Alpha is one of the early platforms in the alternative data field. The company's founder, hailing from an investment banking background, recognized the potential value of newly emerging data types. Eagle Alpha initially offered alternative data to hedge funds, and now counts mutual funds and private equity firms among its clients.

Since its inception in 2012, Eagle Alpha observed large hedge funds becoming the innovators in using alternative data. The company has grown its offering to some 500 data sets across 24 categories over this time. Now, mutual fund and private equity managers may be taking a closer look at alternative data's alpha-generating potential. And as the market matures over time, Eagle Alpha believes that the need to incorporate alternative data will become even greater—with non-embracers losing competitive advantage to firms using these new sources of information.

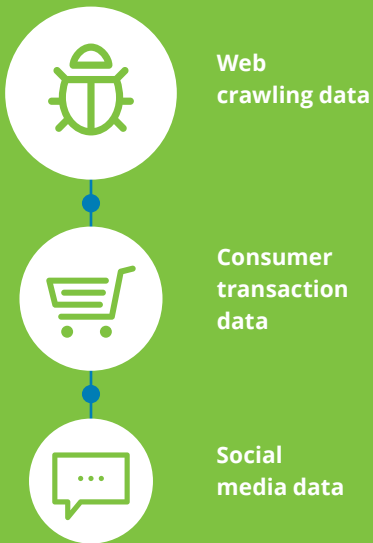
Risk and compliance focus

Eagle Alpha seeks to address potential risk and compliance issues in two ways: through its own internal data procurement process, and by supporting the compliance practices of its investment manager clients. Eagle Alpha works closely with alternative data vendors, incorporating its quality assurance procedures. In this manner, Eagle Alpha ensures that the data is "thoroughly prepared to go to market," in accordance with firm standards.

The company focuses on quality and risk-related aspects of alternative data. These include data provenance, controls around PII, avoidance of MNPI, exclusivity of the data obtained, and the quality and frequency of its predictions.



Figure 4
Alternative data categories
with high risk potential



For quality control around alternative data, Eagle Alpha first considers the following fundamental questions:



Do we understand where the data are coming from?



Does the data vendor have the rights to sell the data?



Do we have written representation regarding the vendor's privacy policies?



Does the representation include a statement that the data do not contain MNPI?

Following these practices may help determine whether a manager is able to reap the informational edge that alternative data may provide, while also mitigating risk.

The future of alternative data

The signals for the future adoption of alternative data helping generate alpha seem positive, yet also mixed. Research on the adoption of alternative data by investment managers indicates that the question to ask may not be whether, but how quickly alternative data usage could become mainstream. IDC data and forecasts indicate steady or moderate growth in most areas of alternative data use, with some areas of cognitive technologies experiencing exceptional growth.

On the other hand, vendors in the alternative data space indicate growing interest in their services from new classes of customers, moving past innovators exclusively, to early adopters and even some firms that are characteristically early majority in terms of risk acceptance and organizational complexity. Interviews with alternative data vendors seem to point to the technology's tipping point with accelerating growth—as is found in the standard adoption curve benchmark. While there are certainly risks associated with incorporating alternative data into investment-decision processes, there may also be strategic risks associated with not doing so. With improvements in advanced data analytics and increasing availability of data to analyze, the stage seems set for IM firms to supplement their decision processes with alternative data. Look for alternative data to likely move quickly through the early adopters segment and into the early majority segment within the next five years.



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