ANALYTICS POWER®
2019

The State of Advanced Analytics
and Alternative Data Use in the
Asset Management Industry

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/   THERE IS SIGNIFICANT GROWTH EXPECTED IN **THE OPERATIONAL USE OF ADVANCED ANALYTICS** (180%) AND **ALTERNATIVE DATA** (70%) OVER THE NEXT THREE YEARS.

/   WHILE ASSET MANAGERS ARE MAKING SIGNIFICANT INVESTMENTS IN ADVANCED ANALYTICS AND ALTERNATIVE DATA TODAY, **EVIDENCE SUGGESTS AN ORDER OF MAGNITUDE MORE WILL BE REQUIRED**.

/   77% OF ASSET MANAGERS SIGNIFICANTLY **OVERESTIMATED THEIR ADVANCED ANALYTICS** AND **ALTERNATIVE DATA CAPABILITIES**.

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BACKGROUND

This, our second benchmark study, was led by Element22, the boutique data and analytics consultancy, in partnership with Greenwich Associates, the leading global provider of data, analytics and insights to the financial services industry, with continued support from UBS Asset Management. UBS has been advancing the use of data and advanced analytics for four years on behalf of their clients and investment teams. In addition to sponsoring the benchmark report for the second consecutive year, UBS served in an advisory role by providing guidance on the report's rigorous research methodology, framework and content strategy, as well as insight into the trends transpiring in the industry. The study highlights the methodology, findings and conclusions of the Analytics Power® 2019 benchmark.

Our first study took a broad look into the use of advanced analytics and alternative data across alpha generation, client acquisition and retention, and business operations at asset management firms. This year's, by contrast, is a more focused analysis looking closely at their application to core investment activities, namely:

- **Research** - supporting Research Directors and Investment Analysts

- **Portfolio Construction** - supporting Chief Investment Officers

- **Portfolio Management** - supporting Portfolio Managers

Detailed analysis of 59 asset management firms in North America and Europe with more than $15.6 trillion of assets under management, representing over 20% of global AUM, reveals that most are now turning to advanced analytics and alternative data to fuel investment performance. More than two thirds of respondents use advanced analytics and alternative data in their research, portfolio construction and portfolio management functions. It is important to note that the early adopters have entered a stage of sustainable value creation.

In the inaugural benchmark study, we created a unique, proprietary index to measure an asset manager's maturity in leveraging advanced analytics and alternative data to drive business value - Analytics Power®. This year's study has affirmed the finding of the Analytics Power® 2018 survey; namely, the path to building competitive advantage and differentiation with Analytics Power® is a journey spanning several stages of maturity:
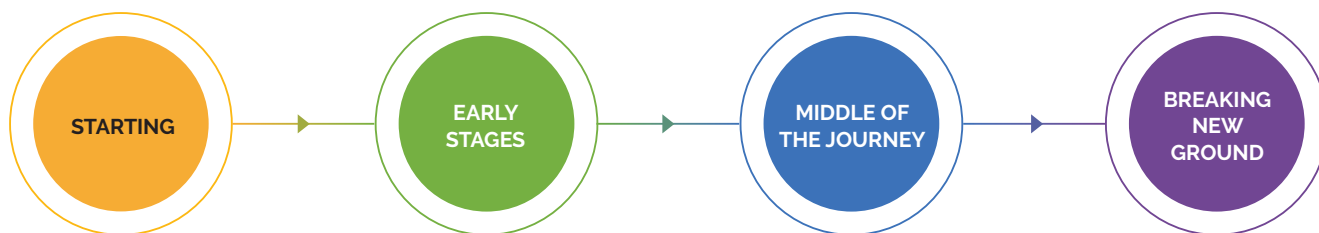
(1) Starting, (2) Early Stages, (3) Middle of the Journey, (4) Breaking New Ground.

This study highlights the distinctive attributes and characteristics of asset managers in each stage of the journey. It is interesting to note that the firms we have found to be the most mature and that are creating sustainable value from their Analytics Power® program, humbly recognize there is much more that can be done. In other words, the journey continues even for the most

advanced – "the more you know, the more you realize you don't know", Aristotle.

We believe Analytics Power® will be an increasingly critical differentiator for asset managers in the coming years. This benchmark study derives important insights on its evolution from early adopters and how the journey may be accelerated.

ANALYTICS POWER®
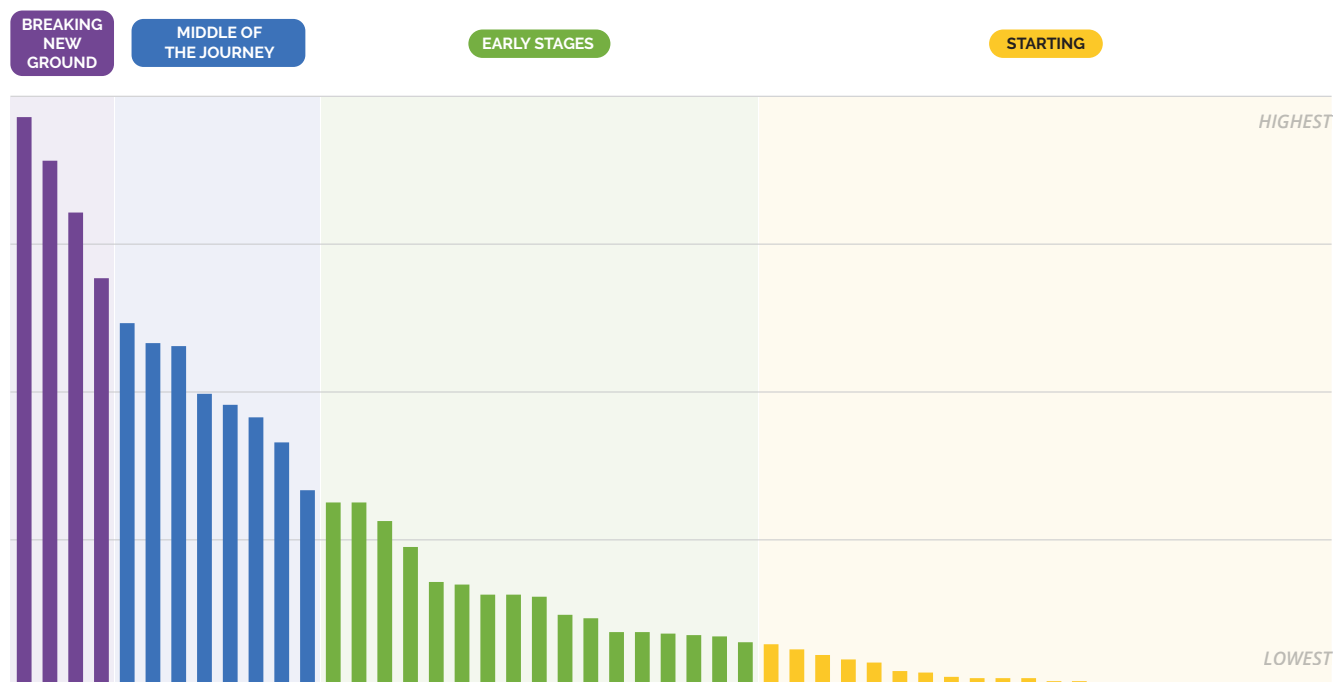
CONTEXT

In 2018, the global asset management sector experienced its first significant decline in AUM since the 2008 financial crisis. This was fueled in part by poor market outcomes and significant declines in net new asset flows in developed economies. 2019 has witnessed volatile equity and credit markets along with widespread political and economic uncertainty as well as a continuation of many of the major long-term trends shaping the fortunes of this sector of the financial services industry - fee compression, M&A consolidation, innovate data and technology capabilities sharpening competitive positioning and operating cost functions being re-defined.
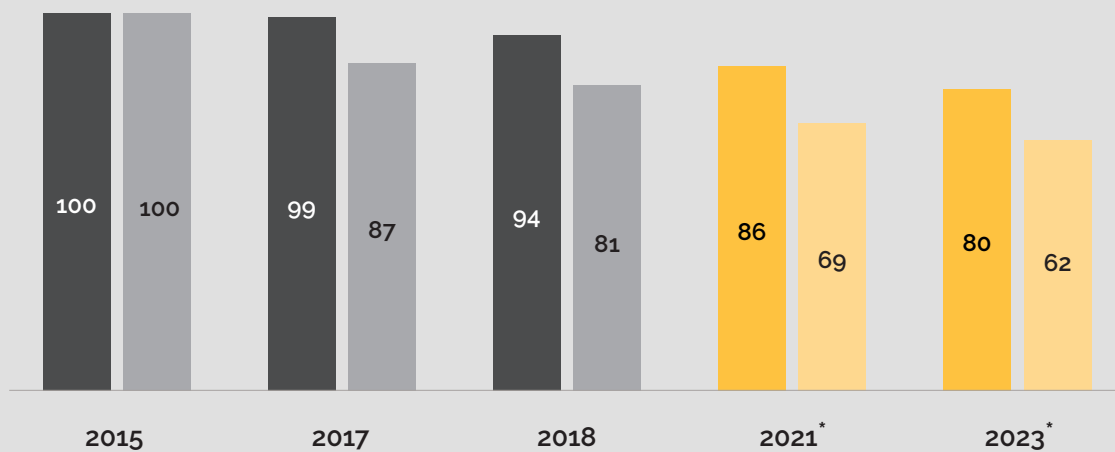
Global AUM declined 4% in 2018 to an estimated $74.3 trillion from $77.3 trillion in 2017, representing the first significant decline since the financial crisis. Both active and passive strategies experienced declines with core active strategies falling by approx. $1 trillion. Although overall revenues are estimated to have increased approximately 3% versus the previous year, both net revenues as a share of AUM and operating profits as a share of net revenues are estimated to have declined in the same period. These results have sharpened the focus of industry executives on initiatives aimed at bolstering revenues through innovative investment strategies and solutions and lowering operating costs through headcount reduction, outsourcing and investments in long term efficiency[1].

GLOBAL AUM ($US TRILLIONS)
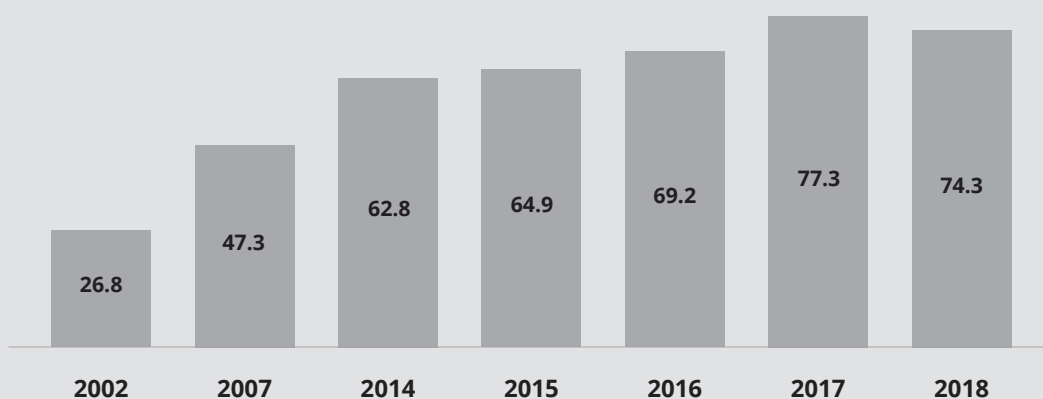
2002	2007	2014	2015	2016	2017	2018
26.8	47.3	62.8	64.9	69.2	77.3	74.3

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[1]   *Global Asset Management 2019: Will These '20s Roar?*, BCG, July 2019; *Asset Managers & Wholesale Banks: Searching for Growth in an Age of Disruption*, Morgan Stanley Research and Oliver Wyman, 2019; Element22 Analysis.

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ACTIVE AND PASSIVE FEES, 2015 - 2023 (FORECAST), INDEXED TO 2015 VALUE

	2015	2017	2018	2021*	2023*
ACTIVE	100	99	94	86	80
PASSIVE	100	87	81	69	62

Active to passive spread, bps

46	48	45	42	40

■ ACTIVE   ■ PASSIVE   * FORECASTED

NUMBER OF M+A TRANSACTIONS AND TRANSACTED AUM ($US TRILLIONS)

	2012	2013	2014	2015	2016	2017	2018
# OF TRANSACTIONS	144	146	135	148	149	210	253
TRANSACTED AUM, $T	1.43	2.16	2.68	2.81	2.60	2.99	3.71

■ TRANSACTED AUM, $T   ─●─ # OF TRANSACTIONS

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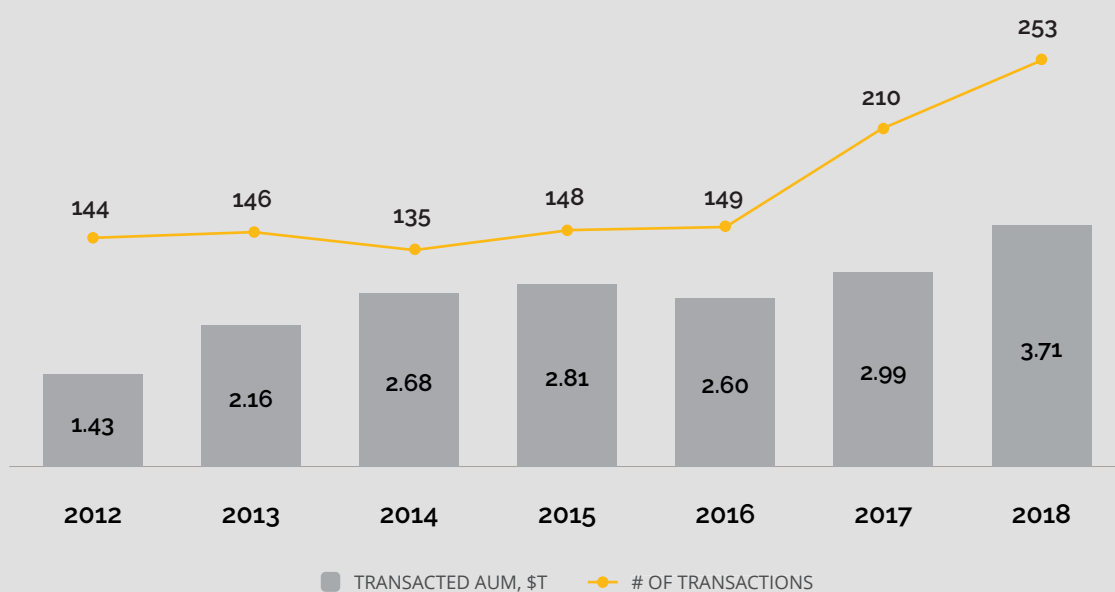
Average fees remain highly competitive and continue to decline for both active and passive strategies. Even though overall revenues are increasing at present, Oliver Wyman estimates that revenues on core active strategies in developed markets will decline by more than 30% by 2023 due to fee compression and outflows to passive strategies. Fees on passive strategies are estimated to have fallen by 7% a year since 2015 and are projected fall a further 5% a year to 2023. Given expected headwinds at the top line, asset managers are evaluating their competitive positioning, building capabilities to capitalize on investors in developing markets, updating investment products and distribution, and accelerating the adoption of advanced analytics, like Natural Language Processing and Machine Learning, to drive process automation and sustainable cost savings[1].

Consolidation through M&A continues at pace as firms build scale while extending their reach in terms of client segments, geography, and strategy. M&A activity in the asset management sector continues to accelerate with increases to both the number of deals and the average deal size. Transactions grew to a record 253 announced deals in 2018, up from 210 in 2017, while announced deals in 2018 represented $3.7 trillion in transacted AUM – an increase of 29% from 2017. Year-to-date through August 2019, there have already been 183 deals announced versus 173 for the same period in 2018[2]. It is our view that leveraging advanced analytics and data capabilities will be important for driving operating efficiencies from these transactions and expanding margins.

Innovation through modern data and IT architectures is now viewed to be vital to long-term competitiveness. The race to capitalize on alternative data continues for both investment managers and information service providers. Greenwich Associates estimates that alternative data budgets increased 52% in 2018 which comes on top of a 76% increase in 2017[3]. Asset managers are replacing legacy 'best of breed' architectures with modern platforms and infrastructure, which is enabling more effective data integration within the firm and more seamless access to a rapidly

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1   *Global Asset Management 2019: Will These '20s Roar?*, BCG, July 2019; *Asset Managers & Wholesale Banks: Searching for Growth in an Age of Disruption*, Morgan Stanley Research and Oliver Wyman, 2019; Element22 Analysis.

2   *2018 Asset Manager Transaction Review & 2019 Forecast*, Sandler O'Neill Partners, January 29, 2019; *Monthly Asset Manager Report*, Sandler O'Neill Partners, August 2019; Element22 Analysis.

3   Demystifying Alternative Data Q2 2019, Greenwich Associates and IHS Markit

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expanding number of open source, third party, and cloud-based data and tools. Armed with these capabilities, asset managers seek sharpened client segment positioning with differentiated investment strategies and solutions. In total, asset managers seek to improve distribution and sales productivity by as much as 30% and permanently lower operating costs by a similar amount[4].

In summary, the changes that have been predicted over the past few years are well underway. Active managers will increasingly need to rely on advanced analytics and alternative data support the innovation required to maintain and grow their client base. On the M&A front, firms with established advanced analytics capabilities will become more attractive takeover targets as larger firms seek ways to fast forward their advanced analytics capabilities.

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[4]   *The explosion in 'alternative' data gives regular investors access to tools previously employed only by hedge funds*; MarketWatch, September 2019; *Advanced analytics in asset management: Beyond the buzz*, McKinsey, March 2019; Element22 Analysis.

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THE BENCHMARK

Since capabilities for advanced analytics and alternative data are nascent in the asset management sector, as well as within the broader financial services industry, Element22 and UBS, in partnership with Greenwich Associates, have undertaken this unique benchmark study with sponsorship from UBS, to better understand the state of adoption of these capabilities and their maturity amongst asset managers.

To establish the benchmark, 59 representative asset managers in North America and Europe were interviewed. *Independent Asset Managers* comprise 29 of the total, 12 are *Hedge Funds*, 10 are *Asset Managers Affiliated with a Bank*, 5 are *Independent Wealth Managers*, and 3 are *Asset Managers Affiliated with an Insurance Company*. Across the 59 firms, 46 have an active investment strategy and 13 have a mixed active and passive focus.
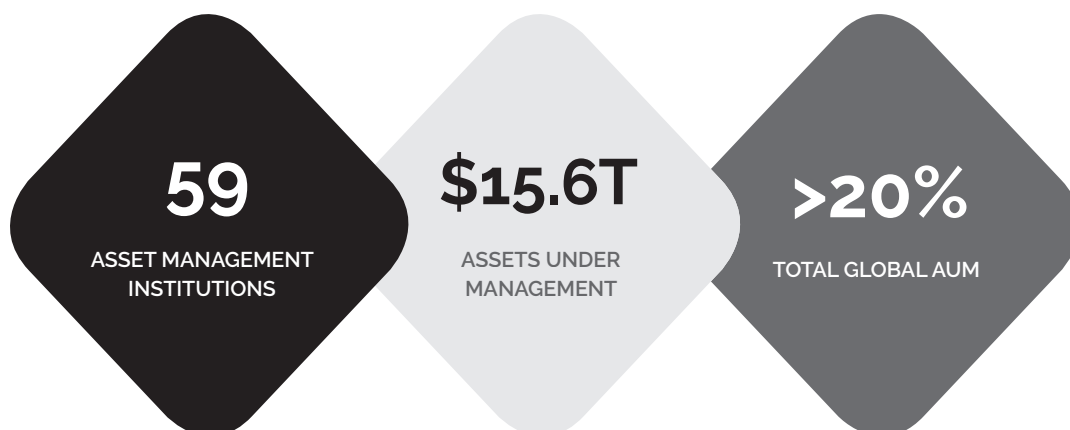

46 ACTIVE

13 MIXED
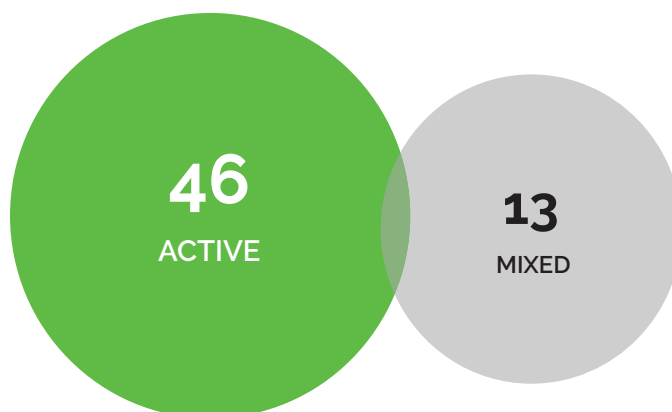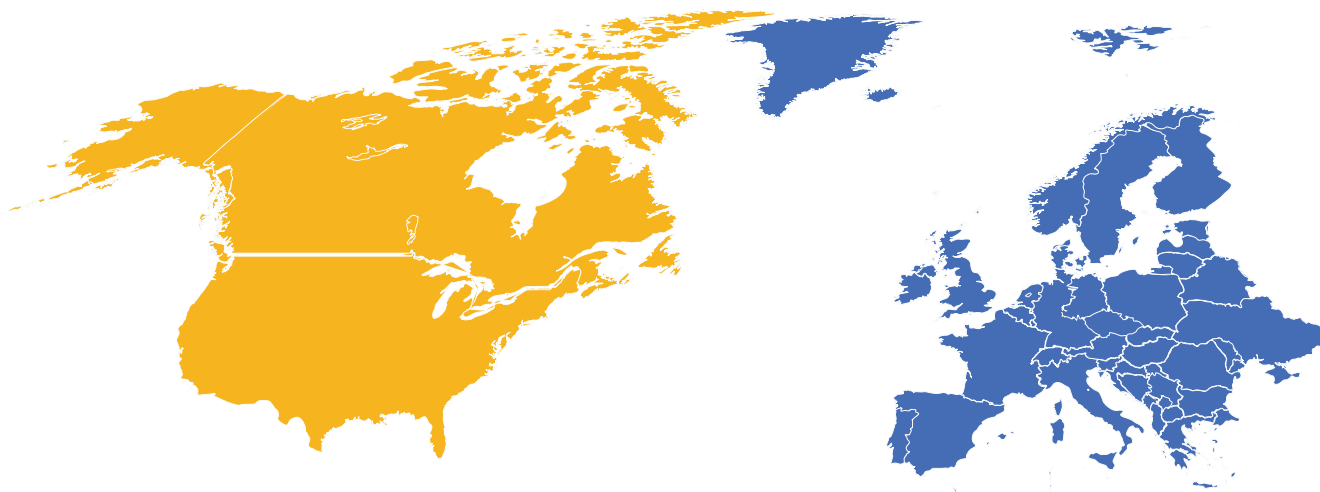
Survey respondents included Portfolio Managers (24%), Heads of Research or Quantitative Research (22%), Chief Data Officers (14%), Chief Investment Officers (10%) with the remaining 30% comprised of Chief Analytics Officers, Chief Executive Officers, Heads of Technology, Chief Data Scientists, and other roles. The study covered both institutional and retail asset managers. Almost a quarter have between 1-50 clients while 39% have 51-1,000 clients and the remaining participants have more than 1,000 clients.

Element22 and Greenwich Associates conducted extensive quantitative and qualitative interviews both online and in-person with a common questionnaire. The results were then scored, normalized and analyzed. All information gathered is confidential and all participant firms were anonymized in the analysis conducted to produce this study.

With assistance from Greenwich Associates, the 2019 survey participant pool is three times the size of the 2018 benchmark study. The 2019 participants are a broader representation of the overall industry. The percent of global AUM remains approximately the same this year as last year even though the participant pool is significantly larger in 2019. This year's study has a stronger presence of hedge funds (up from 3 last year to 12 this year) and independent asset managers grew from 3 to 29 year on year.

29
INDEPENDENT
ASSET MANAGERS

13
ASSET MANGERS
AFFILIATED WITH
A FINANCIAL
INSTITUTION

5
INDEPENDENT
WEALTH
MANAGERS

12
HEDGE FUNDS

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59

ASSET MANAGEMENT
INSTITUTIONS

$15.6T

ASSETS UNDER
MANAGEMENT

>20%

TOTAL GLOBAL AUM

THE BENCHMARK STUDY FOCUSES ON THE USE OF *ADVANCED ANALYTICS* AND *ALTERNATIVE DATA* AS STRATEGIC DIFFERENTIATORS FOR ASSET MANAGERS. THESE TOPICS ARE DEFINED AS FOLLOWS FOR THE PURPOSE OF THIS STUDY:

01. ADVANCED ANALYTICS

Advanced analytics covers a broad range of capabilities that use automated or semi-automated technology to inspect, interrogate, make inferences on or process data. Some of the more common capabilities are machine learning (ML), text mining, natural language processing (NLP), sentiment analysis, Knowledge Graphs and smart robotic process automation (Smart RPA). Each of these seek to eliminate or, at least, dramatically reduce human labor and dramatically scale the volume of information processing. These capabilities generally require learning sets in order to carry out their duties where humans perform the tasks that will teach the machine the correct output or behavior. For example, if a machine learning algorithm is to identify and count cars in a parking lot it first needs to be taught how to recognize a car in an image or video feed. These capabilities are often thought of as narrow artificial intelligence (AI).

Advanced analytics is growing rapidly both in terms of the breadth of offerings as

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well as the sophistication of those offerings. The powerful combination of increasing computing power and ever more intelligent algorithms are rapidly moving these capabilities from the lab and into mission critical production.

02. ALTERNATIVE DATA

Alternative data are unique data sets that, by themselves or in conjunction with traditional market data, could provide additional insight and competitive advantage. Alternative data is often generated by novel data and analysis techniques. Typical traditional information sources are regulatory filings, market data, economic statistics, company fundamentals, and the like. Rather, users of alternative data seek new and sometimes radical sources of information to try to gain new insight or perspective on their target where the focus might be a macroeconomic insight, an industry trend, a specific company's performance, etc. Sources of alternative data are virtually limitless but typical sources are satellite imagery, online search trends, geolocation data, social media feeds, app usage, etc. Use of alternative data in an active investment strategy, similarly, is practically limitless but here are some examples:

- Web-scraping to harvest data from websites at scale; for example, gathering prices on e-commerce websites

- Performing sentiment analysis on social media feeds to understand perceptions of a company or product

- Monitoring credit card and point of sale systems to predict sales performance

- Tracking executive jet destinations to predict M&A targets

- Analyzing app usage (e.g. location check-in's, food delivery services) to predict restaurant performance

Alternative data tends to be less structured and less readily available requiring creativity and complex engineering to capture, transform, qualify and make the data fit for purpose. Leveraging these data sources requires specialized knowledge, in particular there is high demand for data scientists and relevant subject matter experts (SMEs).

Alternative data is relatively new and yet has witnessed explosive growth. In just a few short years based on AlternativeData.org the number of alternative data providers has grown to more than 445. $400 million was spent on alternative data in 2018 and more than $1.7 billion in annual spend is anticipated by 2020.

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ALTERNATIVE DATA SPEND

($BILLIONS)

	2016	2017	2018	2019	2020*
	0.23	0.40	0.66	1.09	1.71
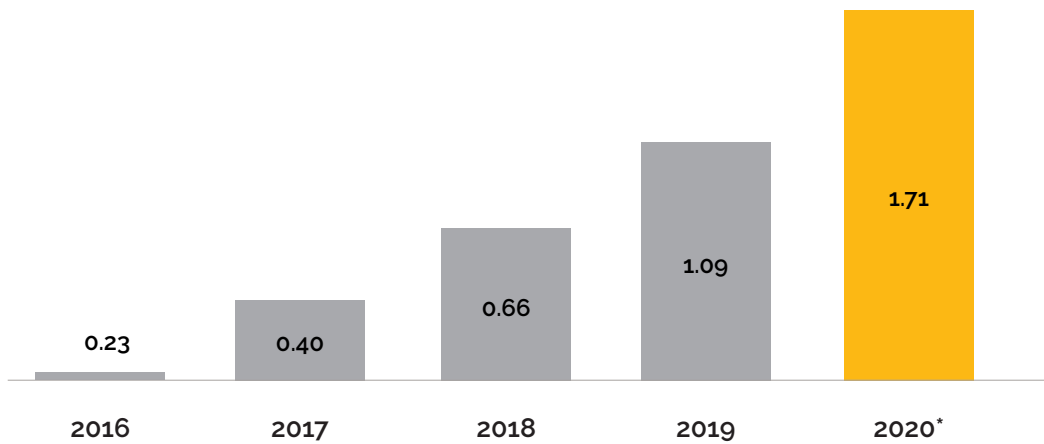
* FORECASTED

Early uses of alternative data were done in isolation within deterministic models, but more recently advanced analytics and alternative data have become both complementary and dependent upon each other. The overlap is not 100% but there is significant synergy. For example, it would not be possible to process the enormous scale of social media feeds both in terms of volume and velocity without ML and NLP capabilities. Similarly, demands for alternative data are driving higher expectations from advanced analytics. Given these capabilities are being deployed in professional environments with high stakes, the required level of precision, sensitivity and quality is ever increasing.

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BENCHMARK FINDINGS

This study calls out the most significant findings from each of the nine observed dimensions for asset managers establishing advanced analytics and alternative data programs. Note that the dimensions are not necessarily independent of each other.
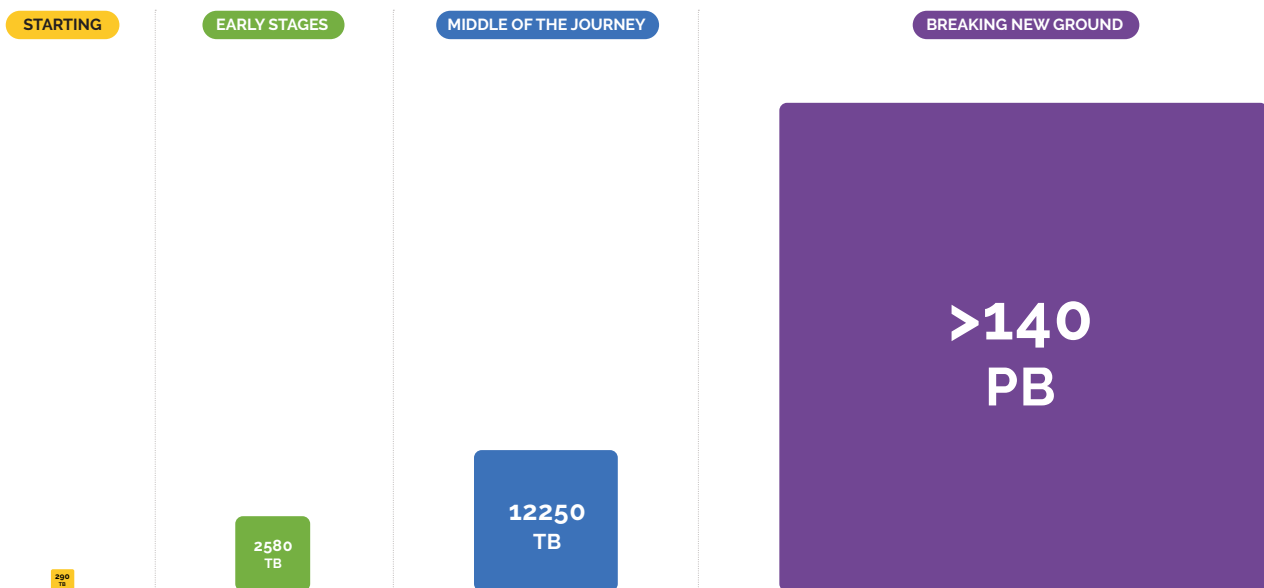
01

ADOPTION

Adoption of advanced analytics and alternative data varies widely across the surveyed asset managers. Advanced analytics and alternative data have witnessed high adoption with 66% of firms using former at some level and 68% leveraging the latter. While production use varies across managers, it is interesting that alternative data provides tangible value early in the journey while advanced analytics in the early part of the journey is used much more in experimentation and proofs of concept (POCs) rather than production. This is due to the fact that some alternative data does not require NLP or Machine Learning to be utilized and in some cases there are specialized providers that preprocess raw alternative data using NLP and Machine Learning and provide prepared data in a form that can be readily digested by managers using traditional technologies.

66%

USE OF ADVANCED
ANALYTICS

68%

USE OF ALTERNATIVE
DATA
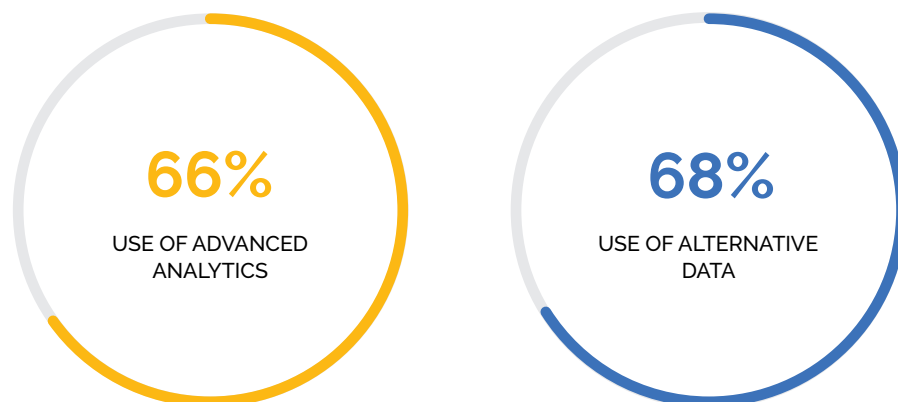
Varied adoption is also evident when analyzing data storage utilization. Given the Big Data nature of advanced analytics and alternative data there is a strong correlation between storage capacity and levels of adoption. Our survey reveals a broad distribution of adoption level with the most committed managers having petabytes of storage. Most asset managers, however, have data stores with less than 50 terabytes. More than a quarter of asset managers project increases of over 100% in data storage to support growth in advanced analytics over the next three years.

STORAGE SIZE IS CORRELATED TO LEVEL OF ADVANCEMENT AND COMMITMENT

STARTING   EARLY STAGES   MIDDLE OF THE JOURNEY   BREAKING NEW GROUND

>140
PB

12250
TB

2580
TB

290
TB

Size of the square represents amount of the data accumulated by the firms within the same stage of the Analytics Power® journey

Similarly, the size of the data team correlates to the level of maturity of the advanced analytics and alternative data program at asset managers. The most committed firms have teams between 15 and 30 FTEs per $100 billion AUM while the majority are below 7.5 FTEs per $100 billion AUM. The largest teams are over 500 FTEs and smallest are below 10 FTEs with the median at 13 FTEs.

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SIZE OF DATA TEAM

(NUMBER PER $100 BILLION AUM)

RANGE OF DATA TEAM SIZE

< 10	13	> 500

MEDIAN
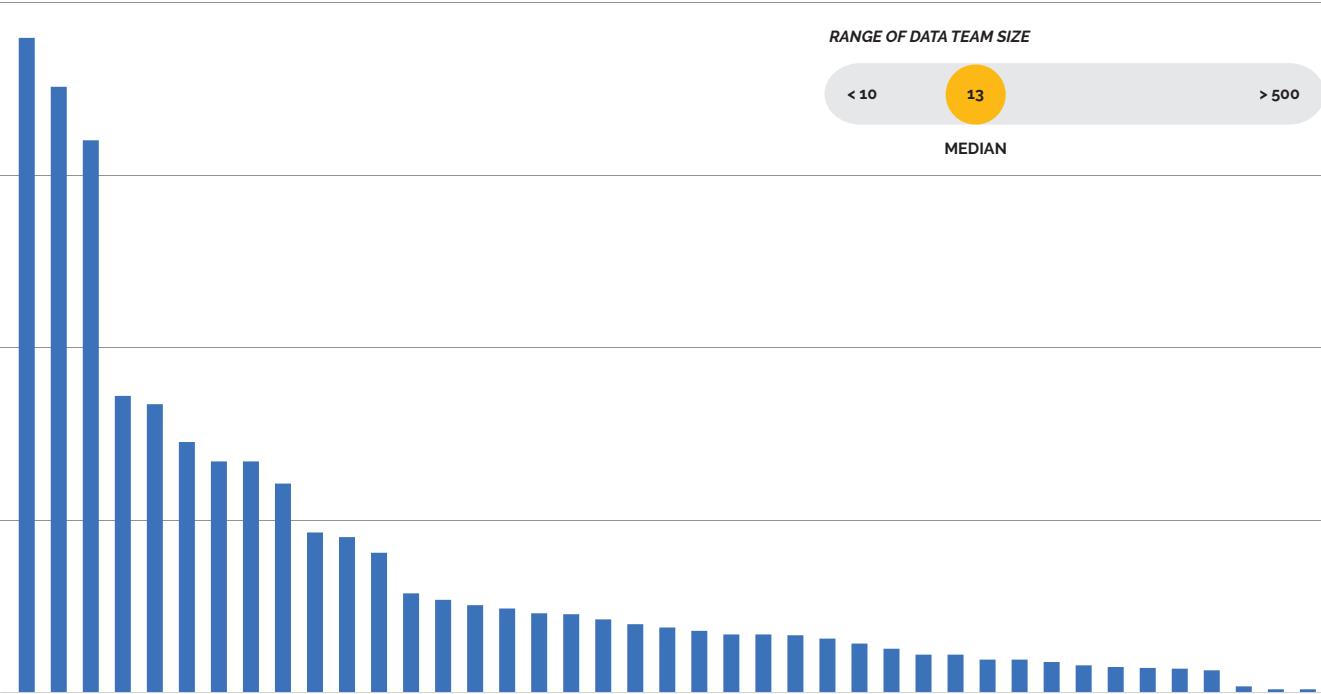
02

JOURNEY

Last year we found that managers are going through a four-step Analytics Power® journey to sustainably realize tangible value from their advanced analytics and alternative data program. The largest group of firms (39%) are in the first step of their journey - *Starting*. This is to be expected because the 2018 survey intentionally skewed toward managers that had embraced the Analytics Power® Journey while the 2019 participants are more indicative of the broader industry. For the most part, these firms are starting to formalize their foundational data programs and they are barely tackling advanced analytics or alternative data.

We identified 29% of managers being in the *Early Stages*. These firms are in the process of developing their data foundation and most are conducting small scale trials and POCs with advanced analytics capabilities and alternative data. This experimentation is mostly being done in labs and leveraging cloud computing.

Another 14% of participants, who are in the *Middle of the Journey*, have largely completed their data foundation and are beginning to realize successes with their trials and POCs. Only 7% of the surveyed firms have begun *Breaking New Ground*. These leaders have realized significant success with advanced analytics and alternative data and, as a result, are making orders of magnitude more investment in their programs[5].

| 39% STARTING | → | 29% EARLY STAGES | → | 14% MIDDLE OF THE JOURNEY | → | 7% BREAKING NEW GROUND |

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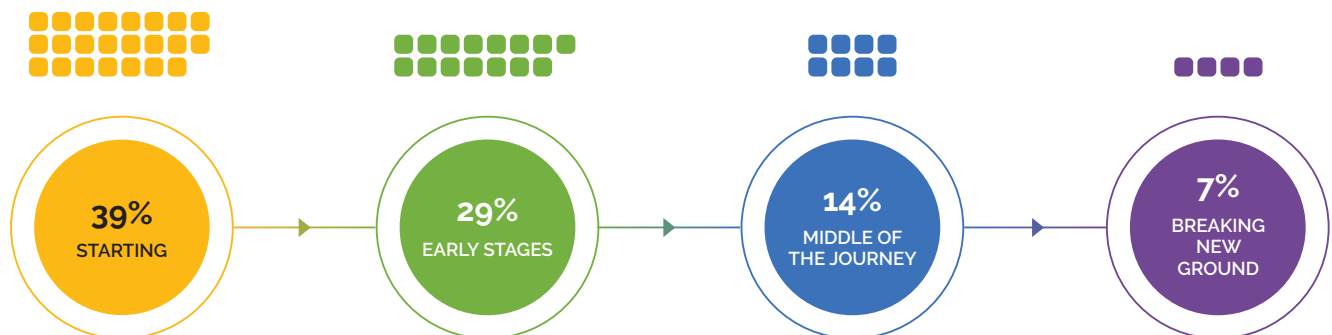
[5]   The remaining 11% of participants, at the time of the survey, either do not have plans for the use of advanced analytics and alternative data or did not provide sufficient data to calculate their stage of Analytics Power®.

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More than half respondents indicated that business stakeholders are satisfied or very satisfied with their data and analytics programs. This appears to contradict the fact that almost 70% of managers are just *Starting* or are in the *Early Stages* of programs, however, this may be explained by either modest expectations for the immature programs or asset managers overestimating their progress early on. Interestingly, independent wealth managers expressed the greatest dissatisfaction with their advanced analytics and alternative data programs.

SATISFACTION LEVEL

HIGHLY SATISFIED 5%

DON'T KNOW OR N/A 14%

DISSATISFIED 8%

SATISFIED 46%

NEUTRAL 27%

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PARTICIPANTS

	Starting	Early	Middle	Breaking
2018	2	11	5	2
2019	23	17	8	4
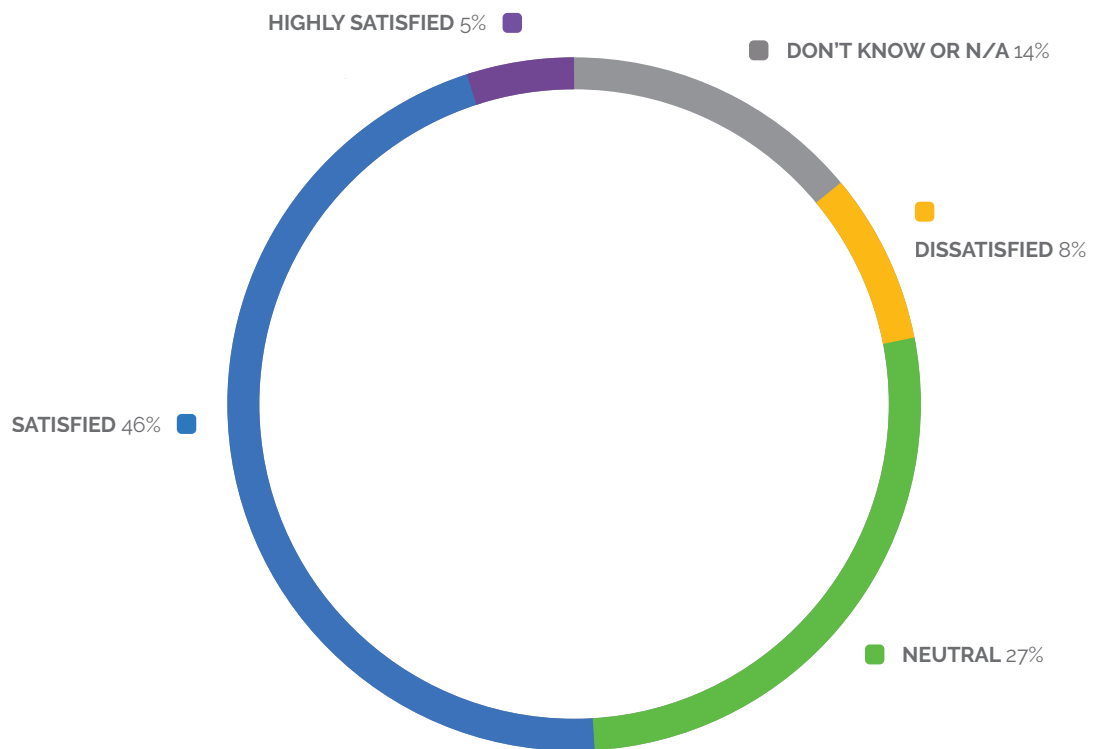
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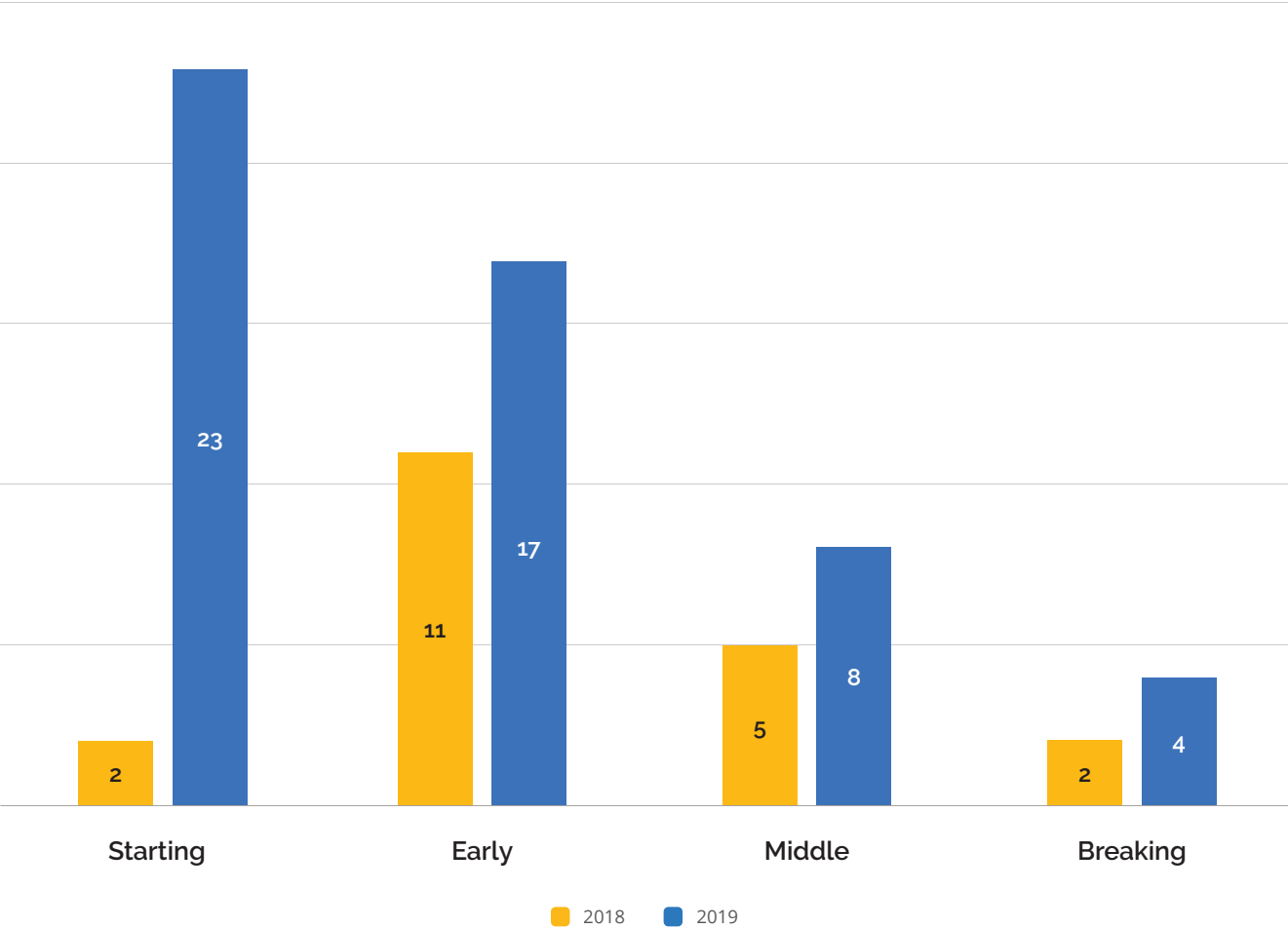
03
STRATEGY

Establishing a successful advanced analytics and/or alternative data program is risky, expensive and time consuming. On average survey participants took four years to begin to realize value from millions of dollars invested in their program. Therefore, it is critical to articulate a strategy that is supported by a business case and endorsed by executive management. Early adopters avail themselves to some of the greatest potential upside but that also comes with first mover risks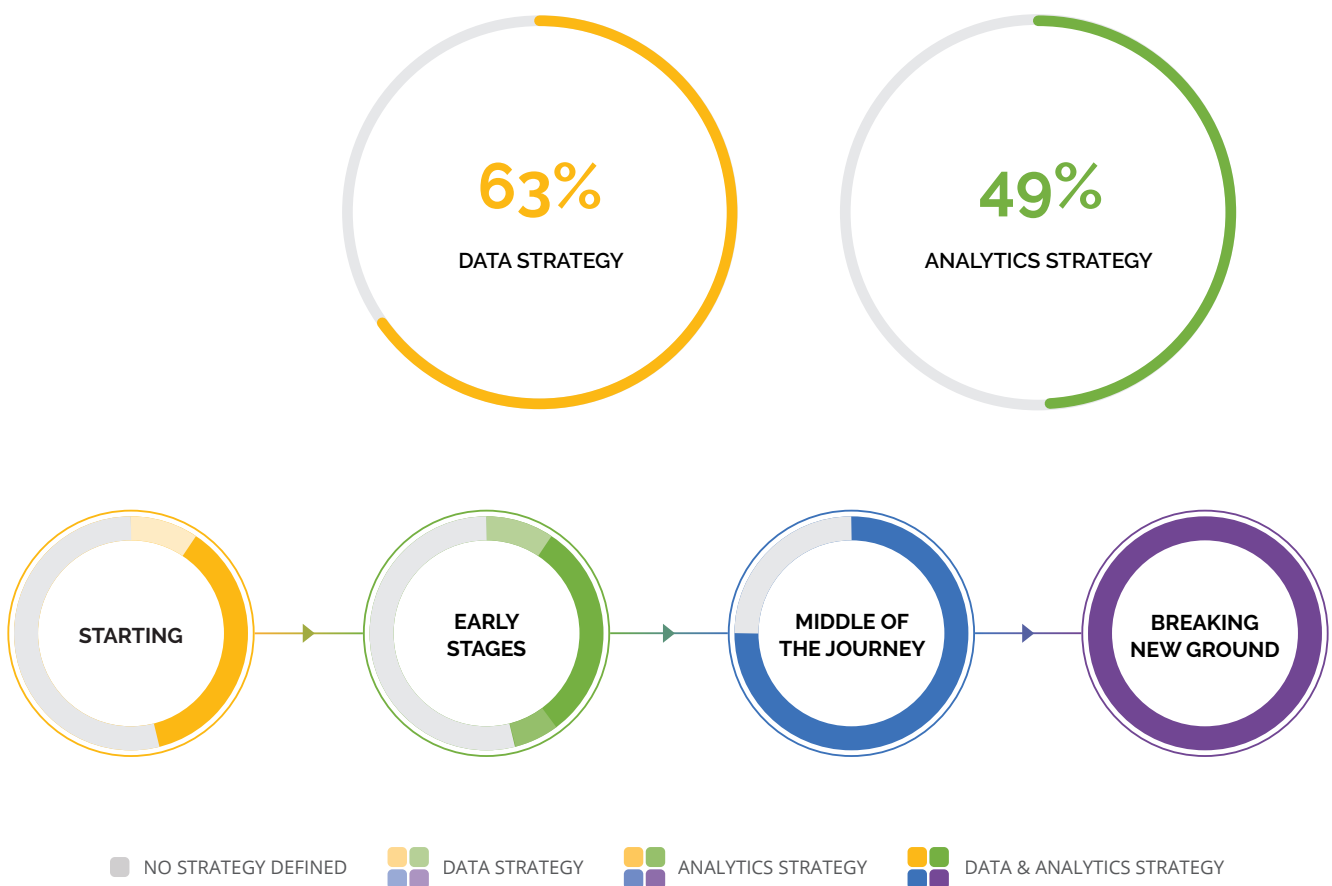. For example, emerging technologies may not realize the potential of their promise or investment hypotheses with alternative data may not bear fruit. Similarly, today's alternative data may soon be tomorrow's commoditized data and the competitive advantage may soon evaporate. Of the survey participants, 49% have an analytics strategy in place and 63% have one for data. Asset managers tend to have a data strategy when they are in the initial stages of the journey and progress to both an analytics and data strategy as they mature to *Middle of the Journey* and *Breaking New Ground*. The findings suggest that asset managers have undertaken targeted trials and POCs as a means of learning, evaluating potential value, building skillsets and gaining buy-in while at the same time containing costs and risks. In the early POCs, asset managers experience more misses than hits, but it is the few hits that build confidence and generate the support that lead to much needed investment capital to build fully-fledged capabilities.

63%
DATA STRATEGY

49%
ANALYTICS STRATEGY

STARTING → EARLY STAGES → MIDDLE OF THE JOURNEY → BREAKING NEW GROUND

⬛ NO STRATEGY DEFINED   ⬛⬛ DATA STRATEGY   ⬛⬛ ANALYTICS STRATEGY   ⬛⬛ DATA & ANALYTICS STRATEGY

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04

**DATA
FOUNDATION**

Next, asset managers establish a data management practice to support their advanced analytics and alternative data program. This foundation ensures that the data management policies, processes, security protocols and governance are in place to be certain the data is fit for purpose, of suitable quality and ready for use. The data foundation is best supported with master data management (MDM) practices. This is well-established approach to define and manage the critical data of an organization. Creating and managing a single physical or virtual copy of critical data, especially data that is applicable to more than one part of an organization, facilitates data integration, commingling and relationship mining. The vast majority of firms (78%) manage their masters either centrally or a combination of centrally and decentralized. Since the same MDM principles can be applied to managing traditional data that asset managers already rely heavily upon, we found 81% of survey participants have at least one data master and 71% have two or more. A Security Master is the dominantly mastered data domain with over 70% participants using it followed by Pricing Master and Corporate Actions Master. Given the close relationship between securities, pricing and corporate actions it is not surprising that these three masters move in lockstep.

NUMBER OF GOLDEN COPIES

NONE 19%

SINGLE 10%

MULTIPLE 71%

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DATA MASTERING

	Starting	Early Stages	Middle of the Journey	Breaking New Ground	Grand Total
Security Master					**71%**
Pricing Master					**59%**
Corporate Actions Master					**49%**
Party (Client) Master					**34%**
Product Master					**25%**
Contact Master					**24%**
None					**19%**

0%   50%   100%
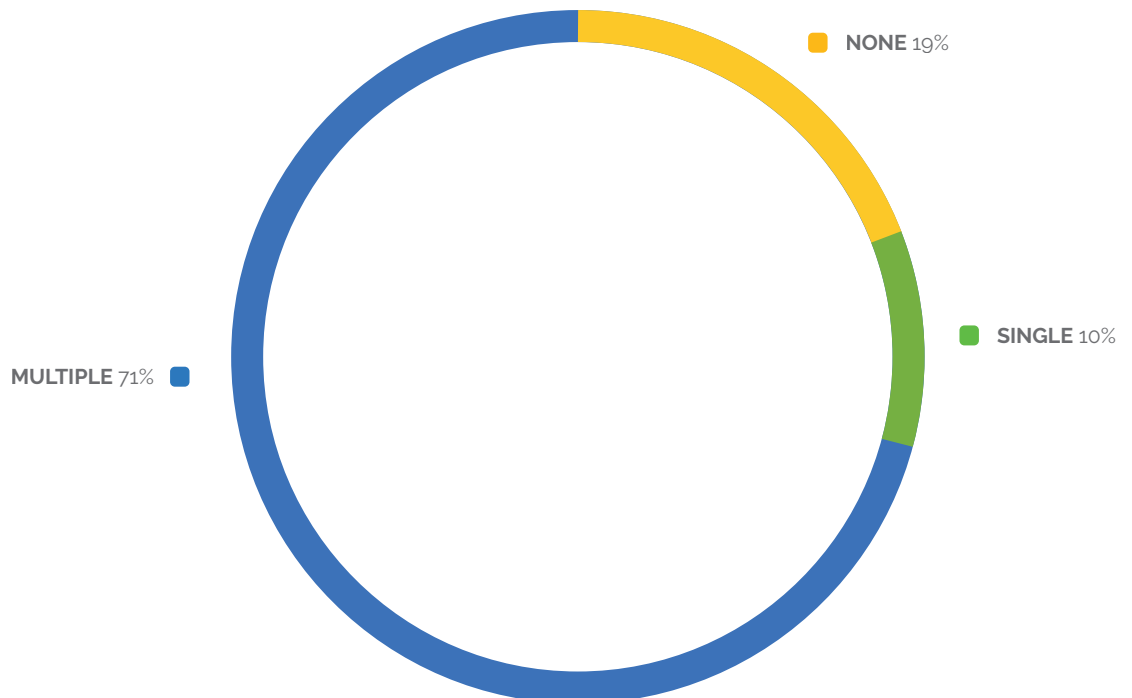
With regard to formal data governance, more than 70% of survey participants had established mature, documented data policies and standards, as well as appropriate entitlements and security policies and procedures. This is very different compared to last year's results where data policies and standards were second to last in terms of presence or adoption. We believe this demonstrates an increasing appreciation for the strategic role of data, and so firms are establishing the governance frameworks to support 'data as an asset'. Documented data lineage, which is the most difficult aspect of data governance, was achieved by only 28% of firms. This is consistent with last year where data lineage had the lowest level of presence across survey participants. With very limited exception, asset managers affiliated with banks and insurance companies have the strongest data governance practices in place. Interestingly, only half of asset managers, all of whom operate in a heavily regulated industry, have aligned their data governance programs with regulatory drivers.

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DATA GOVERNANCE

	Starting	Early Stages	Middle of the Journey	Breaking New Ground	Grand Total
Entitlements and Security					**81%**
Documented Data Policies and Standards					**74%**
Privacy					**72%**
Defined Roles and Responsibilities					**67%**
Alignment with Regulatory Drivers					**52%**
Governance of Machine Learning based Models					**29%**
Data Lineage					**28%**

0%   50%   100%
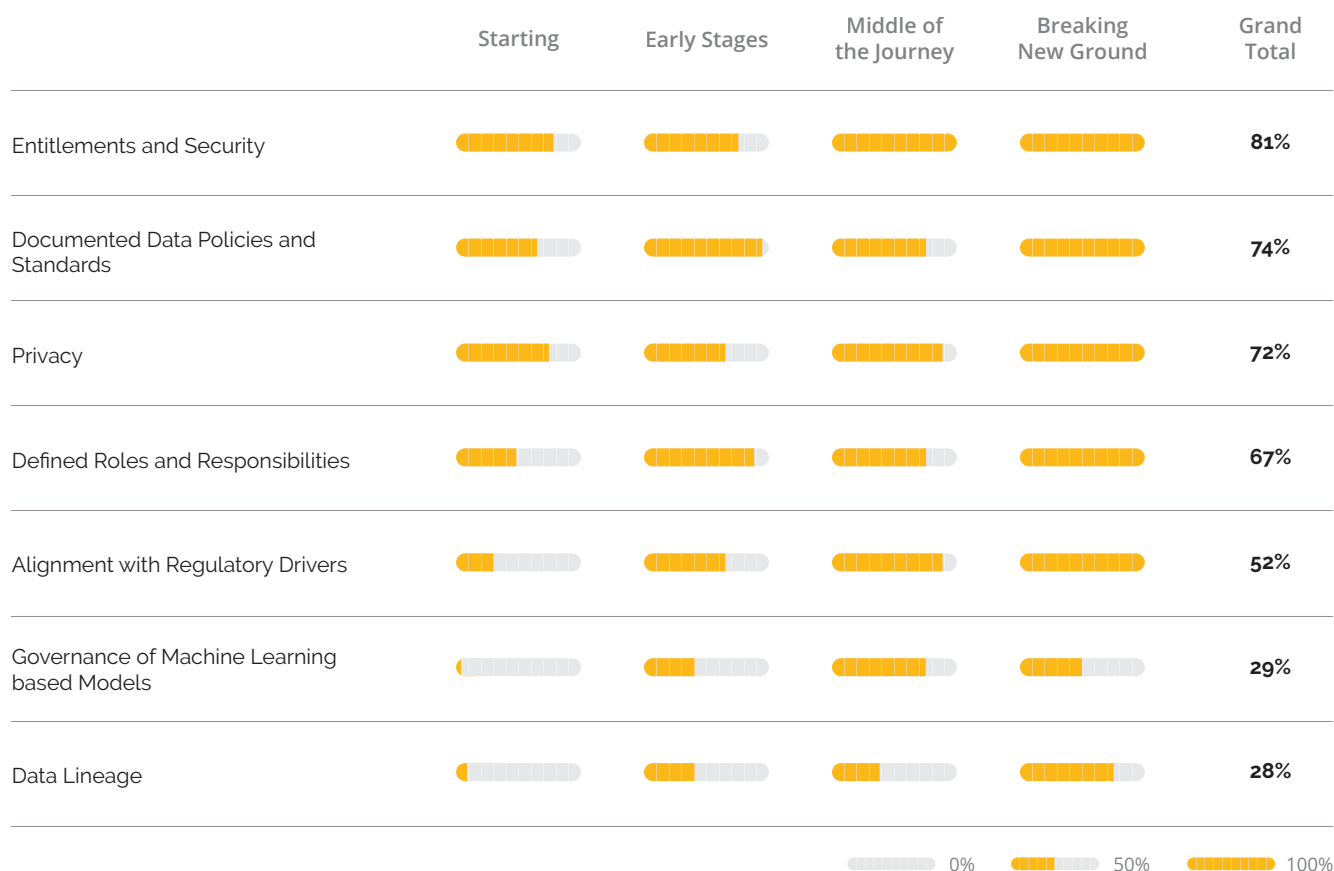
One of the cornerstones of a solid data foundation is robust data architecture. Of the different data architecture components only Logical and Physical data models are present in nearly two-thirds of asset managers (64%). All other components are in use at less than half of surveyed asset managers. A data catalog is present at 42% of asset managers which is a surprisingly high percentage considering data catalogs are a relatively new capability. A business glossary is only present at a quarter of asset managers, indicating that the strategic importance of data is not yet fully recognized by business leaders at asset managers. Semantic data models and ontologies are used by only 8% of asset managers, indicating a long road to acceptance and adoption.

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DATA ARCHITECTURE

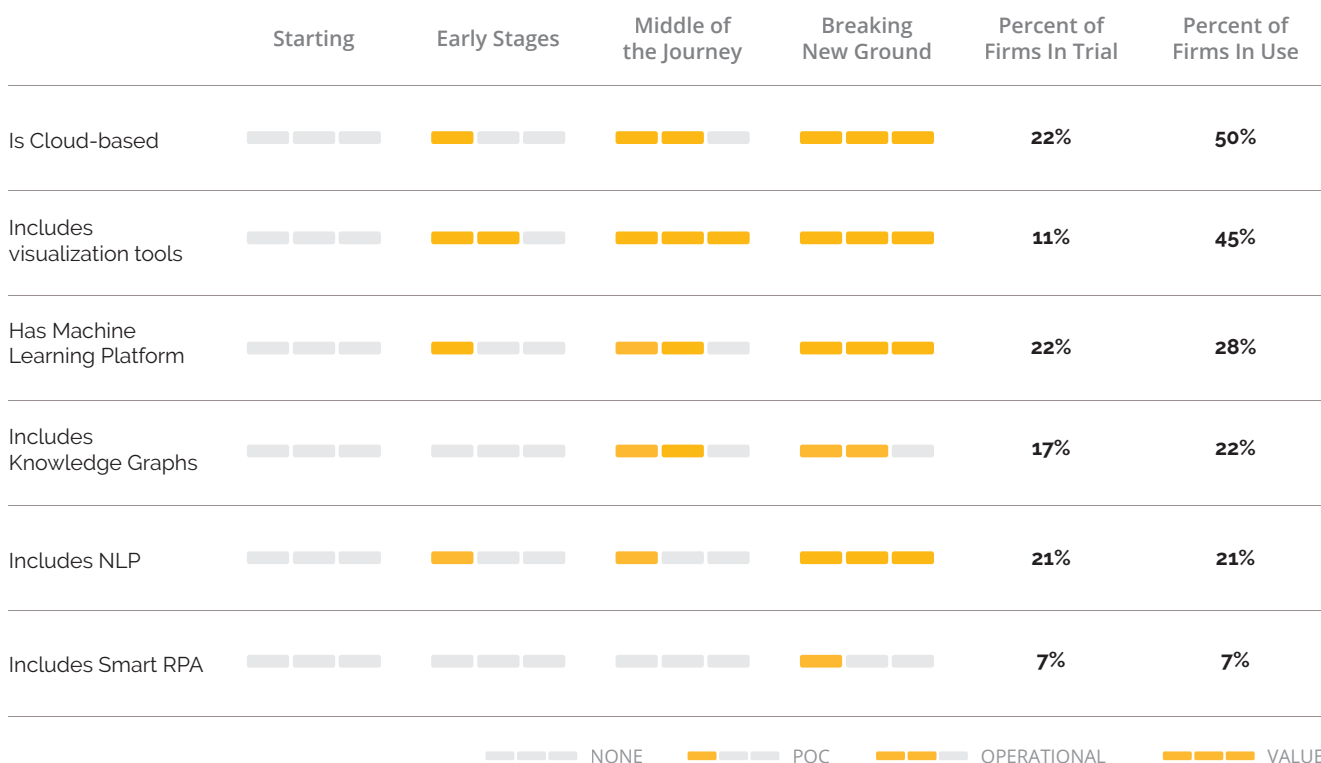|	Starting	Early Stages	Middle of the Journey	Breaking New Ground	Grand Total
Logical and Physical Data Models					**64%**
Data Catalog					**42%**
Metadata Repository					**32%**
Business Glossary					**25%**
Data Lineage					**22%**
None					**22%**
Semantic Data Models (ontologies)					**8%**

0%   50%   100%

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05

ANALYTICS INFRASTRUCTURE

The last component for establishing the foundation is the creation of a technology infrastructure to support an Analytics Power® program. That infrastructure must support many capabilities including:

- Ingestion of diverse structured and unstructured data sources

- Data discovery and automated content tagging

- Wrangling data to prepare it for different analytical uses

- Cataloging data assets

- Automated back-testing of machine learning and other algorithmic models

- Monitoring the progress of the value provided by alternative data and AI use cases

Cloud computing providers are increasing their offerings from infrastructure-as-a-service to higher value-add software-as-a-service including many advanced analytics capabilities. As a result, many asset managers are embracing the cloud, which can be seen as an avant-garde computing environment for long-established, risk-averse asset managers. Already half of the managers have embraced the cloud and are operationally using it. Managers in the *Early Stages* of the journey are in trial or POCs and, not surprisingly, the managers just *Starting* their journey are not yet leveraging the cloud.

ADVANCED ANALYTICS INFRASTRUCTURE

	Starting	Early Stages	Middle of the Journey	Breaking New Ground	Percent of Firms In Trial	Percent of Firms In Use
Is Cloud-based					22%	50%
Includes visualization tools					11%	45%
Has Machine Learning Platform					22%	28%
Includes Knowledge Graphs					17%	22%
Includes NLP					21%	21%
Includes Smart RPA					7%	7%

NONE   POC   OPERATIONAL   VALUE
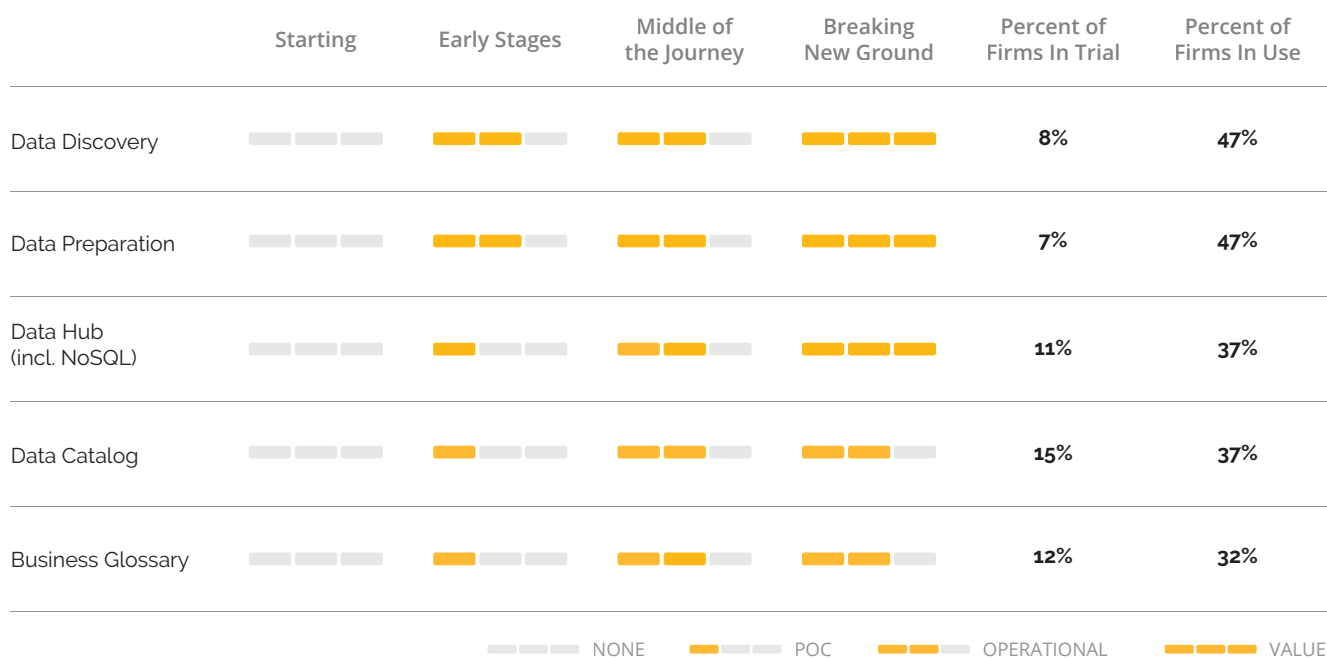
element22   ❄ UBS

A cloud environment is necessary not only to take advantage of advanced analytics technologies but also to exploit massive computing scalability and elasticity that is, for the most part, only available in the cloud. Storage requirements and computing capacity may vary wildly when running advanced analytics or processing alternative data. The cloud also makes it easy for asset managers to stand up sandboxes for POCs, staging environments, innovation labs, etc. Machine Learning and NLP are providing tangible value to managers at the *Breaking New Ground* stage, but overall ML and NLP are at the lower end of adoption within analytics programs where only 28% and 21% of managers, respectively, have implemented them. Machine Learning tends to have earlier adoption as compared to NLP, which is consistent with their respective complexity. Graph technology[6] is used operationally by 22% of managers while 17% are conducting POCs, which is much higher than anticipated. The least used technology that was surveyed is Smart RPA which is at only 7% of managers. This indicates that this technology is not yet recognized as a value creator for front office activities.

Data preparation and discovery tools are used at 47% of the surveyed asset managers with a smaller percentage of managers conducting trials and POCs. As asset managers progress through the journey to *Breaking New Ground* adoption increases. Nearly 25% of those in the *Early Stages* are realizing tangible value from their data preparation tools. This increases to more than a third of those in the *Middle of the Journey* and jumps to a full 75% of those *Breaking New Ground*. Of all of the Big Data tools, data preparation and discovery tools have the highest levels of tangible value achieved (27% and 28%, respectively). Others are mostly using less sophisticated scripting technology or are not performing these functions. NoSQL data hubs are used at only 37% of managers and that is due to the fact that most managers are at the *Starting* or *Early Stages* of developing their advanced analytics platform. It is likely that those firms that are early in their Analytics Power® journey are still focused on traditional technologies and processing structured data and have not yet fully embraced advanced technologies that are better equipped to handle unstructured data.

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6   The question in the survey was specific to the use of Knowledge Graphs however the answers provided were generally for broader graph technology including proprietary graphs

BIG DATA TECHNOLOGY PRODUCTS

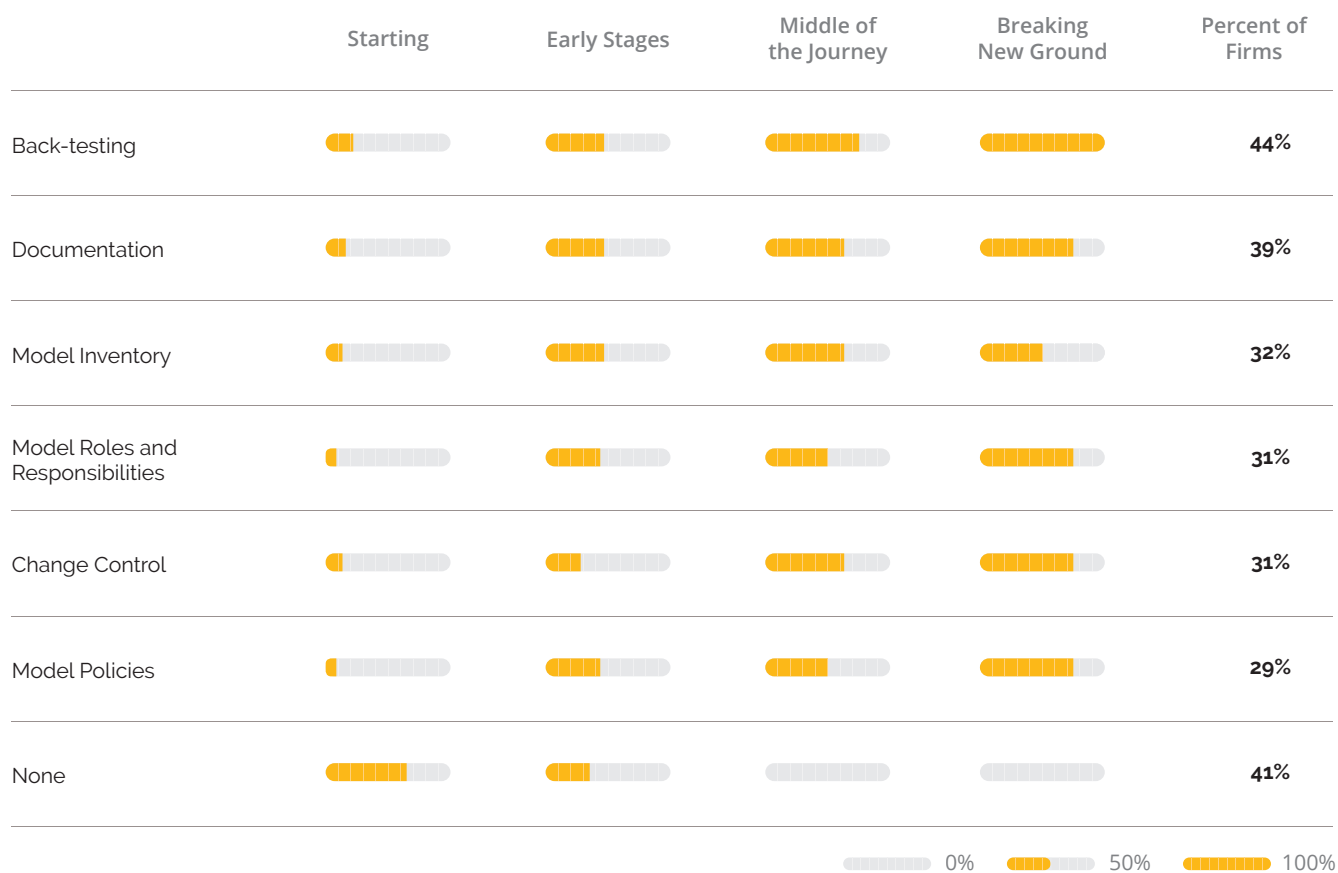|	Starting	Early Stages	Middle of the Journey	Breaking New Ground	Percent of Firms In Trial	Percent of Firms In Use
Data Discovery					8%	47%
Data Preparation					7%	47%
Data Hub (incl. NoSQL)					11%	37%
Data Catalog					15%	37%
Business Glossary					12%	32%

NONE   POC   OPERATIONAL   VALUE

Two-thirds of managers are ingesting data files in batch mode from external data sources and internally generated sources. Approximately one-third (32%) of managers are ingesting data more often through micro-batches, which affords more frequent updates and snapshots throughout the day. Only 15% of managers are ingesting streaming or real-time data into their advanced analytics platform which suggests that the main use of advanced analytics platforms is for offline analytics at this time.

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INGESTION

BATCH 66%

MICRO-BATCH 32%

REAL-TIME / STREAM 27%
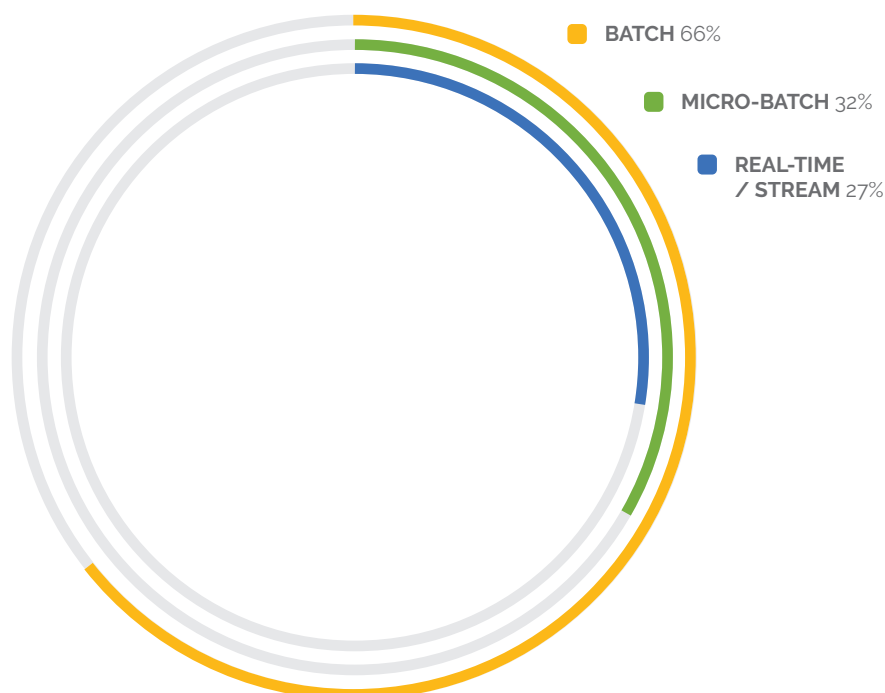
Governance of Machine Learning models, which for many asset managers is indirectly a regulatory requirement, increases commensurately with the size of the asset manager. For all asset managers with more than $1 trillion AUM, all model governance controls are in place. Back-testing is used by 44% of managers overall, which is higher than predicted, and by all of the managers in the *Breaking New Ground* stage. Change Control, on the other hand, is in place for only 31% of the surveyed asset managers. This negatively impacts compliance conformity. Generally, governance controls increase across the board as asset managers mature in the Analytics Power® journey.

element22   UBS

MODEL GOVERNANCE

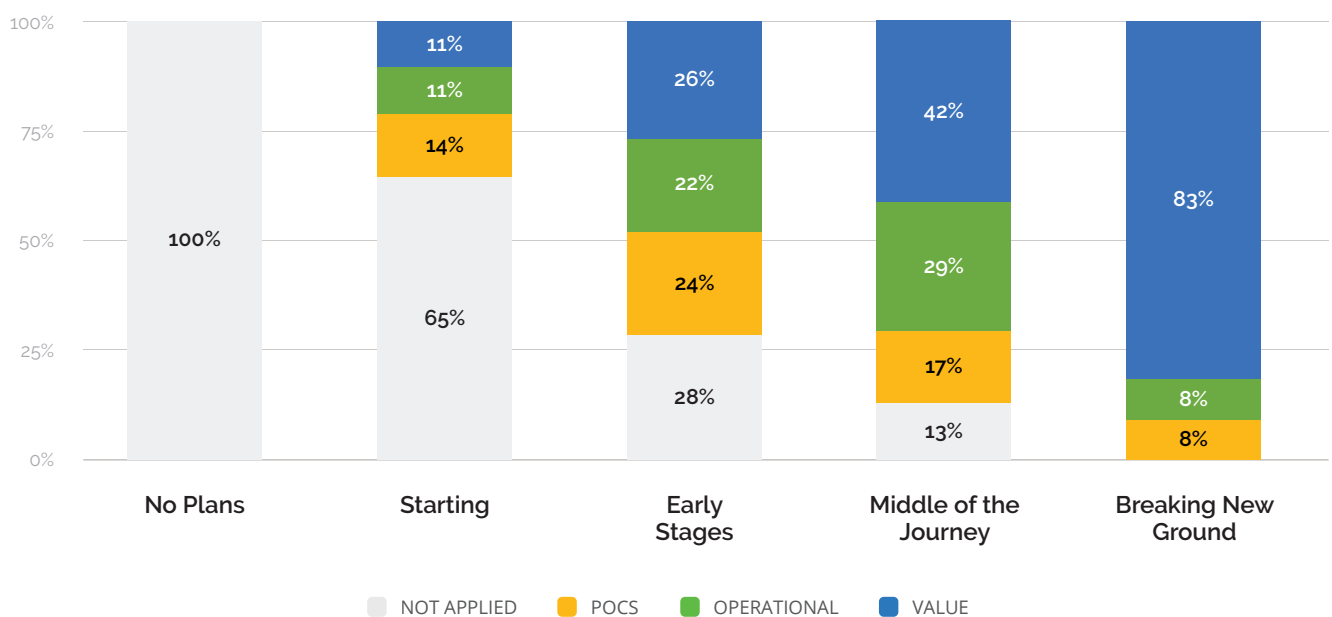|	Starting	Early Stages	Middle of the Journey	Breaking New Ground	Percent of Firms
Back-testing					**44%**
Documentation					**39%**
Model Inventory					**32%**
Model Roles and Responsibilities					**31%**
Change Control					**31%**
Model Policies					**29%**
None					**41%**

0%   50%   100%

element22   UBS

06

ALTERNATIVE DATA

Alternative data plays heavily in alpha generation with 49% of asset managers using it in production while another 17% are in trials and POCs. This increased and relatively high penetration level of alternative data for investment purposes is indicative of the need to find new sources of alpha generation, as well as the desire for asset managers to make better informed investment decisions by broadening their insight. Asset managers further on their journey are using alternative data more intensively in terms of the number of sources and the number of alternative data-influenced investment strategies. This is evidenced by storage requirements reaching as high as 100 petabytes for more mature players. That said, it does take time and subject matter expertise to move from hypothesis to operationalization as there is a lot of work to be done between identifying sources to support the hypothesis to wrangling, preparing, scrubbing and testing the data before moving the data source into production. Asset managers are pursuing POCs at all phases of the journey, suggesting there is still ample opportunity to grow even for those *Breaking New Ground*. It is encouraging for those *Starting* their journey that they are realizing sustainable value very quickly, as 11% have reported. And there is more good news ahead for those starting as 83% of those *Breaking New Ground* are reaping sustainable value from their use of alternative data.
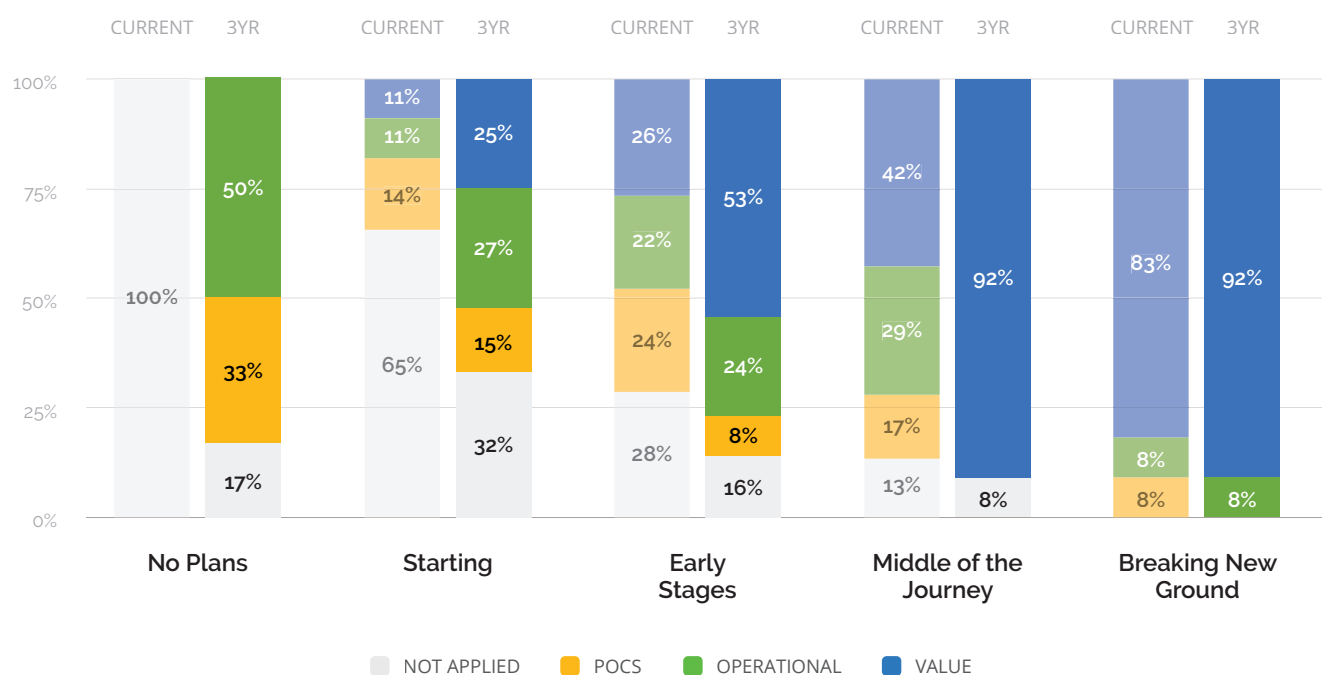
ALTERNATIVE DATA

Use across Front Office Functions

	No Plans	Starting	Early Stages	Middle of the Journey	Breaking New Ground
VALUE		11%	26%	42%	83%
OPERATIONAL		11%	22%	29%	8%
POCS		14%	24%	17%	8%
NOT APPLIED	100%	65%	28%	13%	

NOT APPLIED   POCS   OPERATIONAL   VALUE

element22   UBS

Asset managers are seeing the potential of alternative data and are planning for significant growth in the use of alternative data across all stages of the journey with explosive growth at the *Middle of the Journey* stage which is where the value of alternative data is recognized by the business.
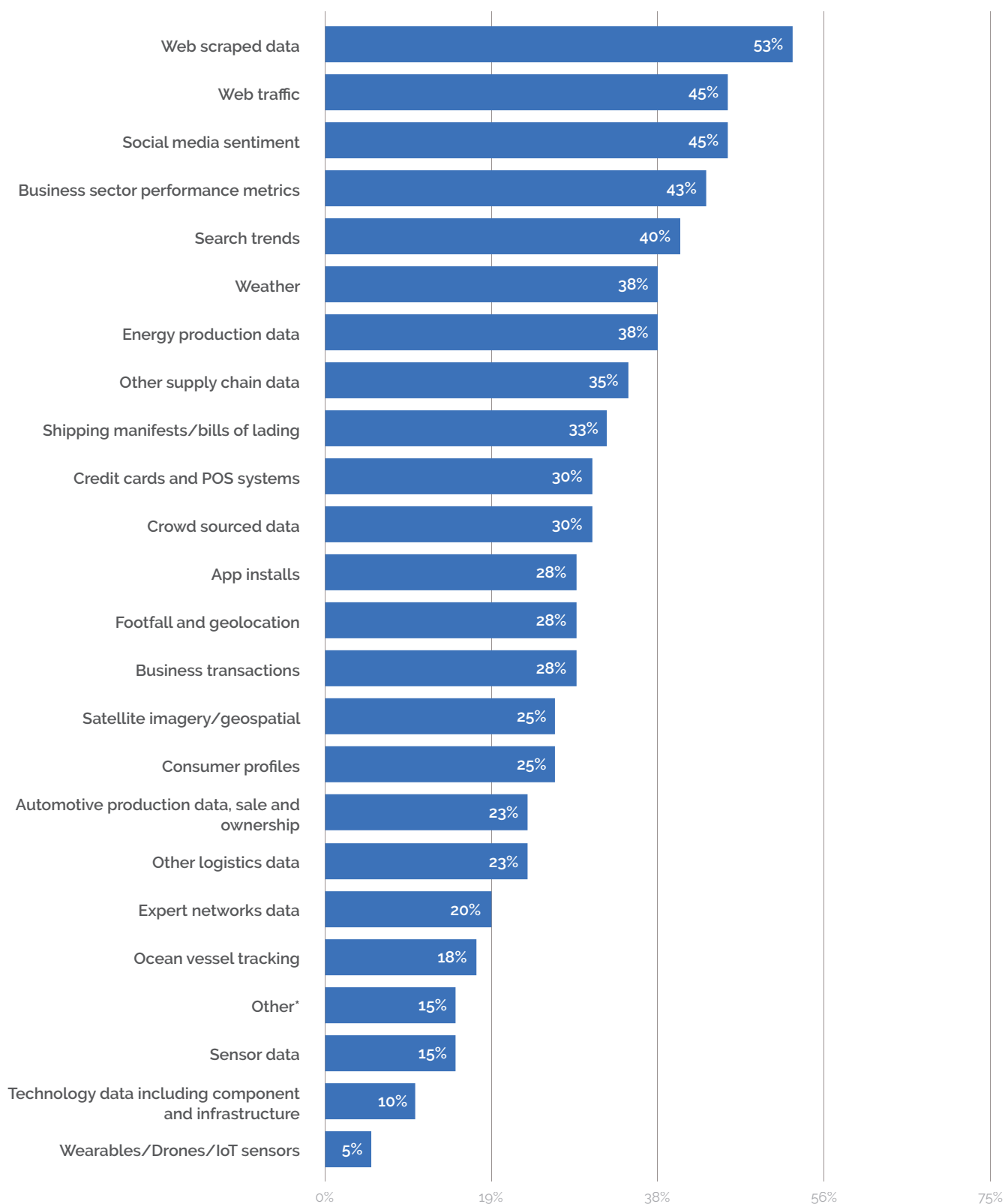
ESTIMATED GROWTH IN ALTERNATIVE DATA USE OVER THE NEXT 3 YEARS

Types of alternative data and suppliers are very diverse and some larger asset managers have created scouting teams to find and investigate new data sources for alpha generation. We surveyed a broad array of alternative data types[7] and found all of them are in use today with web-scraped data being used most frequently at asset managers (53%).

7   Classifications based on Greenwich Associates Demystifying Alternative Data, 2019

element22   ❄ UBS

USE OF DIFFERENT ALTERNATIVE DATA TYPES

Data Type	Percentage
Web scraped data	53%
Web traffic	45%
Social media sentiment	45%
Business sector performance metrics	43%
Search trends	40%
Weather	38%
Energy production data	38%
Other supply chain data	35%
Shipping manifests/bills of lading	33%
Credit cards and POS systems	30%
Crowd sourced data	30%
App installs	28%
Footfall and geolocation	28%
Business transactions	28%
Satellite imagery/geospatial	25%
Consumer profiles	25%
Automotive production data, sale and ownership	23%
Other logistics data	23%
Expert networks data	20%
Ocean vessel tracking	18%
Other*	15%
Sensor data	15%
Technology data including component and infrastructure	10%
Wearables/Drones/IoT sensors	5%

*   Other innovative alternative data types that were provided by respondents included job postings, WASDE (World Agricultural Supply and Demand Estimates), earnings transcripts, research reports, and aviation tracking.

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64% of managers are using multiple data sources which indicates that the use of alternative data sources has become more prevalent in just a year. In fact, 20% of managers are using more than 10 alternative data sources. Increasingly, investment hypotheses require multiple alternative data sources at the same time to generate alpha. Hypotheses that utilize a single source of alternative data are exceedingly rare as alternative data sources become more accessible and increasingly commoditized.

NUMBER OF ALTERNATIVE DATA SOURCES

MORE THAN 10 20%

NONE 34%

6-10 7%

SINGLE 2%

2-5 37%

element₂₂   ❊ UBS
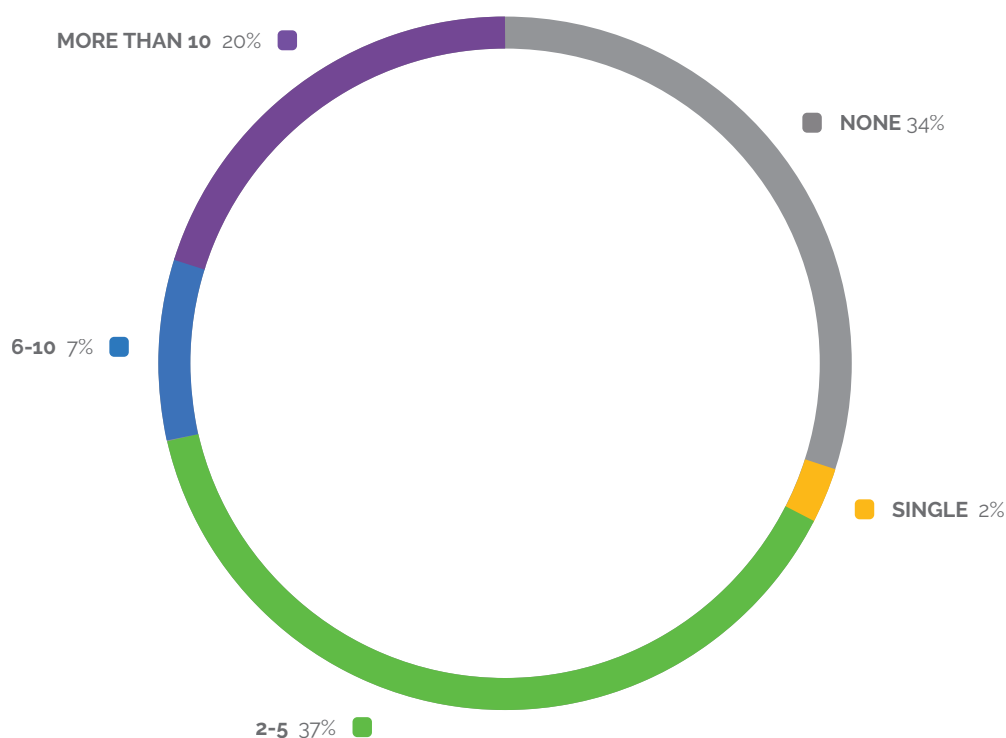
07

ADVANCED ANALYTICS

Use of advanced analytics follows a similar use pattern to alternative data with 66% of asset managers using advanced analytics to aid in research, portfolio construction and portfolio management activities[8]. Machine Learning and Natural Language Processing are the most mature advanced analytics capabilities used in generating alpha while Smart RPA is barely used.

ADVANCED ANALYTICS

Production use across Front Office Functions

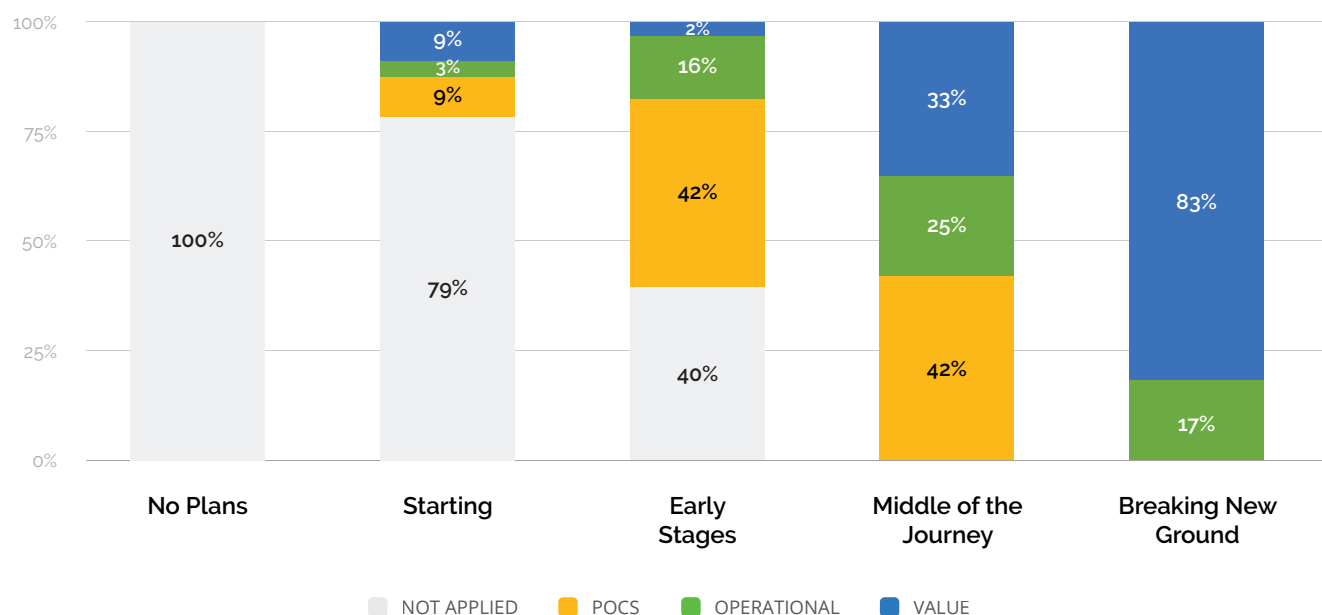Legend: SMART RPA | NLP | ML
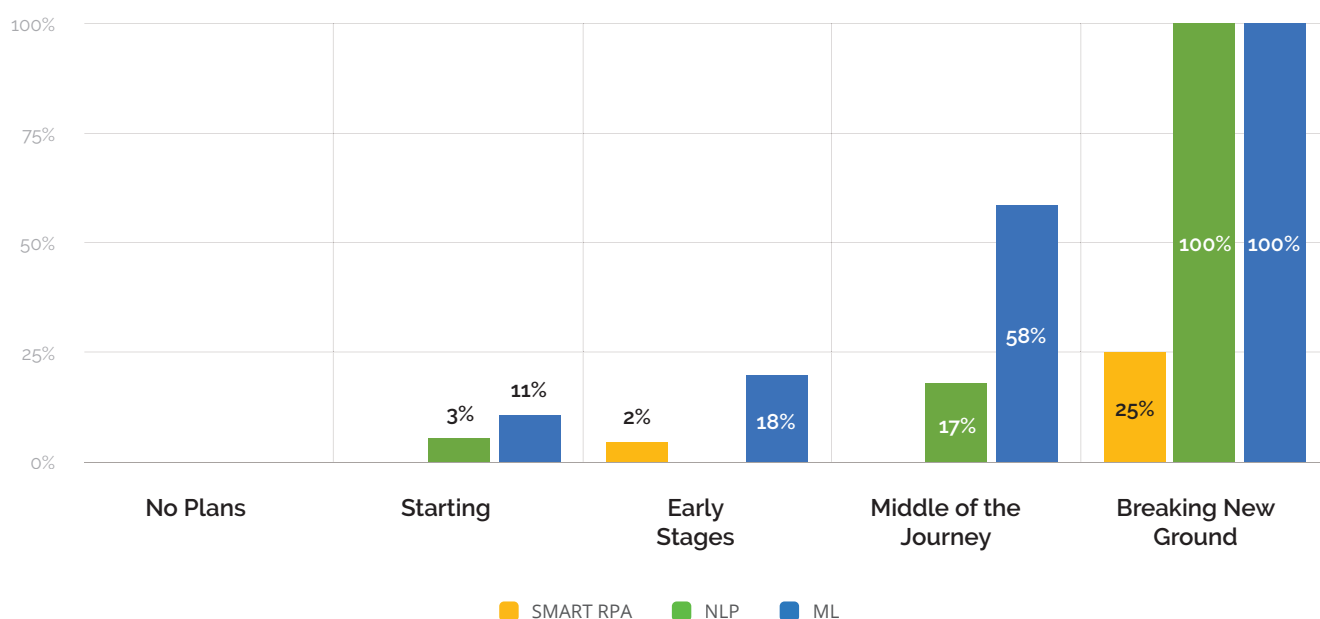
Machine Learning is the most used advanced analytics capability. All of the managers in later stages of the journey are using Machine Learning to some extent and even 9% of the managers at the *Starting* stage are generating value. Machine Learning is used across all three investment functions with it being slightly more prevalent in Research and Portfolio Construction than Portfolio Management.

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8   Research: Capabilities to support Research Directors, Investment Analysts
     Portfolio construction: Capabilities to support Chief Investment Officers
     Portfolio management: Capabilities to support Portfolio Managers

element22   ❄ UBS

MACHINE LEARNING

Use across Front Office Functions

|	No Plans	Starting	Early Stages	Middle of the Journey	Breaking New Ground
VALUE		9%	2%	33%	83%
OPERATIONAL		3%	16%	25%	17%
POCS		9%	42%	42%	
NOT APPLIED	100%	79%	40%		

Legend: NOT APPLIED · POCS · OPERATIONAL · VALUE

Similar to alternative data, asset managers are seeing the potential of Machine Learning and are planning for significant growth in its use across all stages of the journey with explosive growth at the *Middle of the Journey* once tangible value is recognized by the business. Some asset managers are combining ML and NLP in their advanced analytics program. For example, ML and NLP are used to analyze, compare and contrast research analyst reports to company announcements.

element22   ✤ UBS

ESTIMATED GROWTH IN MACHINE LEARNING
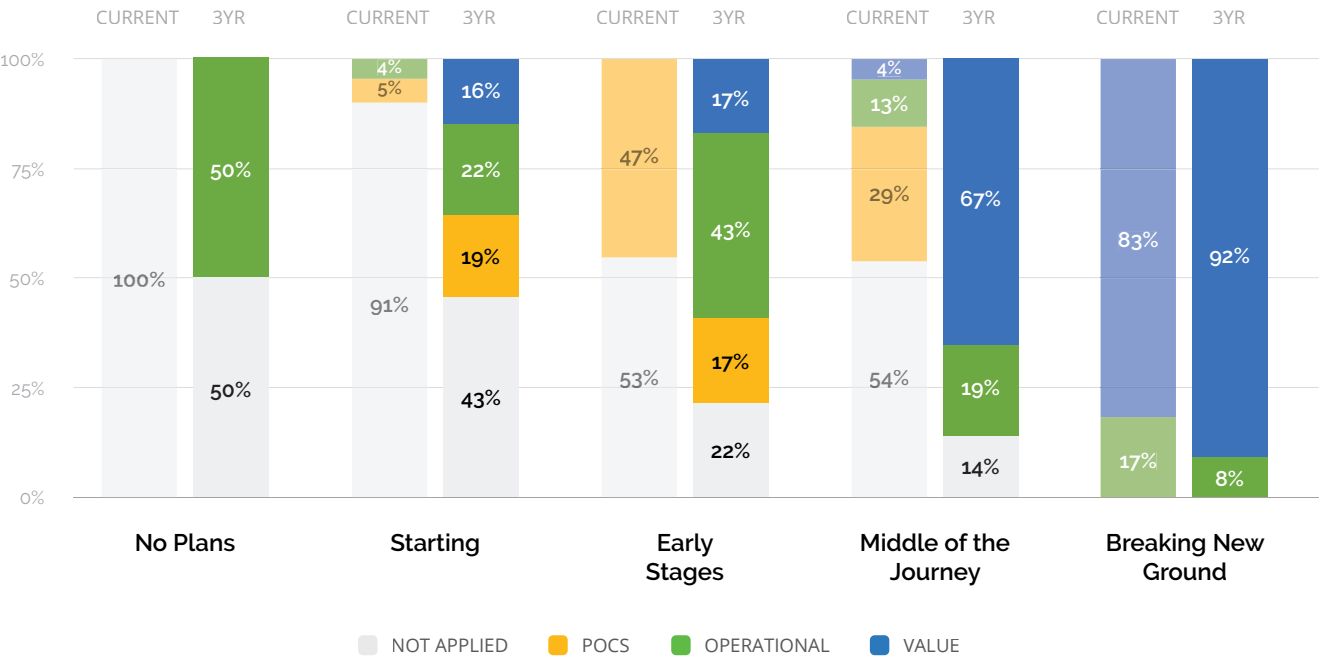# USE OVER THE NEXT 3 YEARS
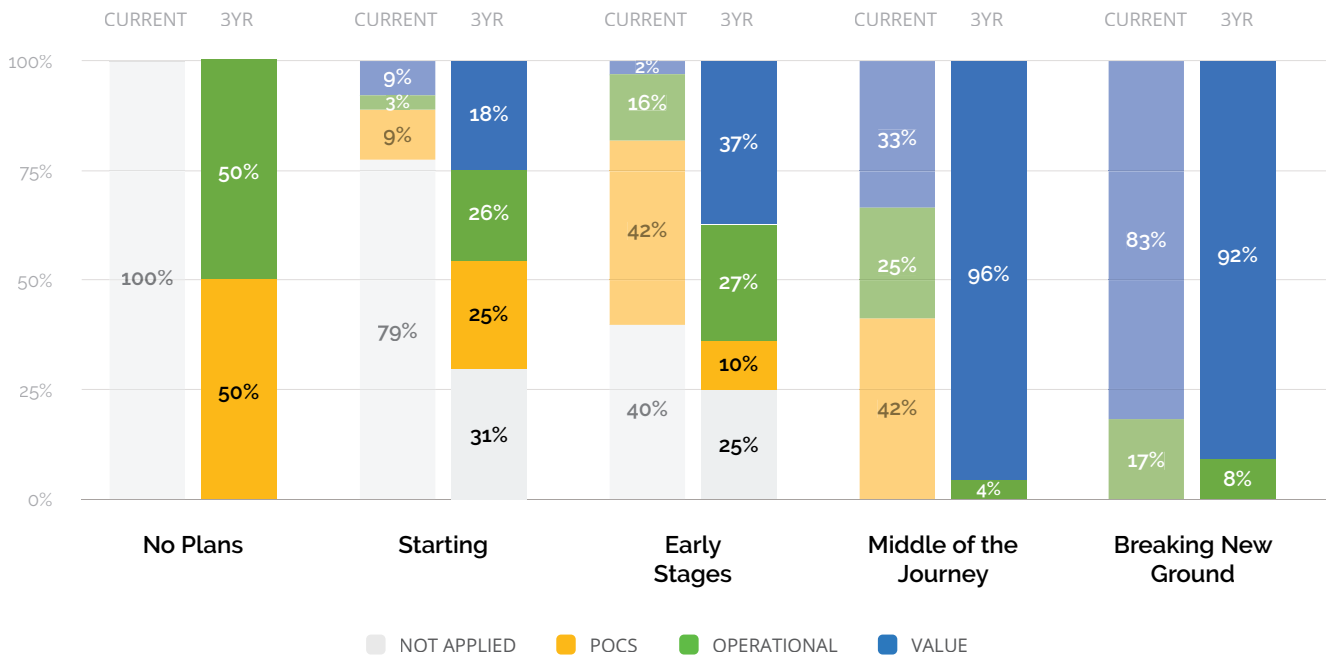
Supervised algorithms are the most common type of algorithm used by asset managers (42%). Unsupervised are used by 22% and semi-supervised, reinforcement and deep learning are each utilized by 19% of surveyed managers. The highest use of supervised algorithms may be explained by better transparency and ease of use of supervised machine learning algorithms. Although deep learning is highly promising it is still relatively new and yet to be widely adopted. Deep learning poses an additional challenge with regard to understanding and documenting the decisions made by the algorithm for governance and security purposes.

element22   UBS

42%

SUPERVISED

22%

UNSUPERVISED

19%

SEMI-SUPERVISED

19%

REINFORCEMENT

19%

DEEP LEARNING
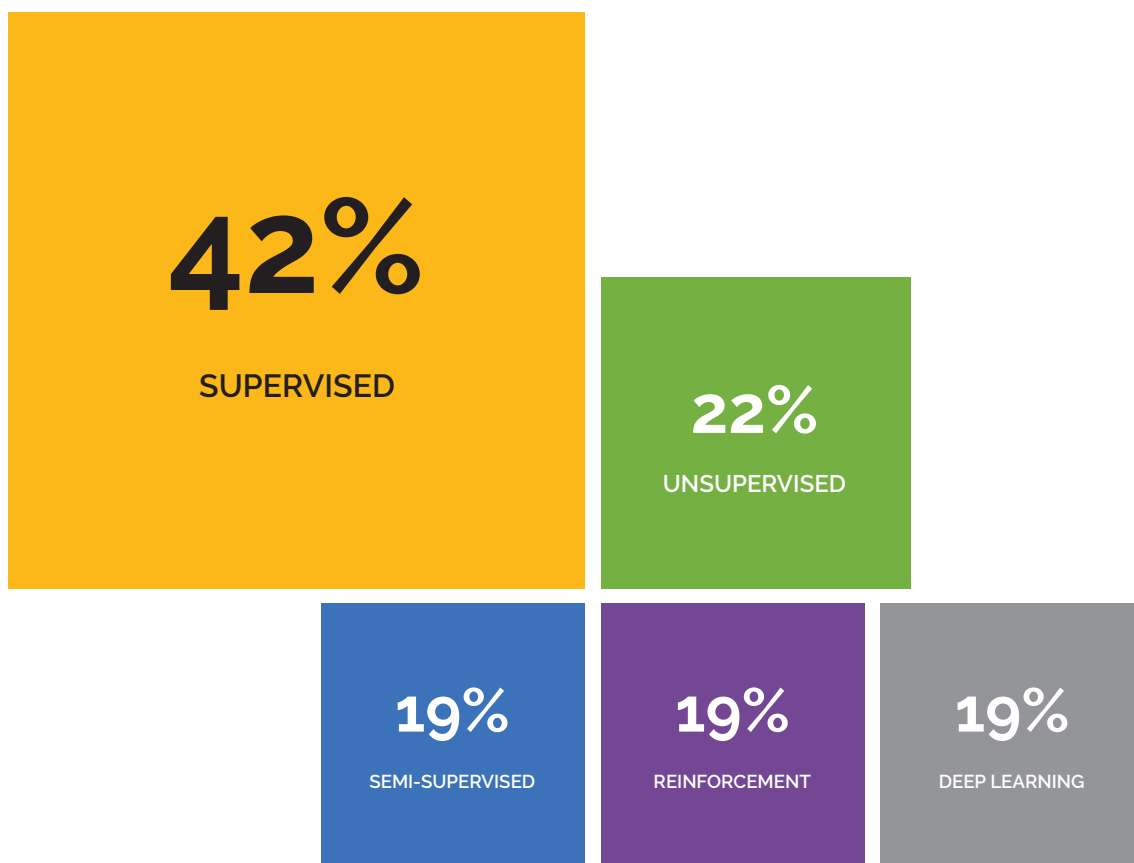
Leading managers are able to operationalize and realize tangible value from the application of NLP for Portfolio Management slightly more than their colleagues in Research and Portfolio Construction. Similar to Machine Learning and alternative data, application of NLP provides benefits at the later stages of the journey where tangible value is only starting to be realized by those in the *Middle of the Journey* and only those *Breaking New Ground* are seeing substantial value. NLP is viewed by managers as a capability that has very good potential to create value and they are planning to aggressively increase its use through all stages of the journey with most growth anticipated by those in the *Middle of the Journey*.

element22   ❄ UBS
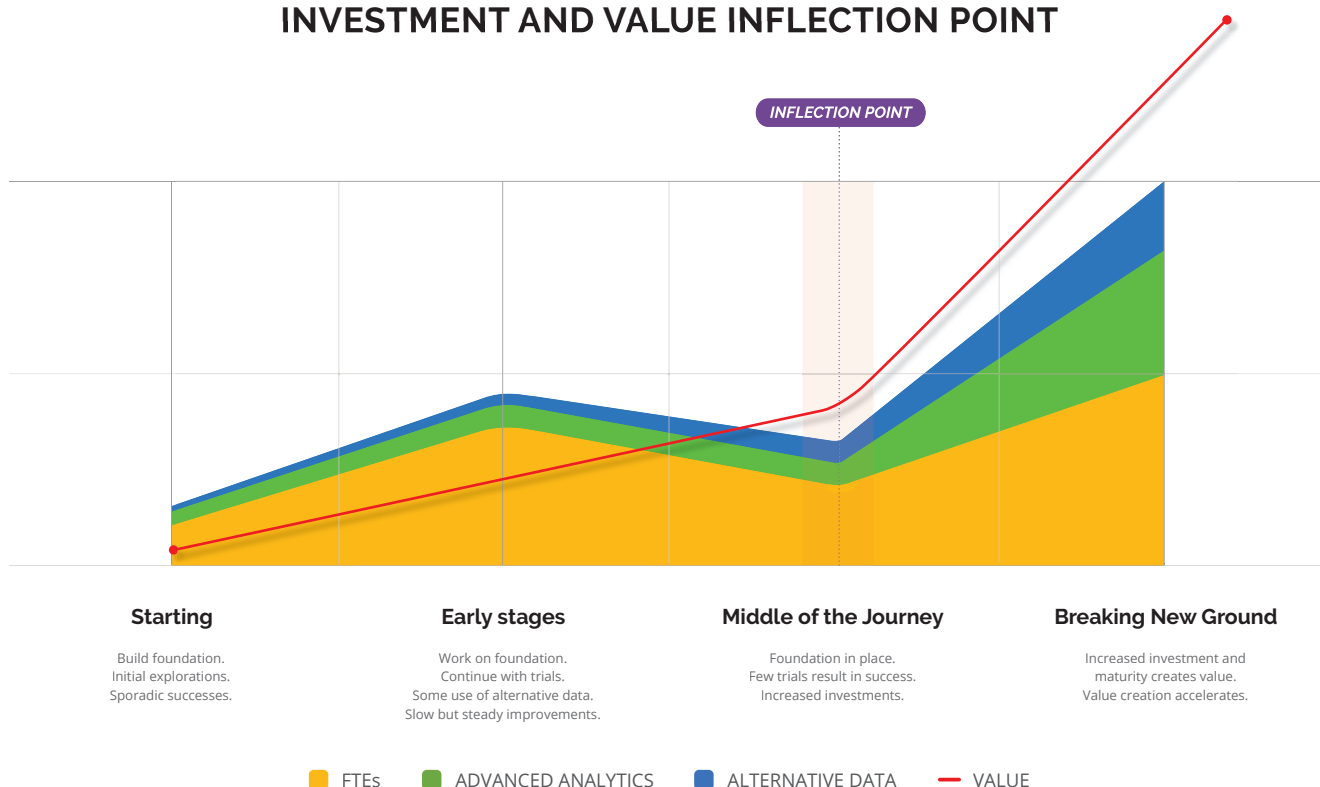
ESTIMATED PLANNED GROWTH IN
NLP USE IN THE NEXT 3 YEARS

	CURRENT	3YR
No Plans	100%	50% (OPERATIONAL), 50% (NOT APPLIED)
Starting	91%, 5%, 4%	16%, 22%, 19%, 43%
Early Stages	53%, 47%	17%, 43%, 17%, 22%
Middle of the Journey	54%, 29%, 13%, 4%	67%, 19%, 14%
Breaking New Ground	83%, 17%	92%, 8%

Legend: NOT APPLIED · POCS · OPERATIONAL · VALUE

element22 UBS

08
INVESTMENT

Asset managers who are pursuing aggressive advanced analytics and alternative data strategies are investing heavily in their programs. The four most aggressive managers are investing 67% of total annual investment among all 59 respondents. In general, managers spend anywhere from less than $1 million to over $100 million annually with median skewed all the way down to below $5 million.

As noted last year, the investment profile for asset managers follows a fairly typical pattern as they progress on their Analytics Power® journey. When in the *Starting* stage, firms invest heavily in the data foundation with little spend on advanced analytics and alternative data. Then, in the *Early Stages*, investment steadily increases in the foundation while significant money is spent on advanced analytics and, to a lesser extent, alternative data. At this time, it is mostly trials and POCs as firms are experimenting and learning. As managers reach the *Middle of the Journey* spend tends to decrease. This is because managers shutter lackluster trials and POCs and focus their spend on fewer initiatives with higher probabilities of success. Here is where things get interesting -- With fewer misses, more hits and more initiatives in production, the advanced analytics and alternative data programs begin to build business confidence. It is at this inflection point that firms significantly increase their investment. This is when tangible value is realized, the program takes off and becomes sustainable.
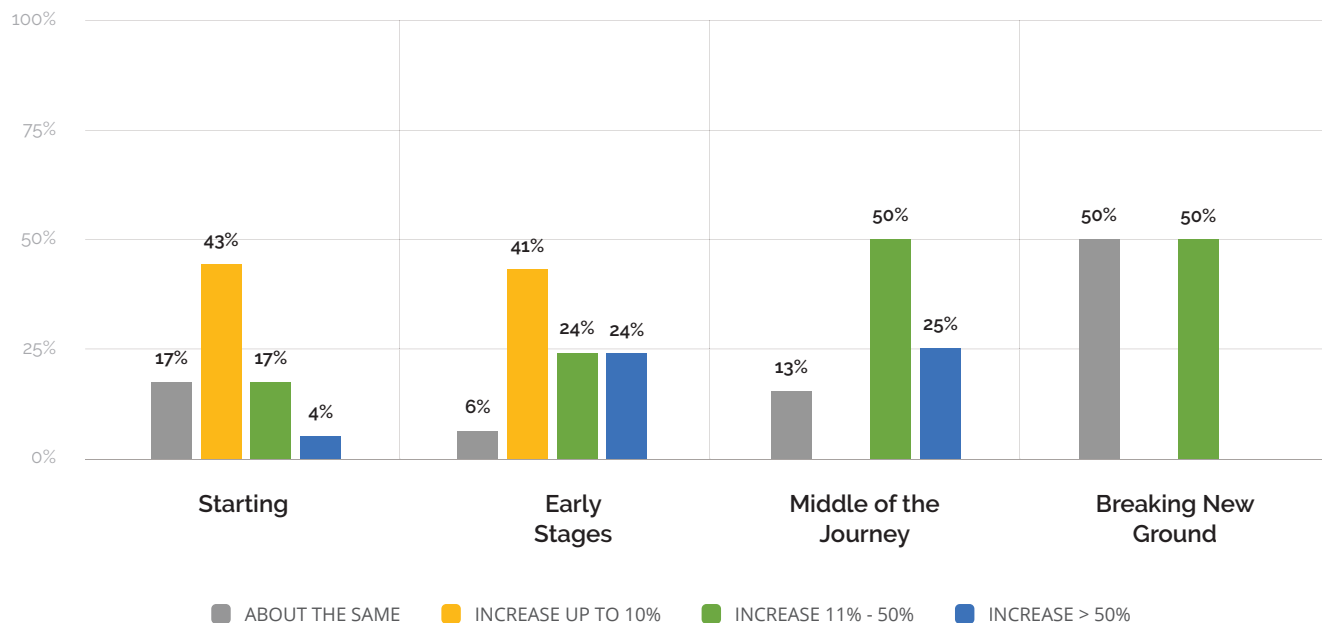
INVESTMENT AND VALUE INFLECTION POINT

INFLECTION POINT

Starting	Early stages	Middle of the Journey	Breaking New Ground
Build foundation. Initial explorations. Sporadic successes.	Work on foundation. Continue with trials. Some use of alternative data. Slow but steady improvements.	Foundation in place. Few trials result in success. Increased investments.	Increased investment and maturity creates value. Value creation accelerates.

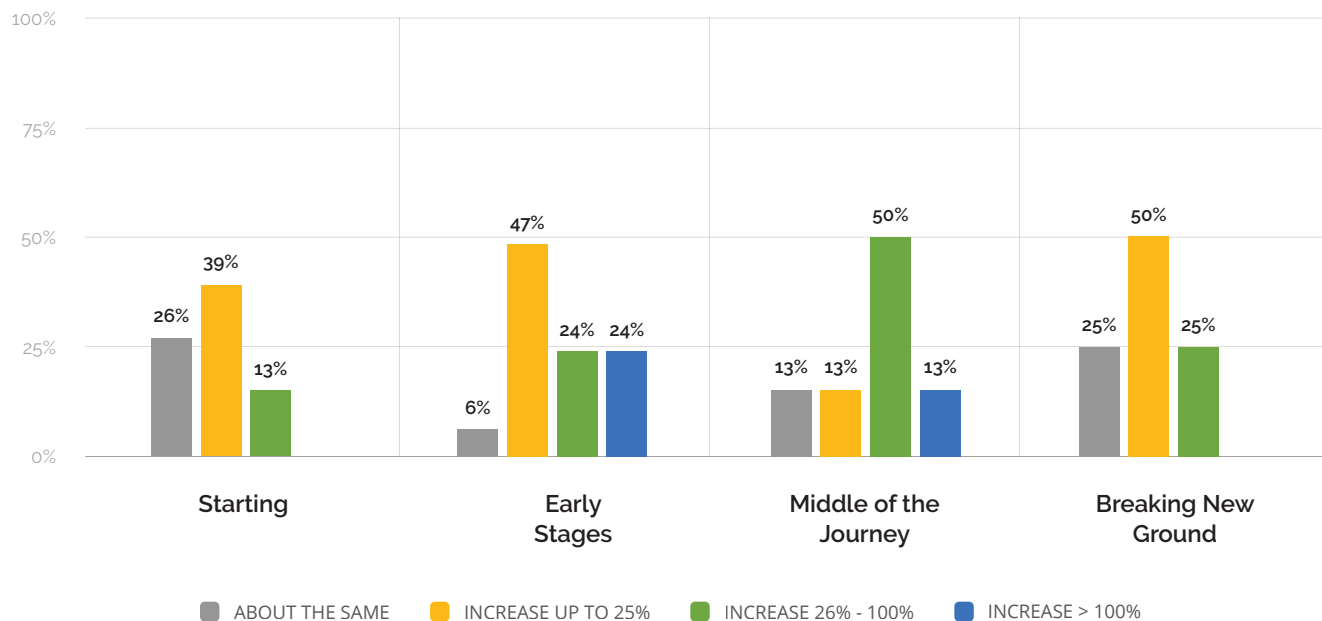FTEs · ADVANCED ANALYTICS · ALTERNATIVE DATA · VALUE

element22   UBS

A successful advanced analytics and alternative data program requires significant investment in technology, data sources and talent. Most of the surveyed asset managers are planning to increase their spend on advanced analytics and alternative data. As many as one-quarter of those in the *Early Stages* and *Middle of the Journey* are planning increases exceeding 50%. As mentioned earlier, the journey does not stop even for those *Breaking New Ground*. Half of that group intends to increase investment in advanced analytics between 11-50% while a quarter of them are planning a similar increase in alternative data investment.

FTEs are the highest cost of an advanced analytics and alternative data program. The median size of the data team across survey participants is more than 12 FTEs and approximately 5 FTEs in the data science team. Some firms employ as many as 500 people in their data program and as many as 200 in their data science teams. Managers at all stages of the Analytics Power® journey are planning greater than 50% increases in their data teams. Interestingly, the percent of managers planning these large increases grow from approximately 10% of those *Starting* to 50% of those *Breaking New Ground*. Those in the *Early Stages* and *Middle of the Journey* are planning nearly identical investments in their data science teams as they reported for advanced analytics. Approximately 25% are planning investment increases of more than 50%. Across all four investment categories we surveyed, those in the *Early Stages* are, as a group, the ones most consistently planning to increase investments. In all categories roughly 90% of the managers in the *Early Stages* are planning increases.
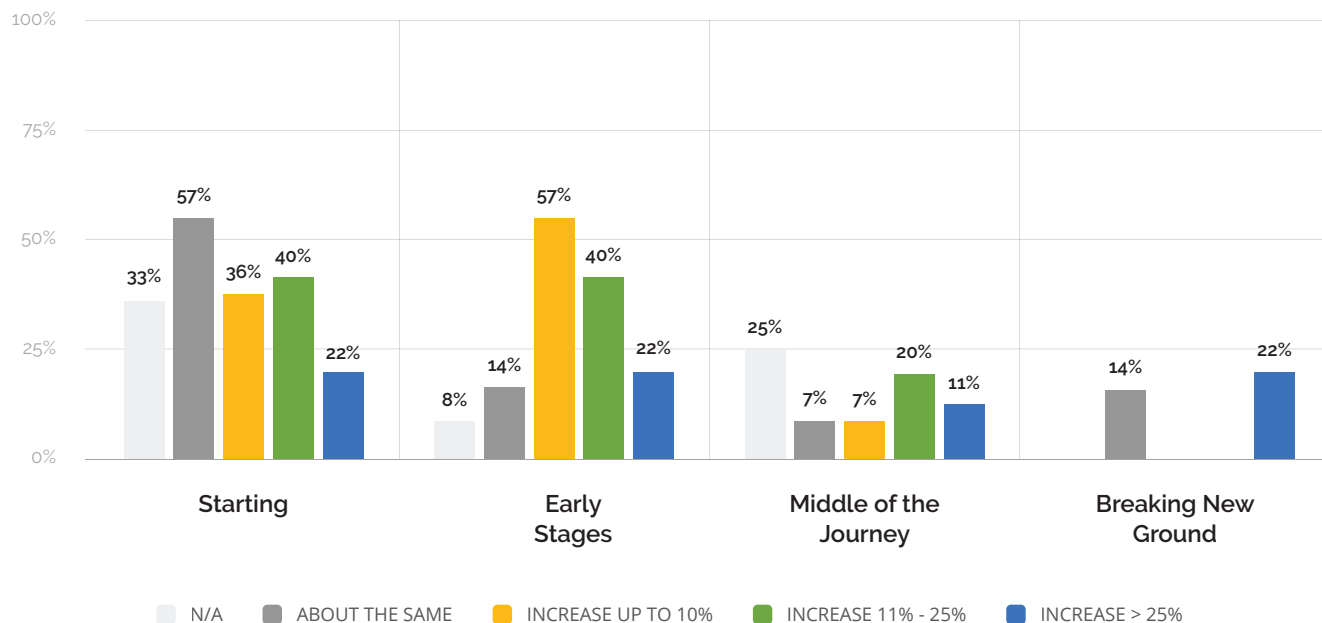
element22   UBS

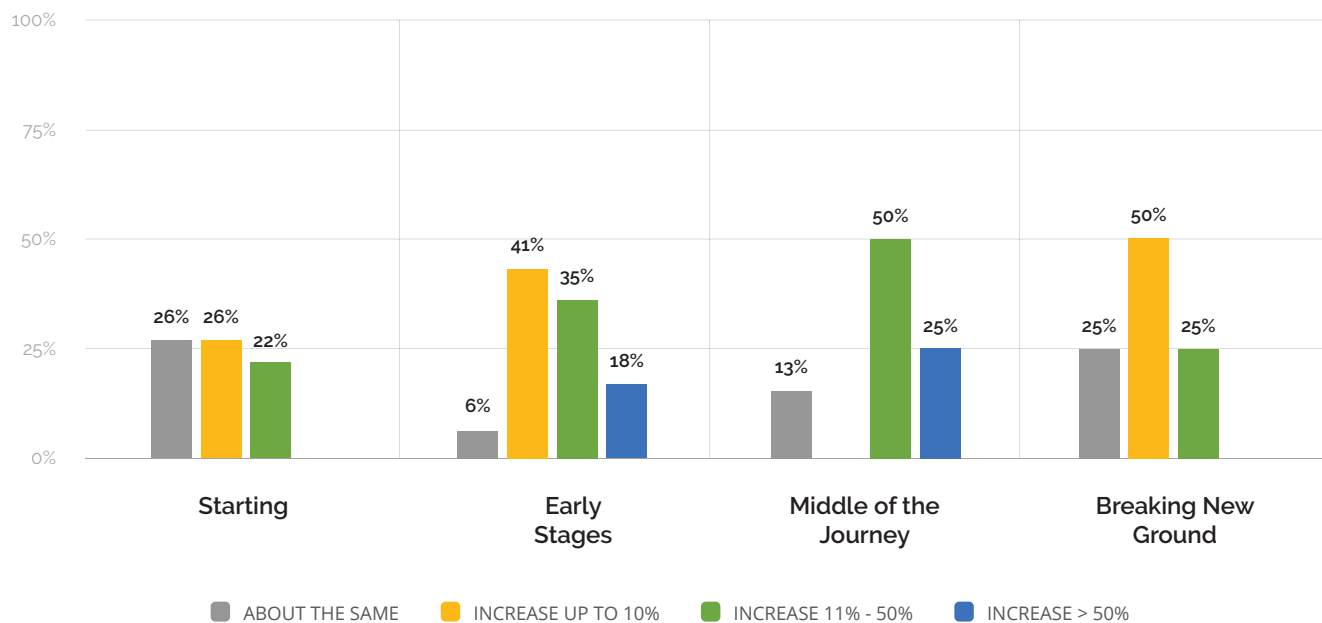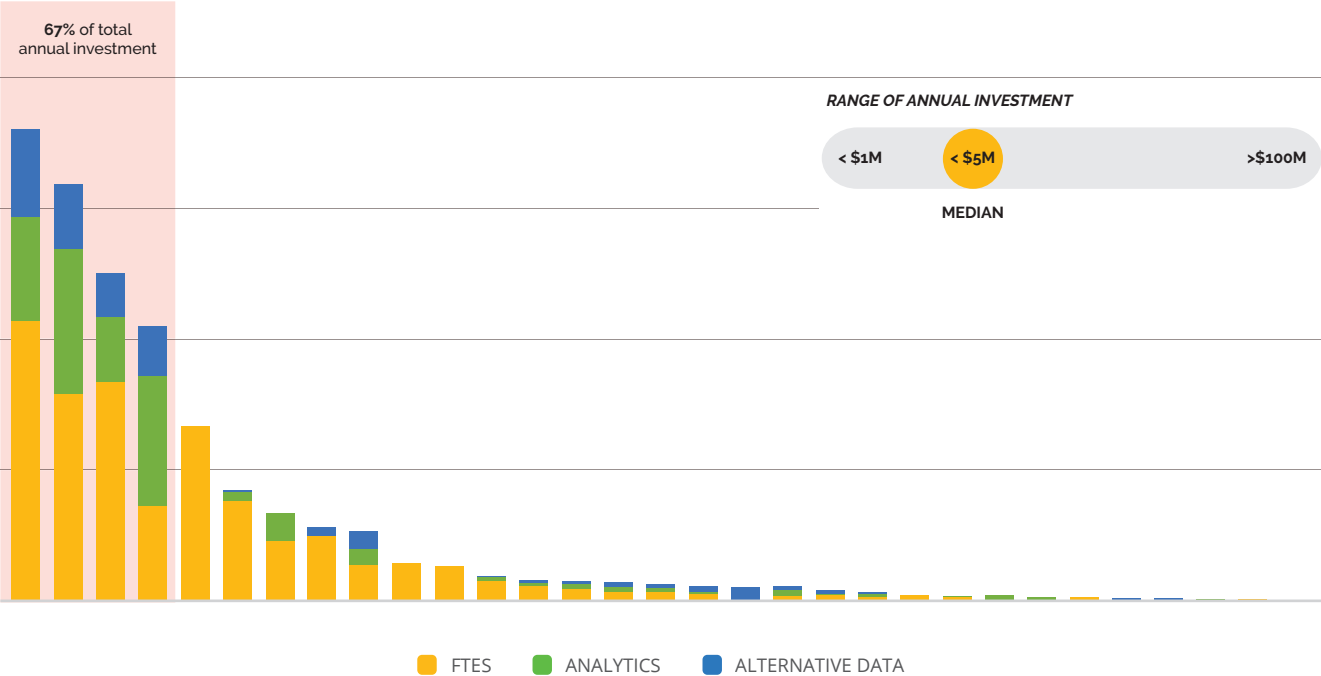## ADVANCED ANALYTICS

Starting: ABOUT THE SAME 17%, INCREASE UP TO 10% 43%, INCREASE 11% - 50% 17%, INCREASE > 50% 4%

Early Stages: ABOUT THE SAME 6%, INCREASE UP TO 10% 41%, INCREASE 11% - 50% 24%, INCREASE > 50% 24%

Middle of the Journey: ABOUT THE SAME 13%, INCREASE 11% - 50% 50%, INCREASE > 50% 25%

Breaking New Ground: ABOUT THE SAME 50%, INCREASE 11% - 50% 50%

Legend: ABOUT THE SAME | INCREASE UP TO 10% | INCREASE 11% - 50% | INCREASE > 50%

ALTERNATIVE DATA

Starting: ABOUT THE SAME 26%, INCREASE UP TO 25% 39%, INCREASE 26% - 100% 13%

Early Stages: ABOUT THE SAME 6%, INCREASE UP TO 25% 47%, INCREASE 26% - 100% 24%, INCREASE > 100% 24%

Middle of the Journey: ABOUT THE SAME 13%, INCREASE UP TO 25% 13%, INCREASE 26% - 100% 50%, INCREASE > 100% 13%

Breaking New Ground: ABOUT THE SAME 25%, INCREASE UP TO 25% 50%, INCREASE 26% - 100% 25%

Legend: ABOUT THE SAME | INCREASE UP TO 25% | INCREASE 26% - 100% | INCREASE > 100%

element22   UBS

DATA TEAM

Legend: N/A · ABOUT THE SAME · INCREASE UP TO 10% · INCREASE 11% - 25% · INCREASE > 25%

Starting: 33%, 57%, 36%, 40%, 22%
Early Stages: 8%, 14%, 57%, 40%, 22%
Middle of the Journey: 25%, 7%, 7%, 20%, 11%
Breaking New Ground: 14%, 22%

DATA SCIENCE TEAM

Legend: ABOUT THE SAME · INCREASE UP TO 10% · INCREASE 11% - 50% · INCREASE > 50%

Starting: 26%, 26%, 22%
Early Stages: 6%, 41%, 35%, 18%
Middle of the Journey: 13%, 50%, 25%
Breaking New Ground: 25%, 50%, 25%

As impressive as the anticipated investment amounts in the next three years are, it is our opinion that even more will be needed. Standing up technology, hiring talent with new skillsets (especially data scientists) and building new strategic programs are almost always more expensive than anticipated.

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TOTAL ANNUAL INVESTMENT

(% OF AUM)

67% of total annual investment

RANGE OF ANNUAL INVESTMENT

| < $1M | < $5M | >$100M |

MEDIAN

FTES   ANALYTICS   ALTERNATIVE DATA

SIZE OF DATA SCIENCE TEAM

(NUMBER PER $100 BILLION AUM)

RANGE OF DATA SCIENTIST TEAM SIZE

| < 5 | > 5 | > 200 |

MEDIAN

element22   UBS
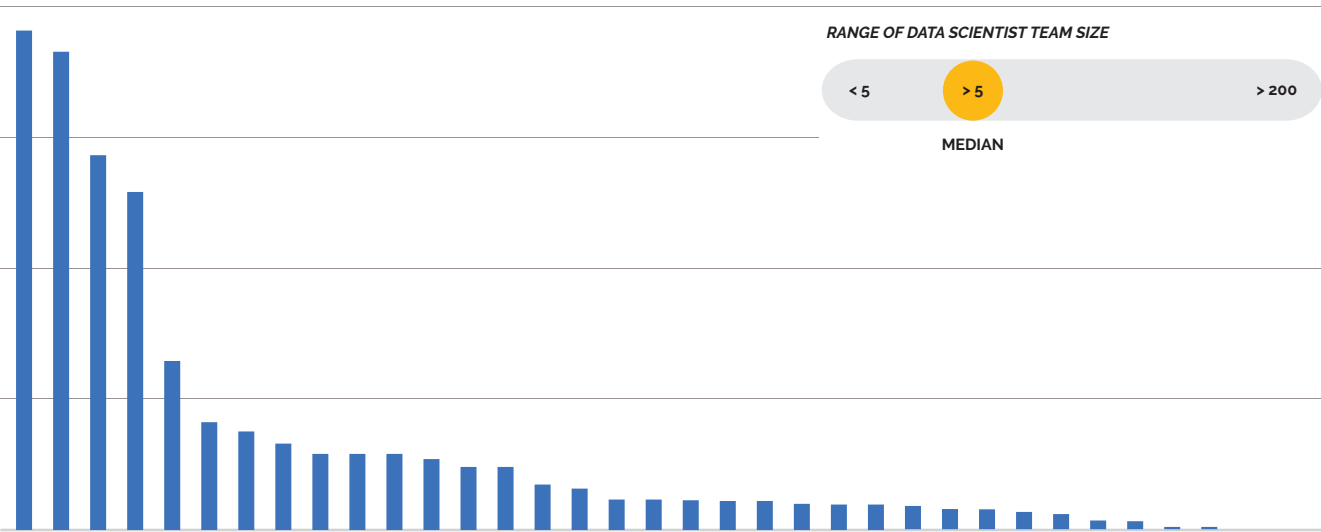
09

ANALYTICS
POWER®

Analytics Power® is a measure of analytics competitiveness. It provides a summary perspective on the relative potential for firms to generate sustained value from advanced analytics and alternative data. It has two primary components, as depicted below:

1) **Analytics Capabilities** – defined as the product of the *Breadth* and *Depth* of related capabilities[9]

2) **Value Focus** – defined as the product of related *Investments* and *Experience*[10]

ANALYTICS POWER®

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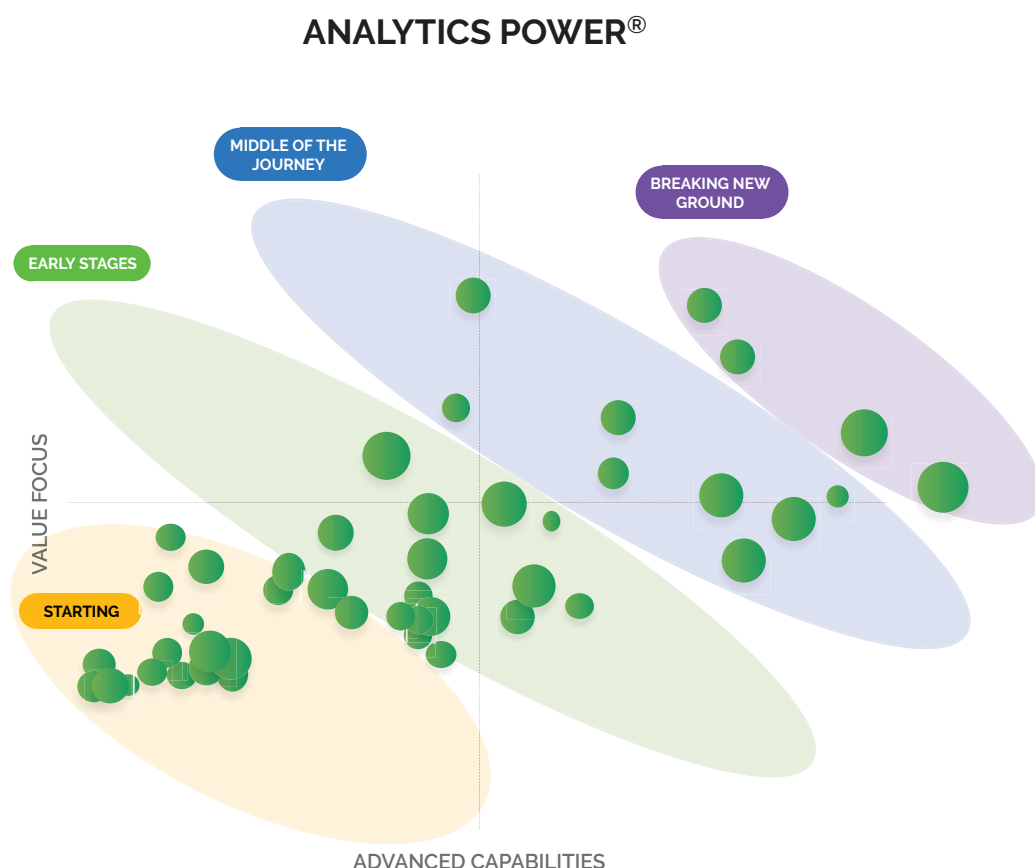
9   *Breadth of Capabilities* is defined as the scope of data management capabilities present, including strategy, program, governance, market data management, advanced infrastructure (e.g. cloud, knowledge graph, Big Data hubs, data preparation, data discovery, ML, NLP). *Depth of Capabilities* is defined as the extent and granularity to which these capabilities are implemented.

10   *Investment* is defined as data and analytics funding adequacy and planned growth in 3 year spend on data and analytics capabilities. *Experience* is defined as adoption of alternative data and analytics for alpha generation, client acquisition/retention, and business operations activities.
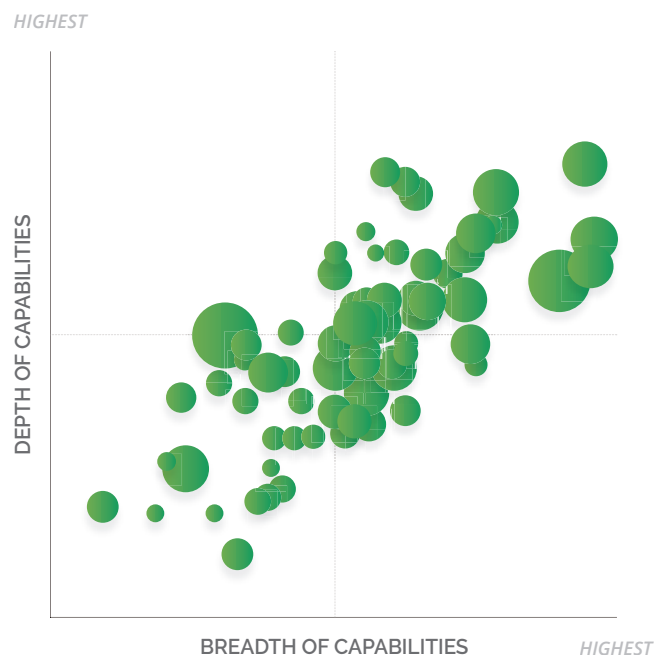
element22   UBS

Through the lens of Analytics Power® there is clear separation among managers, with results falling into the four stages of the journey: *Starting, Early Stages, Middle of the Journey*, and *Breaking New Ground*.

Leaders that are in *Breaking New Ground* and *Middle of the Journey* stages have established advanced capabilities and are actively taking steps to derive value and competitiveness from them. They also indicate the greatest increase in planned 3-year investment. Followers that are in the *Early Stages*, generally show stronger results for advanced capabilities than value focus. Having built significant foundations, they are in a position to ramp up focused investments to create tangible value for the firm. Starters appear to be at the beginning of their journey with limited capabilities, experience and investment plans.

With regard to advanced capabilities, breadth and depth are highly correlated. Given this relationship, managers generally indicate greater breadth of capability than depth, suggesting that the focus for most is on building foundations. Those with the highest combined capabilities also tend to have the most aggressive plans to increase investment. Managers are more dispersed in terms of investment (level and growth) and experience, suggesting that varied emphasis is placed on advanced analytics and alternative data as a value driver across firms.

These results together point to the potential for leaders to further differentiate themselves from the field and, at the same time, a call to action for those seeking advantage through advanced approaches but have not yet made this a priority for strategic investment.

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CAPABILITIES

HIGHEST

DEPTH OF CAPABILITIES

BREADTH OF CAPABILITIES   *HIGHEST*

VALUE FOCUS

HIGHEST

INVESTMENT

EXPERIENCE   *HIGHEST*
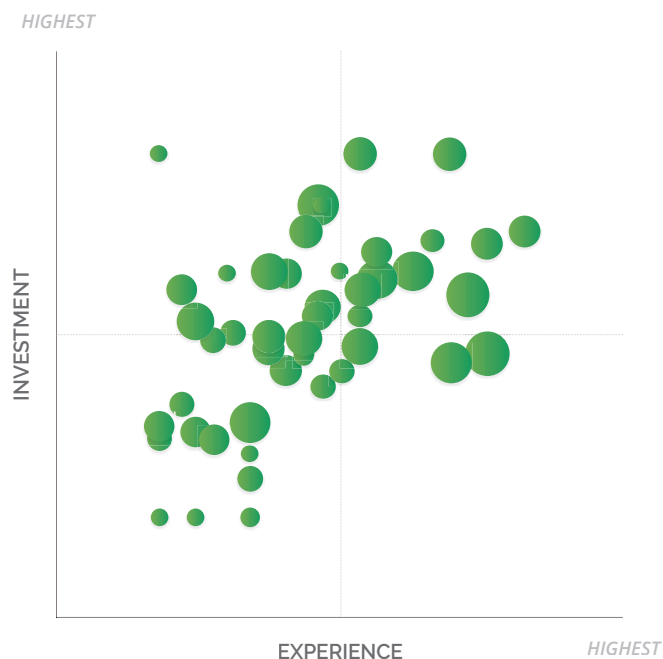
When comparing this year's Analytics Power® results to last year there was more progress on Advanced Capabilities than Value Focus this year. While there is similar clustering at the *Starting, Early Stages, Middle of the Journey* this year sees some of those *Breaking New Ground* standing further out from the crowd both in terms of Advanced Capabilities and Value Focus.

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ANALYTICS POWER®

VALUE FOCUS

ADVANCED CAPABILITIES

■ 2018   ■ 2019

element22   ❄ UBS
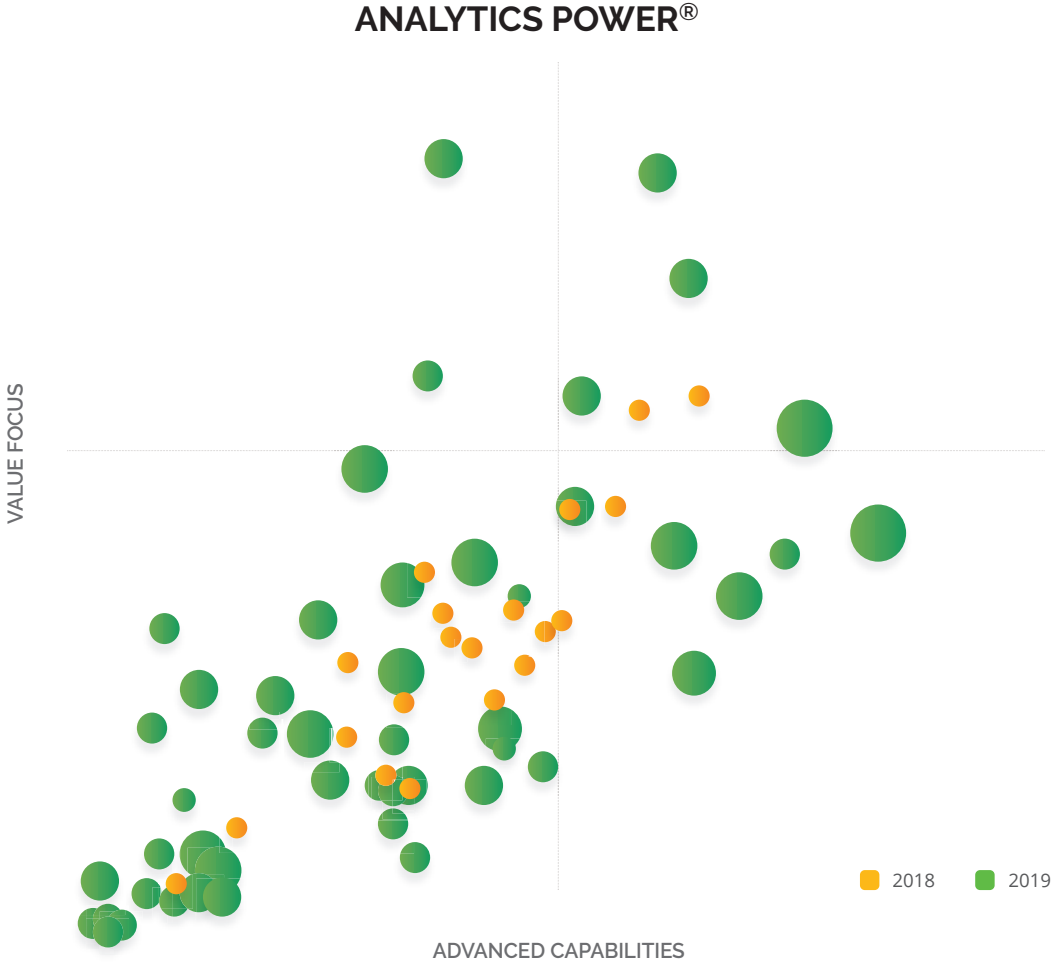
CONCLUSION AND RECOMMENDATIONS

Given the backdrop of increasing downward fee pressures, firms will need to continue to find new ways to generate alpha in a hyper-competitive marketplace. Similar to our findings in the Analytics Power® 2018 survey, firms that are leading the pack in the use of advanced analytics and alternative data are realizing sustainable tangible value from their programs. They see no end to their journey as they recognize they will need to continue to invest heavily and find new ways of generating alpha. The components of Analytics Power® are now seen as a core competency that provide leading firms with a competitive advantage.

This year, by expanding the scope of our survey, we were able to assess a more representative cross-section of the industry, which offers more insight into firms at all phases of the journey. The Analytics Power® benchmark provides participants with an objective assessment of their capabilities and value focus as well as how they compare to their peers.

One of our key findings is that many firms in the *Starting* and *Early Stages* of the journey are overestimating the maturity and success of their Analytics Power® program. Many of these firms have made inroads in the use of advanced analytics and alternative data, but they have yet been able to fully operationalize or realize tangible value from their efforts to date. That said, even the most advanced asset managers, those *Breaking New Ground*, realize there is much more that can be done, hence, why they acknowledge this is a journey without a final destination.

Another finding was the significant progress that firms are predicting in their use of advanced analytics and alternative data. For Machine Learning, over 50% of respondents expect to be fully operational or realizing tangible value across all investment activities within three years. This is double what is currently in place. For NLP, the expectations for adoption are almost five times higher, with a rise from just over 10% to 50% in the next three years. Similarly, although alternative

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data is already an established capability within our survey group, roughly 35% of firms currently are at least fully operational in its use with an anticipated rise to over 65%.

Of the three functions we surveyed – Research, Portfolio Construction and Portfolio Management – we found the greatest appetite for Analytics Power® to be in the Research area. The results clearly demonstrate that while progress has been made, there is much more to deliver in order to keep pace with ever growing needs in an ever increasingly competitive and challenging landscape.

Asset managers that are looking to embrace Analytics Power® as a competitive differentiator are embarking on a multi-year journey before they begin to realize meaningful value from their programs. In review of the success of firms that are *Breaking New Ground*, we recommend that following steps to ensure success:

01 / STRATEGY

Expectations to improve capabilities will need to be supported by a comprehensive analytics and data strategy, as well as executive sponsorship, necessary approvals and adequate funding. This strategy must include the appropriate level of investment in the foundational elements of a data and analytics program as well as the proper mix of the data leadership and human capital required to deliver value. While some firms in the *Starting* and *Early Stages* of the journey are putting their strategies in place, roughly 50% and 38% of firms overall don't have an analytics or data strategy, respectively.

02 / PEOPLE

The support of advanced analytics requires new roles and skillsets which do not exist in the traditional environment. Our survey results show that firms in the *Early*

Stages are not investing enough in human capital, which will inevitably impede the maturation of their Analytics Power® program. Only about one quarter of firms in the *Starting* stage of the journey will increase their spending on their data organization (including data scientists) by more than 10%. In order to achieve lofty expectations over the next three years, more will be needed. This is further evidenced by the fact that only 40% of firms surveyed have C-Level analytics and data executives in place. This points to a pronounced lack of leadership to see these programs through to success.
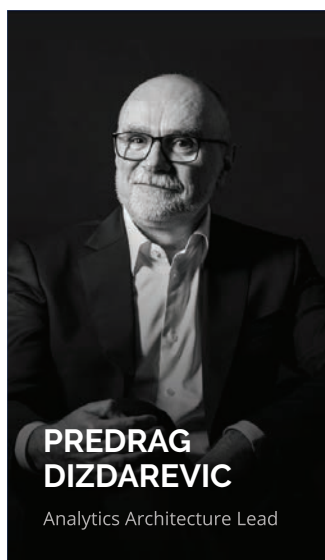
03 / PROCESS

Robust governance of the analytics and data program is critical to ensure that the necessary controls are in place while maintaining cost effectiveness. Although regulated firms are required to have these controls in place (e.g. ML models), we found that controls were only prevalent in firms with more advanced Analytics Power® capabilities, even those that are not regulated.
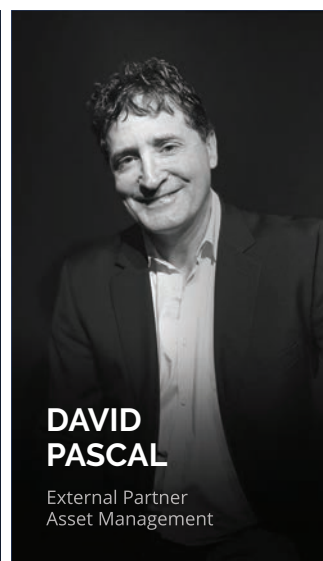
04 / TECHNOLOGY

There is a need for a change in mindset in the role that traditional asset management technology teams play going forward. Many traditional capabilities, such as infrastructure management, reporting, and data management, are either now being outsourced (e.g. management of internal servers), managed as a separate discipline (e.g. data), or taken over by users (e.g. reporting). While these changes significantly impact IT teams, new opportunities and risks are arising in terms of the adoption of Big Data technologies and cybersecurity. From the perspective of this survey, support for the adoption of the cloud and Big Data technologies (e.g. data catalog, business glossary) is a core requirement to manage the explosion in quantity and diversity of data required for Analytics Power®.

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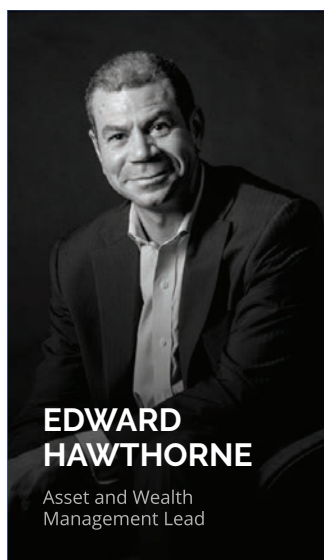
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