

THE ART OF THE POSSIBLE IN DATA AUTOMATION FOR INSTITUTIONAL INVESTORS

- While data automation is still in its infancy, it is evolving at such a rapid pace that it is profoundly shifting the investment landscape.
- For asset owners, the need to build effective, flexible, and holistic data management frameworks has never been more important.
- The rise of ESG and of alternative assets is presenting new complexities around data management.
- In the future, many processes that seem innovative today will become commonplace. To prepare for this, asset owners should think about their data needs not only today, but over the next decade and more.

Imagine a financial ecosystem where data automation clearing houses exist, acting as independent central repositories for key digital insights, or where large language models deliver instantaneous, automated new information across an asset owner's entire value chain, requiring no manual engagement or interventions. In this financial ecosystem, a single, golden source of data is embedded into the fabric of all investment and operational decision-making, and into the entirety of the lifecycle of any given asset, acting as a hub around which everything else takes place. Many processes and procedures that are laborious and time consuming today simply no longer exist.

In this new world, data becomes an engine. If you're driving, you may want to check your oil once in a while, but mostly, data is getting you from one place to another without you really having to think about it. It exists in the background, automating across a multitude of different networks, while giving you full control of where you want to go.

This world may feel far away, but it's closer than you think. While data automation is still in its nascent stages, it is evolving at such a rapid pace that it is profoundly shifting the investment landscape. For asset owners, data management is both a challenge and an opportunity. Embracing best practices, and getting data processes right in the short and medium term will help set up asset owners to leverage new technologies in the future state. As we examine in this paper, much of the future is already here. Now it's about embracing it.



The Evolution of Data

To understand the future, it's sometimes helpful to look at the past. Data science is evolving at an exponential pace, but it's come very far already. Long before the arrival of computers, scholars were grappling with the idea that the world was creating an ever expanding body of knowledge.¹ We may feel that we are living in the time of an 'information explosion', but that term was actually first coined in 1941, as people began to struggle with the volume of data that was being created. In 1956, the concept of virtual memory was developed by German physicist Fritz-Rudolf Guntzsch, introducing new ideas for how we could store our data.²

As a discipline, data science was created when the world of applied statistics merged with the world of computer science. In 1962, John Tukey wrote a paper entitled *The Future of Data Analysis*,³ where he talked about ways to harness the power of computer analysis to optimize data. Later, in the 1980s and 1990s, knowledge discovery in databases became an important concept, so much so that in 1994, *Business Week* ran a cover story on how companies were starting to gather large amounts of personal information on their customers. By then, the arrival of the internet was changing everything. By the end of the decade, there was an increasing understanding that new tools would be required to manage data,⁴ particularly in the context of emerging digital information and insights.

Exponential growth in the world of data science occurred at the turn of the century. 'Big Data' was coined in 2000 by Francis X. Diebold,⁵ and Software as a Service (SaaS) was created in 2001 as pre-cursor to cloud-based solutions.⁶ By 2008, the term 'data scientist' had become a buzzword, and in 2012, Harvard University declared that data scientists had the sexiest job of the twenty-first century⁷, the same year that Facebook went public, proving that collecting vast arrays of data could be monetized in substantial ways.

The rest of the decade brought further change, with key concepts like machine learning (ML), deep learning, and artificial intelligence (AI) shifting the needle considerably. By 2013, IBM had revealed that 90% of the world's data had been created in the last two years.⁸ And two years after that, using Deep Learning techniques, Google's speech recognition platform, Google Voice, experienced a performance jump of 49%.⁹

Today, data continues to evolve at a rapid pace, with cloud-based storage and cloud-based infrastructure becoming critical tools for how we work. In 2021, cloud data centres were expected to have processed 94% of all workloads.¹⁰ That year, people created 2.5 quintillion bytes of data every day. It is estimated that by 2025, 200+ zettabytes of data will be in cloud storage around the globe, and that, by then, 463 exabytes of data will be generated each day.¹¹

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The Current State: Drivers for Data Automation

As data science has evolved, so have the complexities of the asset management industry. Asset owners have faced a myriad of cost pressures, whether they are around keeping pace with technological innovation, or the increased need to meet regulatory, operational and compliance requirements. They are searching for alpha in a world of volatility and grappling with the implications of digitalization. They are also navigating an investment landscape where passive investing has grown substantially, and where alternative and private assets are now in the mainstream. If that wasn't enough, there is an ever-greater need for asset owners to focus on ESG and the transition to net zero, all the while building sustainable inclusive cultures. Together, these themes are increasing the need for asset owners to build efficiencies across their value chains, especially through effective data management.

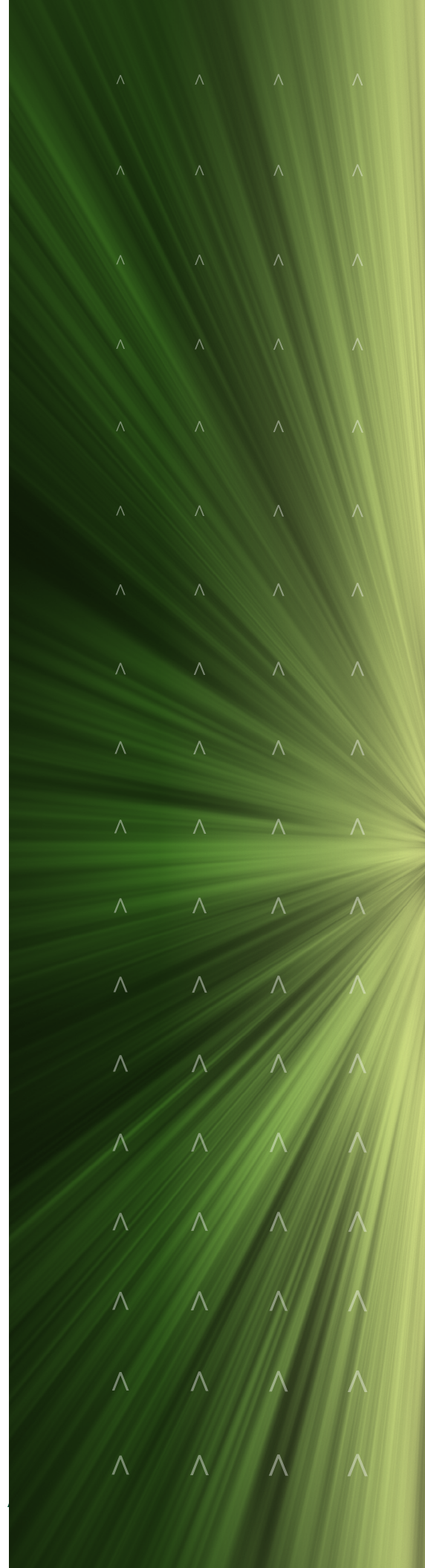
The Rise of Alternative and Private Assets

Consider, for example, the growth of alternative assets. By 2025, total alternative investments under management are projected to reach \$17.2 trillion – a four-fold increase since 2010.[xii] Much of that growth comes from private, often illiquid assets, rather than public or listed alternatives: private equity, real estate, private debt and infrastructure. 2021 was a record year for fundraising of private assets, with figures reaching almost \$1.2 trillion, which was nearly \$200 billion more than what was raised in 2020.¹³

Institutional investors continue to increase allocations to private markets at the expense of public markets, largely due to the outperformance posted in the private sector. Average allocations to private markets increased by nearly five percentage points over the period 2012-2020, reaching 18.5%.¹⁴ The rise comes as public markets in the US continue to shrink as fewer and fewer companies go to initial public offerings.¹⁵

From a data point of view, this shift poses significant challenges. While traditional assets are already fairly automated, data from private and alternative assets is still very siloed, coming in from disparate providers and sources, often unstructured and still via pdfs or emails. Valuations are manually added to investment performance calculations. For many asset owners, activities like data aggregation and normalization still require plenty of spreadsheets. It also means that key insights sometimes live in the heads of individual investment professionals, or on their desktops or emails, in isolated ways, rather than being communicated in a holistic, integrated manner.

The rise of alternative and private assets looks set to continue even further for asset owners, who are working hard to find alpha. Over time, we believe there will be even greater need for robust data models as asset owners increasingly move away from private equity to co-investment and direct investment.



Digitalization and the Need for Efficiencies

It is no understatement to say that asset owners face challenging times, whether it is because of macroeconomic drivers like inflation, or rising geopolitical risks, or recessionary fears. In 2022, both equities and bonds underperformed. The Nasdaq Composite closed the year down 33.1%, while the Russell 2000 was down 21.6% and the S&P 500 was down 19.4%.¹⁶ Meanwhile, 2022 was the worst year on record for US bond investors,¹⁷ with global bond markets struggling as well. Even owning private assets has proved problematic, with some industry commentators making the case that certain kinds of private equity is overvalued.¹⁸ Industry assets under management neared an all-time high of \$126 trillion at the start of 2022 and Moody's Investors Service estimated that total AUM as of Dec. 8 had declined by more than 15%.¹⁹ The outlook for the global asset management sector in 2023 is turning negative due to weak economic and financial conditions, according to Moody's.²⁰ Elsewhere, a survey highlights that asset owners remain concerned about equity valuations and inflation.²¹

Now, more than ever, they are searching for efficiencies. According to the survey, they are focused on increasing the application of technology within their organizations. Around two-thirds of respondents to the survey cited the importance of process automation to improve staff efficiencies. 90% are currently channelling technology to improve analytics tools and services, and 94% are investing in performance reporting and attribution technology. 97% are deploying technology to manage risk.²²

Digitalization and Digital Assets

The move towards increasing digitalization is also taking up time and focus, with efforts to automate processes and embrace digital assets increasing in importance. Asset owners see digital assets as key to their future. According to the Fidelity Digital Assets 2022 Institutional Investor Study, adoption of digital assets among institutional investors has increased in both the US (42%) and Europe (67%), a respective 9-point and 11-point change year over year.²³ Asian institutional investors reported a small decline in adoption but remain the most accepting of digital assets amongst the regions, with nearly 7 in 10 (69%) reporting an allocation to digital assets.

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Focus on ESG

Another key driver has been the shift towards the decarbonization of portfolios, and the increased focus on ESG and transition to net zero in markets around the world. Global ESG assets are expected to surpass \$50 trillion by 2025.²⁴ In the second quarter of 2022, Northern Trust and PwC conducted a global ESG market study to explore institutional investor attitudes, future needs and preferences, as well as key trends and implications for businesses. The study reveals that 89% of asset manager and 78% of asset owner survey respondents cited that collecting and analysing data was a top challenge in incorporating ESG into their investment process (Figure 5). There is an increasing need for standardized and comparable metrics, with 82% of asset manager survey respondents and 77% of asset owners citing that securing and normalising sustainable investing data is one of their top five challenges.²⁵

Asset Owner Experiences

Asset owners are at different stages of their data journeys. A few have embedded enterprise-wide operating models, generating significant insights and using advantage analytics, while others are operating in a more fragmented way, with a reliance on siloed data initiatives and limited in-house capabilities.²⁶

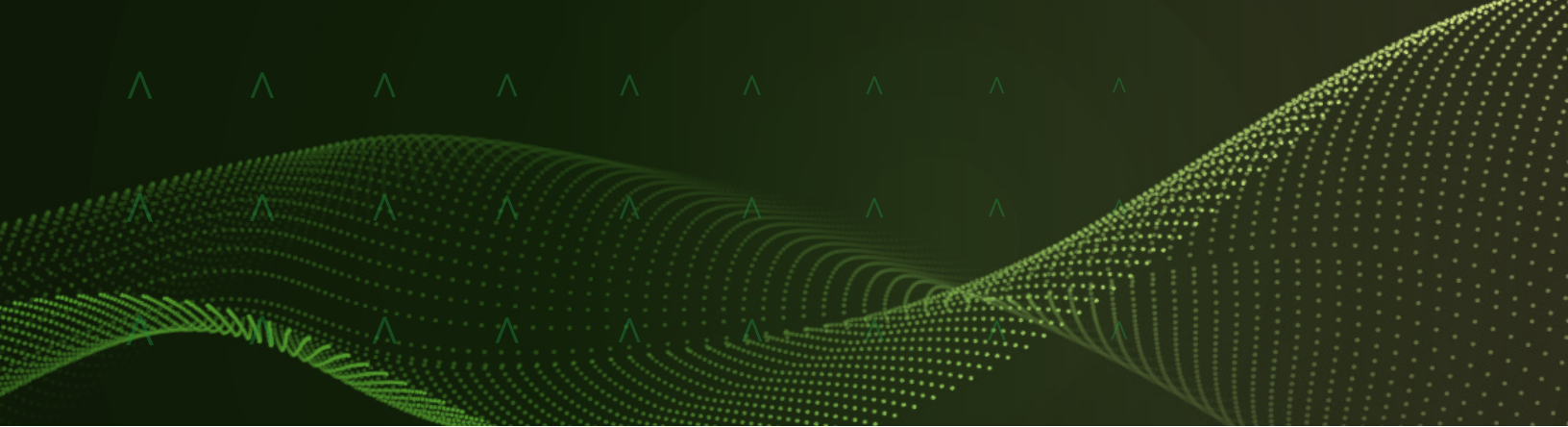
For asset owners, data presents different levels of complexity than it does for asset managers. Alpha FMC and Northern Trust's cross-industry roundtable discussion around key data themes revealed some of the challenges for asset owners. They are dealing with differences between liquid and illiquid investments, and as a result require a range of data solutions across their entire value chain. They are also looking at their investments over several time horizons, meaning that the need for data quality and timeliness is different between the short and long term.²⁷ Moreover, asset owners are unable to maximize their portfolio decisions with data tools that support only long-term forecasting.²⁸

Gone are the days when asset owners waited for a quarterly report. Now, they are becoming much more proactive about the insights that they need, and they want granular, immediate access to information. They are data hungry, and they are far more data articulate.

Asset owners have a lot to think about as they seek to meet their growing data and operational needs. For some, a key concern has been to keep up with the pace of technological innovation, and the sheer amount of data available. They are inundated with thousands of emails or fund information materials that are sometimes unmanageable to process, for example. Data management frameworks have to validate and ensure that high volumes of data are accurate, which means setting up a framework that is customized to each asset owner's needs. Another challenge has been the fact that data has evolved in so many disparate ways and in so many different formats, with limited flexibility or scalability. Siloed data models with complex technology stacks make the sharing of data with internal and external stakeholders challenging, particularly in a timely way.

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Moreover, as mentioned earlier, the growing and broader-based popularity of alternative and private asset investing has brought its own complexities. In public markets, clearing houses, central counterparties and exchanges support the flow of information and processes like trading, valuation, and price discovery. That world of evolved straight through processing does not exist for the alternatives sector, however. Managers and sponsors typically communicate with investors via pdf, email, online portals, and even paper. Spreadsheets are used by asset owners to aggregate internal and fundamental data, and they are left to manually piece together a view on a portfolio's composition and performance.²⁹

This challenge highlights the sheer redundancies of systems currently in place. Consider that if a portfolio manager sends an investor a pdf, that data is already sitting in a system somewhere, in digital format. However, the asset owner then re-digitizes the information that exists in that pdf, creating extra work, when really, systems should be communicating with one another.

In actuality, asset owners require elevated processes to service complex alternative and private assets, examining performance, risk, and liquidity in key detail. With the limited standardization and variety of reporting formats used by managers, automation has become a real challenge.³⁰ As a result, a significant amount of time, effort and investment is expended in managing and aggregating data, rather than creating insights, or being invested in higher-value activities. However, emerging technology applications are helping.

Asset owners are partnering with artificial intelligence (AI) providers to build efficiencies, decrease risk of errors and potentially lower operating costs. While AI capabilities will not eliminate the need for specialized knowledge in data normalization, it can allow for higher quality data and reduce the need for human intervention.³¹ They are also gaining insights into the performance of alternative assets through natural language processing (NLP) particularly in the case of private market investments. Developments in NLP and other subsets of AI such as optical character recognition and visual relationship detection are enabling systems to translate human language and extract specific data found within scores of documents.³² Similarly, machine learning (ML) is helping asset owners achieve refined capabilities in document extraction and data regulation, and blockchain has the potential to ease asset owners' growing need to gain visibility into their private investments.³³ Increasingly, cloud infrastructure is allowing for faster and more efficient development of solutions as well, something that would not have been possible even a few years ago. Now however, cloud infrastructure has become more affordable, with a greater prevalence of open-source technology.³⁴

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While all these innovations are supporting investors today, they are also changing the skillsets that are needed for the future. Asset owners who want to build sustainable and efficient business models over the long term will need to think about leveraging their talent pools in new ways.

With some traditional roles becoming automated, employees will be freed up and able to spend less time generating data and more time on harnessing insights and making decisions. For many staff this may mean upskilling in order to recognize new ways to make processes more efficient, and to implement innovative ideas and strategies off the back of those processes.

It also means that asset owners must work hard to attract the right expertise in an increasingly competitive marketplace. In today's API economy, where system platforms leverage multiple software sets and interoperability is key, organizations need to be sure they have staff that can fluidly access and interrogate data sets. It is no surprise that, as the importance of technology and data solutions grow and as asset owners continue to expand their use of data science toolsets, for example, they are hiring increasing numbers of analysts adept with programming, as well as more technology and data specialists. Employees who can maximize the best data outcomes for their businesses are in increasing demand.

The Art of the Possible

The direction of travel for data automation is clear, and some of what will be developed in the future is already at its nascent stages today. For asset owners, for example, one key area where data science is creating new opportunities is around behavioural analytics. The discipline of behavioural analytics is allowing asset owners to truly examine outperformance and how it is generated.

Just as elite athletes today have every aspect of their performance scrutinized, whether it is their speed or stamina or decision-making, so is the performance of portfolio managers coming under the spotlight. By using data analytics and examining all decisions being made, technology can reveal whether a manager is outperforming or just plain lucky. They may be picking the right stocks, for example, but do they know when to scale and size? Are they selling at the right time? Data will allow for analysis of poorly timed trades, unintended risk, and unconscious bias. By measuring the skill of their managers, asset owners can tell whether someone has a consistent, sustainable investment process.

Measuring investment skill is becoming an increasingly vital component of data analytics, but there is plenty of potential for growth. A 2021 Northern Trust global survey of 300 managers revealed that while 57% of respondents felt that their data strategy included leveraging a central platform for investment data consolidation, nearly half (48%) admitted that their organizations are still measuring the investment skill level of their investment team by using a 'qualitative measurement, which mainly relies on anecdotal evidence of proper decision-making'.³⁵

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The Future State

Last November, the AI chatbot ChatGPT was launched by San Francisco based Open AI, and generated a huge amount of marvel and controversy simultaneously, reaching 100 million users in just two months³⁶. ChatGPT has managed to pass an MBA exam, (some sections with flying colours),³⁷ do homework, play tic tac toe, write music, tell you where to eat out when visiting a new city, and write and debug code, amongst a host of other abilities. As a result of its significant skills in collecting online data and generating insights – including writing essays – schools are banning its use, or talking about changing the way teaching is done. Models like ChatGPT or Galactica,³⁸ which are open sourced and share knowledge, are showing us exactly where the use of AI in data management could be heading.

For the asset servicing industry, the world could look very different in the future state. For example, centralized, independent data clearing houses for fund administrators could be created. Administrators of hedge funds and private equity could send data into a central hub so that it could be made available for consumption to a select group of people, in effect acting as a digital guardian of vital knowledge.

Moreover, in the future state, the investment industry could create an interconnected marketplace of a total shared permissioned data ecosystem, in the same way that cloud-based data company Snowflake enables sharing on a single, integrated platform, optimising what had traditionally been a very manual process of excavating and delivering data files.³⁹ This ecosystem would host a variety of data sets with the right data tagging features, and the right data keys, which would update as the single, ‘golden’ source of data was amended at source.

Such ecosystems could adapt a ‘low code or no code’ platform concept, which allows enterprise developers and citizen developers to drag and drop application components, and connect them together, without having to write lines and lines of individual code.⁴⁰ There would no longer be a need for multiple programmers with deep expertise to navigate through a maze of disparate databases. Instead, asset owners could take the data and put it through a Data Mesh construct, leveraging machine learning tools to run some analysis and leverage some insights.

Furthermore, large language models could tell asset owners what they need to know about their portfolio composition or operating models before owners even realize the information is needed, setting daily parameters which mean that traditional quarterly asset allocation decision-making meetings are rapidly outdated. Systems could update instantaneously, allowing for real time insights but also moving beyond data to a metadata model, where the data management manages itself, allowing you to drive your car without ever checking on your engine.

Another change in the future state will be increased data harmonization. Currently, different regions and geographies have different data regulatory requirements. 75% of all countries have implemented some level of data localization rules, for example.⁴¹ While there is no one size fits all version of things, we believe that data dashboards will be much more interconnected. Regulatory requirements may not become standardized, but the AI systems and mechanisms in place will allow data to be communicated in a standardized manner.



Adopting Best Practice Approaches

To adopt for this future state, asset owners will need to think about how they are positioned today. That means going back to basics. Given the complexities around legacy systems, one consideration will be around building a data strategy that can maintain its flexibility and evolve with the times. Developing a central hub which captures data and feeds it downstream could help, for example, but it is important to adopt a foundational approach.

Key Considerations for Developing a Data Management Strategy

- Is your system timely, and can it provide a completeness of data?
- Do you have control of the data, and do you trust its validity?
- Does it require significant manual intervention?
- Can your data framework address ESG requirements?
- What about alternative assets data?
- Do you have staff members that can interpret the information in your databases and clearly articulate your data needs?
- Are there opportunities to create larger data sets with new data sets and better statistical results?
- Does your system support data science tools such as behavioural analytics?
- Is your data model adaptive?
- What key learnings is it generating for you?

Historically, data management has been an organic process, and systems have evolved over the years. However, that hasn't necessarily led to scaled solutions. If an asset owner is spending a great deal of time sourcing and capturing data related to its investment activity, then it faces the challenge of infinite resource – people cannot spend all their time hunting through documents or shifting through files, not as the amount of data continues to increase. There needs to be more efficiency in the process.

Asset owners must look to the future to understand what problems they will be solving for, not only today, but over the medium and longer term. Those who are able to develop and adopt models today that will work effectively in a decade's time will be best positioned to take advantage of data automation in the future state. To plan for the future, we must assume that the future is already here.

While data automation is still in its nascent stages, it is evolving at such a rapid pace that it is profoundly shifting the investment landscape.



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