

# Why the C-Suite Needs to Care About Data: A Capital Markets Sell-Side Impact Assessment Survey

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Prepared for:



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## EXECUTIVE SUMMARY

Why the C-Suite Needs to Care About Data: A Capital Markets Sell-Side Impact Assessment Survey, commissioned by InterSystems and produced by Aite Group, highlights the impact of poor data support on business processes, including financial, regulatory, and risk management. This white paper is based on conversations with executives with knowledge of their firm's data architecture and data management strategy at 19 global capital markets firms. It examines why firms need to invest in data architecture to improve their competitive and operational capabilities in the era of digital transformation. Key takeaways from the study include:

- Three of the top four data architecture challenges are around integrating, cleansing, normalizing, and transforming data for use by the business. These challenges will only increase as the volume and number of data sources needed increase.
- All of the sell-side respondents have a problem with operational and technology data silos, but many have plans to tackle these silos via technology investments and strategic governance programs.
- Investment in robust and scalable data support can enable the front office to avoid the reputational damage caused by outages and scalability issues. Consequently, trading teams place a great deal of emphasis on data architecture support because of the need to maintain a competitive edge.
- An effective data management team is focused on demonstrating the “value” in data and emerging business cases—the priority is gaining business buy-in and support across the enterprise for improvement of data architecture and data delivery.
- The majority of sell-side respondents view faster time to market as the most important benefit and goal of data architecture improvement. Responding to client requirements and trading opportunities in a timely manner by supporting new asset classes and geographies is vital in such a competitive landscape.
- Compliance is also at the top of the list for sell-side firms because of the increased importance of reporting and data transparency post-crisis. For example, trade and transaction reporting are predicated on accurate and timely data aggregation, which can be exceptionally challenging across internal silos, especially at scale.
- The sell-side firms are either implementing an API strategy or are in the process of considering one. The focus is on external API strategies that allow clients to connect internal platforms, improving real-time data transfers and the provision of analytics.
- Aite Group estimates that Tier-1 sell-side and buy-side firms have less than 10% of their total technology stack hosted in a public cloud environment. This is due to change as multiple banks seek to improve balance sheets and C-suites have a strong desire to adopt more flexible approaches, avoiding huge one-time expenditures.
- Though it is early days for machine learning (ML) technology overall, all sell-side respondents are either actively considering ML's application or are piloting this technology in areas such as fraud and financial crime detection, and trade analytics.

## INTRODUCTION

The capital markets community is under intense client, regulatory, and business pressure to transform the way both buy-side and sell-side firms operate. The regulatory agenda that stemmed from the global financial crisis has fundamentally altered functions such as risk management and compliance, burying many operations teams under a heavy burden of data and processing requirements. At the same time, revenue has declined and margins have thinned, meaning firms must deal with these requirements with fewer staff resources. They must also develop new services and new insights into opportunities in the markets and with existing and prospective clients.

This white paper highlights the essential role that effective and efficient data management and data support play within sell-side firms. It provides C-suite executives with insights into the business impacts of poor data support and the competitive and operational edge that can be gleaned through investment in data management technology.

## METHODOLOGY

This white paper is based on conversations with executives with knowledge of their firm's data architecture and data management strategy at 19 global capital markets firms. It also includes proprietary Aite Group data gathered during research across the capital markets community during 2019 and 2020.

## WHY CARE ABOUT DATA ARCHITECTURE?

Capital markets firms face competitive and market pressures to cope with a rising tide of data and an increasing analytic workload across key functions such as trading, risk management, and compliance. Both structured and unstructured data sets are increasing in size, complexity, and variety, and Aite Group expects spending on alternative data sets to continue to grow at approximately a 20% compound annual growth rate, exceeding US\$901 million by 2021. Timeliness of processing and scalability are even a consideration for middle- and back-office processes due to the continuous global regulatory focus on transparency and systemic risk reduction.

Greater demands from end clients for efficiency and cost savings have put pressure on all firms to do more with fewer human resources, and many regulations are also compelling firms to retain and be able to access and interrogate data for longer periods of time. Being able to aggregate data and report on demand is more important than ever before to both regulators and clients. In the past, many calculations by investment banking institutions could be done at end of day for regulatory reporting, but as a new wave of regulations such as FRTB came into play in the early 2020s, pre-trade calculations became commonplace to measure the impact of prospective trades on capital costs.

In a similar vein, trading desks have started to incorporate various flavors of valuation adjustments, commonly known as XVAs, to more accurately price trades in the face of identified risks and costs to the bank, such as counterparty credit risk or the cost of funding uncollateralized derivatives. All of these dynamics will place a greater strain on the existing data architectures, with firms needing to handle greater workloads for regulatory compliance, as well as investing to remain competitive in the industry.

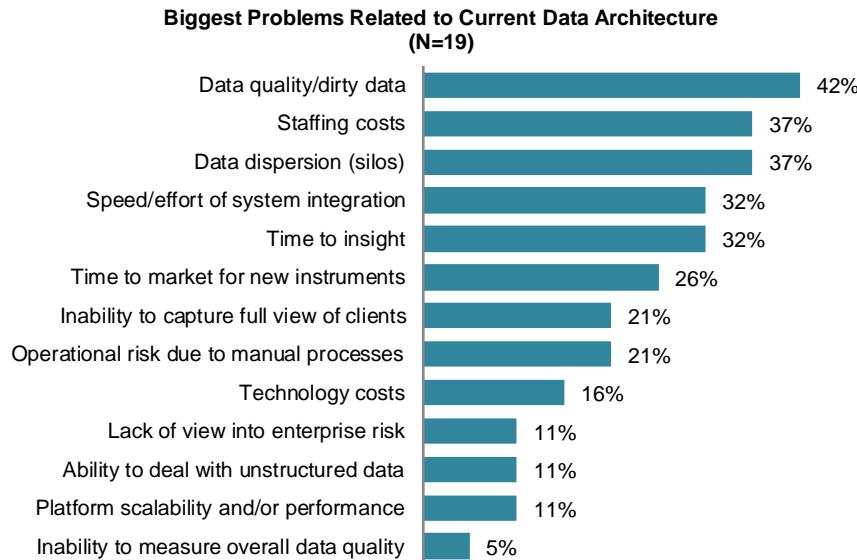
The rising pressure to store a high volume of data over time also creates a real C-suite executive desire to reduce the total cost of ownership for storing decades' worth of information. At the same time, these architectures must scale to meet the analytics requirements inherent in retaining a competitive edge in the front office, be that trading or portfolio management.

A lack of investment in data architecture can therefore result in significant challenges to a firm's future growth and competitive edge. Figure 1 shows the problems related to a lack of investment in data architecture cited by respondents, with three of the top four challenges centered around integrating, cleansing, normalizing, and transforming data (respondents were allowed to select multiple answers). These issues will be further amplified by the growing volume and number of data sources used by capital market firms.

Specifically, poor quality data results in inaccurate information potentially provided to clients, regulators, and internal teams charged with important functions such as risk management. High staffing costs result from manual data cleanup tasks, and delays resulting from these processes mean business heads are unable to make decisions in a timely manner. Data quality cleanup involves numerous repetitive and duplicative processes for data management teams, and employees from other functions must also engage in reconciling data to ensure it is fit for purpose. The time spent by end-functional users of the data equates to time not spent engaged in revenue-generating activities; hence, poor data management can come at the cost of

efficiency and profitability. For the sell-side, time to insight is critical to making optimal decisions in a high-velocity business world.

**Figure 1: Challenges Caused by Lack of Investment in Data Architecture**



*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

Manual processes have a limited shelf life. Financial technology innovation strategists propound ad nauseam, but they must recognize that any progress in this direction is predicated on data and process standardization. And this standardization must happen within an industry that traditionally thrives on complexity and customization. Bad data is bad news for an industry seeking to introduce digital labor and ML technologies in the near future.

## THE SELL-SIDE AGENDA

The investment bank and brokerage communities have had to contend with a barrage of compliance requirements post-financial crisis. Regulators are keen to see an audit trail for data underlying these financial institutions' operational decisions, such as risk analytics or the pricing of trades. This means that data must be tagged with metadata to prove lineage and provenance. Active data management and quality assurance are required to ensure firms stay clear of regulator-imposed financial penalties and reputational damage caused by inaccurate reporting.

There are more industry and regulatory guidelines around data governance and management best practices than pre-2008, such as the principles drawn up for risk data aggregation by the Basel Committee on Banking Supervision. A Tier-1 bank respondent explains that the sentiment within the data management community is that regulators have evolved from expecting systemically important firms to prove "high-quality" data underlying reporting and decision-making to "almost-perfect-quality" data.

Data aggregation, which effective risk management and reporting entails, requires a consistent manner of storing and managing data over time. This is a difficult task for firms to manage across their entrenched operational silos and functionally specific data fiefdoms. The establishment of data governance programs and the installation of C-level executives in charge of communicating and driving data management strategy are two ways in which these firms have attempted to increase the internal focus on data architecture.

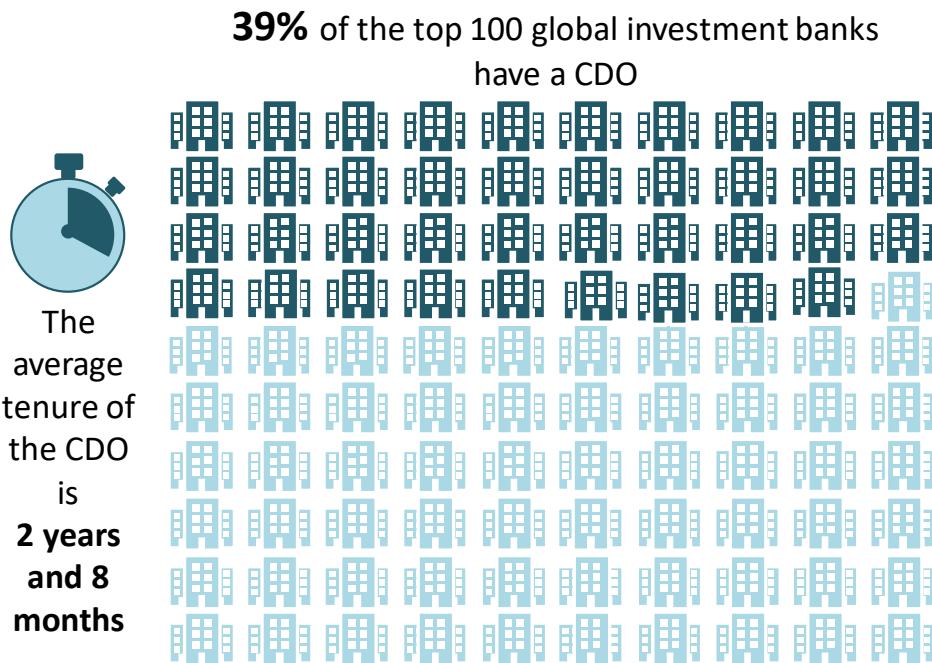
The chief data officer's (CDO's) role is often tied to the introduction of data analytics, data science, and "digital" or "big-data" projects, rather than to operational responsibilities for data management and governance. Some of these banks have more than one CDO in place, which reflects the regionally or operationally siloed nature of these firms and the data fiefdoms that have grown up around the various business lines. The majority of these CDOs are present at the enterprise level of financial institutions that also have significant retail banking operations; thus, their presence more likely reflects the progress that has been made in addressing data strategy shortcomings within that segment of the market than that of capital markets, per se. They are also more likely to hail from North America-headquartered firms than from those with headquarters elsewhere.

Unfortunately, despite its current importance and its potential future impact on a financial institution's technology adoption and innovation, data management has lagged other areas in terms of investment. C-suite executive attention tends to be directed at data management teams primarily when data-quality problems arise. Only 39% of the top 100 global investment banks have a CDO in place, and the average tenure of these executives is two years and eight months (Figure 2).

Accordingly, CDOs could quickly become chief scapegoat officers if regulator-imposed financial penalties are incurred for data infractions. It is also challenging to prove return on investment in an area that is not directly revenue-generating—preventing regulatory infractions or bringing down operational risk is not easily quantifiable. This means that CDOs tend not to stick around for long, but there is some evidence that data management is moving up the priority investment ladder for several large capital market firms.

**Figure 2: The Presence of CDOs at Investment Banks**

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Source: Aite Group

## TACKLING DATA ARCHITECTURE CHALLENGES

Whether they are called CDOs or any other variant, data management and IT executives face a tough task ahead: How do you effectively manage data across operational and geographic silos and introduce a culture of data responsibility within the business while meeting ongoing tactical and strategic targets and cost-saving goals? Enabling a firm to focus on the value of its data is the number-one cited challenge by sell-side respondents (Figure 3), which reflects the cultural as well as operational hurdles that must be overcome to effectively address data architecture problems. The practical challenges of delivering relevant data and developing an effective operating model must be tackled alongside convincing the business to invest time and effort into data governance tasks.

A Tier-1 global bank interviewee indicates that the firm has tackled this challenge by combining the data team with the digital transformation team and ensuring the function sits across business units. The team is focused on demonstrating the “value” in data and emerging business cases—the priority is gaining business buy-in and support across the enterprise for improvement of data architecture and data delivery.

**Figure 3: Greatest Hurdles to Overcome to Address Data Architecture Problems**



*Source: Aite Group’s interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

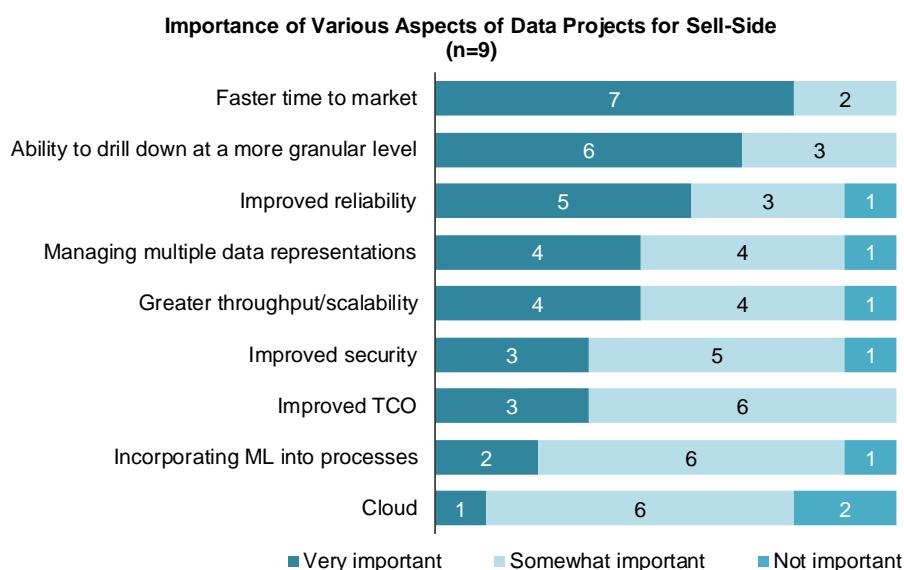
In terms of executive buy-in, regulatory compliance can prove to be both a benefit and a challenge for the data management function as compliance requirements continue to be introduced across key regions for global firms. Compliance projects can be a source of funding if the C-suite fosters a strategic view of data requirements across regulations, or if tactical firefighting is the executive team’s default approach, compliance projects can divert resources that may otherwise be spent on operational efficiency. Identifying common data requirements across specific regulations is a challenging task and one that entails a high degree of forward

planning. Firms with robust data architectures and strong governance programs tend to be better able than their peers to deal with the ongoing barrage of regulatory changes.

## TIME TO INSIGHT AND TIME TO MARKET

When it comes to capital markets, latency has long been a focus for the front office, but the importance of timely data is recognized across the enterprise, from trading through to compliance. Figure 4 shows that the majority of sell-side respondents feel that data projects can have a wide-reaching impact across the firm. For example, faster time to market is an important benefit and goal of data architecture improvement. Responding to client requirements and trading opportunities in a timely manner by supporting new asset classes and geographies is vital in such a competitive landscape. The ability to drill down into data to view opportunities and insights that competitors may miss is also essential to two-thirds of sell-side respondents.

**Figure 4: Sell-Side Respondents' Views on Benefits of Data Architecture Improvements**



*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

The end benefits of investment in data architecture from a competitive standpoint may be clear, but as a Tier-1 bank respondent notes, getting to the defined end state is far from simple. Many data executives have a vision of the target operating model in which data is truly an asset to the organization, but the steps required to get there may not be clear. It is almost like being able to view the final move in chess to checkmate the king but being unable to visualize all of the pieces that need to move before that can happen. Most of these challenges within top-tier sell-side firms relate to coping with legacy architectures and breaking down asset class silos. IT system modernization is best done when new tools and application run alongside existing architecture, with outright replacements done incrementally, which enables firms to realize improvements in the least disruptive and swiftest manner.

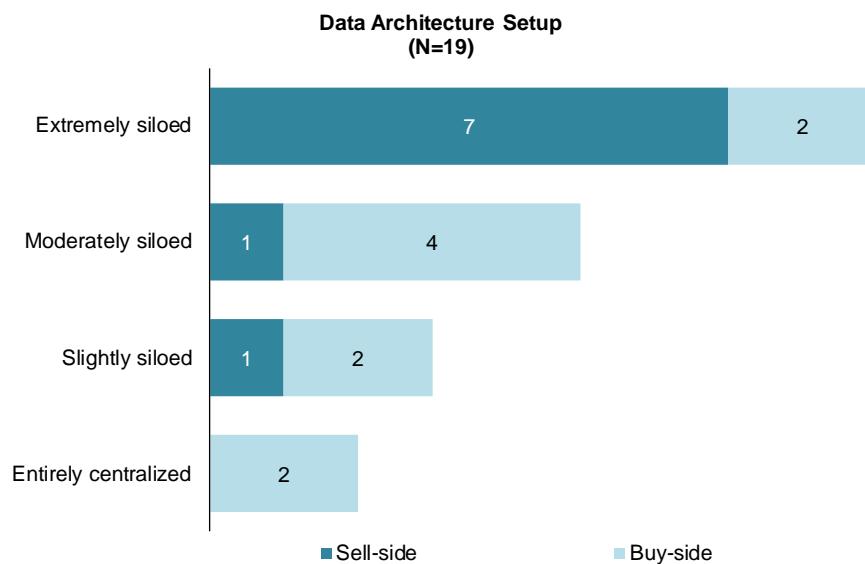
Another Tier-1 bank respondent notes that it has been difficult for the firm to truly scale because of silos across banking and trading divisions, especially at an asset class level. The bank's major challenge is aggregating different data sets residing in incompatible technology architectures. The firm is also under heavy pressure to meet regulatory obligations and remain profitable, both of which are challenging due to siloed infrastructure.

Increasing data volume has not helped matters, as these firms are dealing with increasingly granular data requests from clients and regulators. To cope with this rising tide, a Tier-1 global custodian respondent indicates that the firm is ranking and optimizing the management of its data sets. The data that is most frequently in demand by the business, clients, or regulators is being prioritized and better supported with more modern data tools. Obviously, this isn't a perfect long-term solution, but it is one that firms can use to begin down the path of data architecture improvement.

## BREAKING DOWN PHYSICAL AND CULTURAL SILOS

Tier-1 sell-side firms have traditionally tended to approach data architecture transformation with strategic intent because of the scale of the data problems they face. These strategic programs can be tied to meeting underlying business function requirements, such as risk management data improvement or the need to cope with mergers or acquisitions, but they are often part of a wider centralization push to reduce operating costs. Lower-tier sell-side firms, on the other hand, have tended to tie these projects to more tactical business-led initiatives, such as preparation for the outsourcing of back-office functions or a need to support new requirements in the front office. Given the rising visibility of data as a strategic asset within the capital markets community, even smaller firms are focusing on tackling their data architecture challenges.

A consistent metadata layer and data model across silos enables the integration and support of multiple data sources; hence, the lack of such a framework results in increased reconciliation and data cleansing activity. The higher the number of manual processes and bespoke technology workarounds used by a data management team, the higher the operational and key-person risk. Figure 5 indicates that all of the sell-side respondents have a problem with operational and technology data silos, but many have plans to tackle these silos via technology investments and strategic governance programs. Bridging data within silos is fundamental to meeting future business requirements.

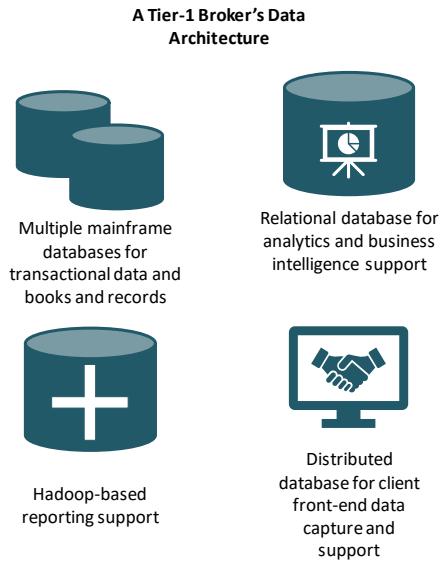
**Figure 5: The Silo Problem Within Top-Tier Firms**

*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

A Tier-1 broker respondent indicates that the enterprise has made significant investment in both senior management appointments and other data strategy personnel hiring over recent years to drive forward its program of work. Investments and strategic choices in data management are made through a dedicated architecture review board, and data management senior members are in charge of setting the firm's related policies. Lines of business are represented within the review board membership to provide strategic prioritization and data oversight, and a data stewardship program has also been adopted.

This engagement of the lines of business is key because quality control and fitness for purpose must be determined by the business, and the data management team must become the enforcers of the standards provided by these end consumers. Communication between these parties is not always simple and straightforward, which can cause significant disconnects between the data managed centrally and the data used by the business. This is why a more formalized structure is important, as are alignment of the firm's goals toward becoming a more data-driven organization and digitalization.

One of the biggest challenges facing these committees is to rationally prioritize data governance efforts by thinking outside functional silos. Rather than representing their individual functions, each representative on a committee must select projects based on enterprise-level priorities and for the "greater good" of the business. But a silo mentality is hard to overcome, especially when physical data silos are already complex to navigate (Figure 6).

**Figure 6: A Practical View of a Tier-1 Broker's Data Architecture**

*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

## SUPPORTING THE BUSINESS

The larger the firm and the wider the geographic and investment footprint, the larger and more diverse the data sets are that must be maintained. Moreover, the more esoteric instruments required to be supported, the higher the complexity of the task of managing those data sets. Common taxonomies rarely exist across desks and divisions—it is not unusual within capital markets for the same acronym to be used for different data items, which makes data managers' daily tasks much harder.

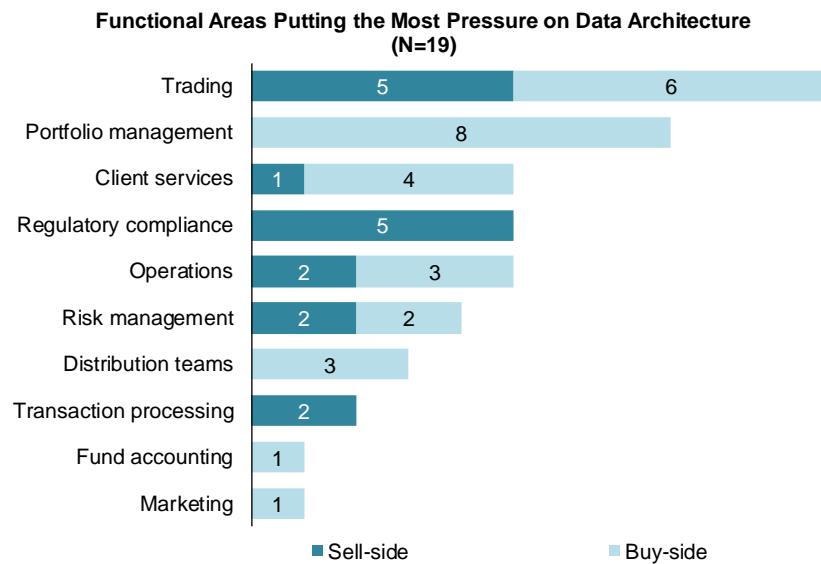
Within the middle and back offices, the automation of heavy-lift processes brings down the operational risk involved in manual or spreadsheet-based tasks and reduces costs via the redeployment of staff members to more value-adding tasks. Investment in robust and scalable data support can also enable the front office to avoid the reputational damage caused by outages and scalability issues. Sell-side firms' end clients are placing direct pressure on their counterparties to prove systems are robust and able to cope with the volatile market environment. Figure 7 shows that trading teams place a great deal of emphasis on data architecture support because of the need to maintain competitive edge.

Compliance is also at the top of the list for sell-side firms because of the increased importance of reporting and data transparency post-crisis. For example, trade and transaction reporting are predicated on accurate and timely data aggregation, which can be exceptionally challenging across internal silos, especially at scale. Moreover, trades with counterparties in multiple jurisdictions often involve multiple incompatible internal data stores and trade-processing systems. These data sources are expected to feed regulatory rules engines that determine whether to report the trade to a trade repository or to an approved reporting mechanism, and to which entity to send the data. If the underlying data itself is not normalized and the systems do not communicate in a timely manner, it can be impossible to fulfill the rule requirements.

Lack of compliance, in turn, can result in financial penalties, which impacts a firm's reputation and competitive edge.

**Figure 7: The Business Areas Most Impacted by Data Architecture**

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*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

## ARMING YOUR FIRM FOR THE FUTURE

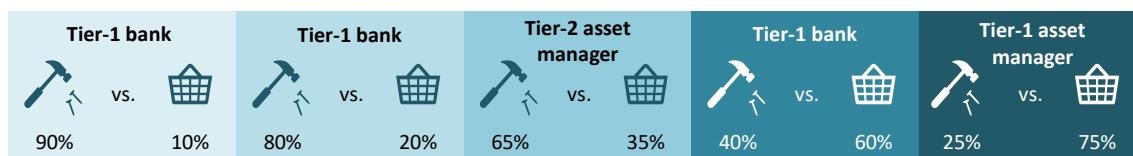
Existing competitive dynamics are only one aspect that C-suite executives must bear in mind when assessing data architecture. They must also consider future client and market requirements, as well as enabling their firms to cope with the rapid evolution of technology.

### BUILD VERSUS BUY

Though many sell-side firms have previously demonstrated a tendency to build in all areas, these firms are increasingly being pushed toward vendor deployments or partnership approaches for noncore or differentiating functions. Moreover, there is much more internal firm evaluation of hosted and managed services, even if most firms eventually opt for an in-house install. Not every firm is convinced that out-of-the-box technology is the right approach, however. A Tier-1 bank respondent notes that it has heavily customized vendor technology because of the desire to move from an expensive monolithic solution to a more agile approach to technology deployment and support.

Figure 8 shows a range of approaches to build versus buy at five different capital market firms. One Tier-1 bank has built 90% of its technology assets, whereas another has 60% of its data technology stack provided by vendors. A Tier-1 bank respondent whose firm has historically bought off-the-shelf solutions indicates that this strategy has not always delivered what the firm expected. The total cost of ownership of the technology has sometimes been higher than expected, and the agility and functionality provided have been a lot less than expected. This has led the firm to focus more on a hybrid approach to provide a more flexible and agile end result.

**Figure 8: The Range of Approaches to Build vs. Buy at Five Capital Market Firms**



Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020

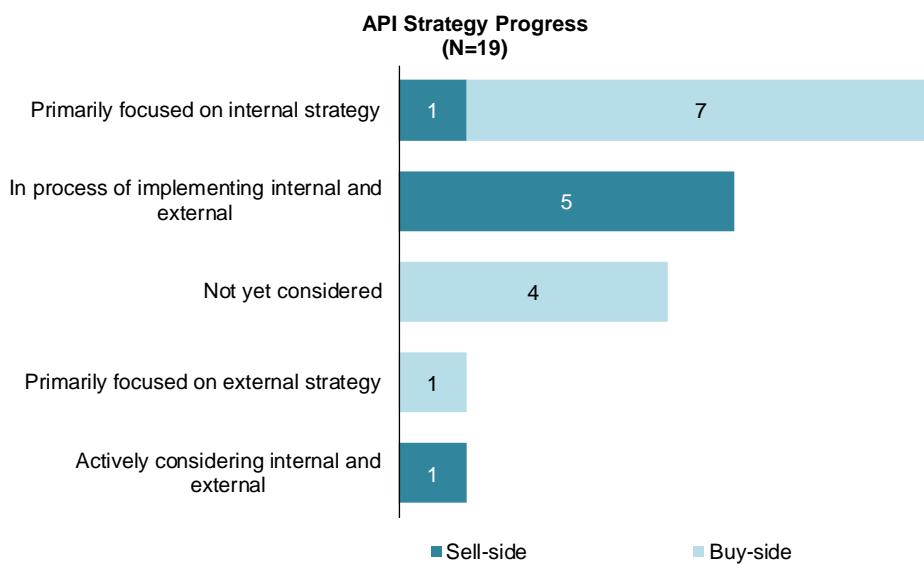
### API STRATEGIES

APIs have been around for decades, but up until recently, the concept of an API strategy or the API economy (to take it a step further) wasn't in the industry lexicon. As a potential spillover from what's going on within open banking within the realm of retail and commercial banking, APIs have suddenly become front and center for those operating in the capital markets. APIs essentially allow clients or internal teams to connect one application to another or allow a client or applications to access services or requested data sets. They come in a variety of flavors, but the industry is focused on open APIs, which are also known as public APIs because they allow access to the public and select external parties, and web services APIs such as representational

state transfer (REST) APIs. Usage of APIs can be restricted by user keys and also throttled as desired by supplying firms.

Figure 9 shows that all sell-side respondents are either implementing an API strategy or are in the process of considering one. Internal APIs enable greater levels of straight-through processing between systems and support important functions such as data aggregation. External API strategies focus instead on connecting a client platform to other providers or vice versa. The API can be used to call the required data or functionality from the connected platform and deliver it to the end client.

**Figure 9: Progress Toward Implementing an API Strategy**



*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

A Tier-1 broker respondent indicates the firm is working on an API strategy to expose its major business services for clients and partners via a published API library, as well as using internal APIs to access data across shared applications. Externally consumable APIs are needed for its customers to integrate data into their applications in real time. To be able to realize this strategy, the firm must adhere to proper data retrieval practices and maintain related business logic. Data architecture investment is often an integral part of an API strategy to this end.

API strategies also often go hand in hand with cloud adoption programs. As a Tier-1 bank respondent explains, cloud interoperability is much easier to achieve with an API-first adoption approach. The firm is gradually migrating its various data stores from on-premises data centers to a cloud environment, and the use of APIs allows connectivity between the legacy and the current environments.

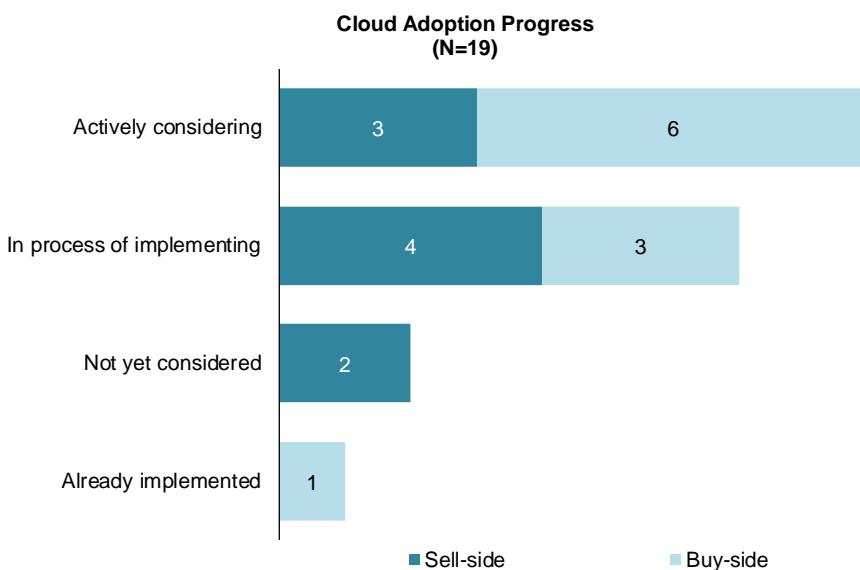
## THE MOVE TO CLOUD

Public cloud adoption has been slower than many in the industry anticipated it would be over the last 10 years, and Aite Group estimates that the majority of Tier-1 sell-side and buy-side firms have less than 10% of their total technology stack hosted in a public cloud environment. Cybersecurity and data security risk have been on the radar of all market participants over recent years due to high-profile data breaches and denial of service attacks, which have made some C-suites wary of moving mission-critical systems to a public cloud environment. Firms also have a host of cultural and operational hurdles to overcome before they can adopt a cloud-first approach to technology—similar to some of the hurdles data management teams face.

Enterprise-level innovation within capital markets firms is always much slower than functional-specific innovation within revenue-generating areas, such as the front office. Given that moving to the cloud has often been viewed by financial institutions as a strategic enterprise decision, it is unsurprising that the size or existing technology footprint of the firm has a significant impact on how quickly the firm pulls the trigger on the rollout of a cloud strategy across its divisions.

A Tier-1 broker respondent indicates that the firm has not yet considered deployment in the cloud, as the executive team is concerned about security and data privacy, and the management of supervision and controls required for third-party governance. However, the majority of sell-side respondents are considering or in the process of moving certain functions to the public cloud (Figure 10).

**Figure 10: Adoption of Public Cloud by Respondent Firms**



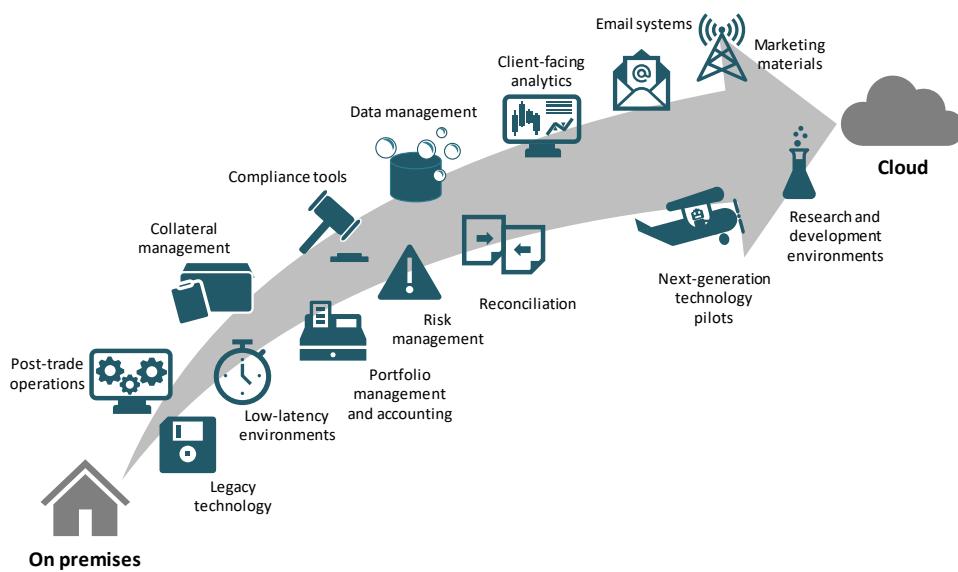
*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

A Tier-1 global bank respondent has deployed a cloud bursting strategy to deal with its high-performance computing requirements on demand. Ad hoc data requests from regulators and stress-testing requirements mean that the firm faces peaks and troughs in computing requirements throughout the month; hence, cloud bursting allows it to scale to increase its

computing capacity as necessary. Not all banks have reached this level of comfort with cloud bursting, however, and another Tier-1 investment bank interviewee explains that the firm has a large portion of similar functions that require high compute power deployed on its internal cloud. The firm is beginning to test the viability of an external cloud but is concerned about the cost structure of such an arrangement, taking into account both fixed and variable costs.

Figure 11 shows a high-level snapshot of where the industry is in terms of moving on-premises functions to a public or private cloud environment. Legacy technology and non-client-facing post-trade operational functions still tend to be hosted on premises because they are perceived as being harder to move to a cloud environment and because C-suites view them as cost centers and lower-priority functions. At the opposite end of the spectrum are research and development environments, and marketing and email systems, which are more client-facing and less sensitive in terms of data privacy in the case of marketing information. The more industrialized and standardized processes, such as reconciliation, are also perceived as easier to move to a cloud-hosted environment because of the IT team's greater understanding of data flows and processes.

**Figure 11: The Functional View of Cloud Adoption**



Source: Aite Group

Multiple bank interviewees indicate that an ongoing need to remove costs from the annual balance sheet has driven their firms to consider a shift from capital expenditure to operational expenditure. C-suites have a strong desire to adopt more flexible approaches that avoid huge one-time expenditures, assuming that these pay-as-you-go/subscription models result in relatively predictable annual or monthly payments.

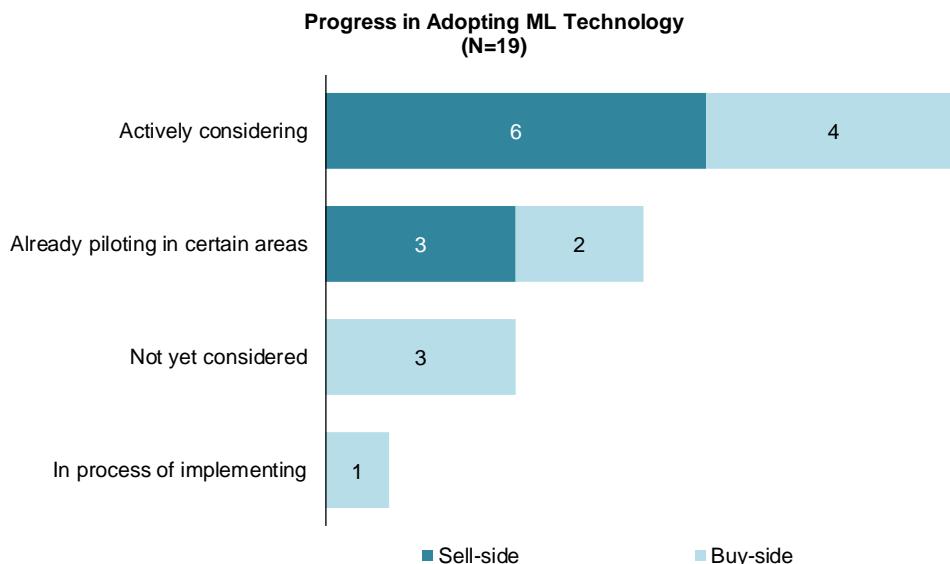
Tier-1 banks do not shy away from procuring hardware or developing their data centers, but even these firms are reviewing their costs and considering their long-term technology footprints. And as the volume of data balloons, determining long-term hardware requirements without creating redundancy issues is an even tougher balancing act. Cloud technology adoption is likely inevitable even for mission-critical functions and the most resistant firms. A Tier-1 bank notes

that cloud adoption is also significantly impacting the firm's assessment of its data architecture requirements. The driver to adopt in-memory processing has dropped substantially because the firm is able to ramp up and scale via next-generation cloud-based architecture.

## MACHINE LEARNING AND AI

As noted by a Tier-1 broker respondent, the demand for data and digitalization is expected by many in the market to grow exponentially over the next five years as a result of sell-side efforts toward improving customer experience and reducing costs via business process automation. AI and ML technologies will be an integral part of this trend, particularly around the enhancement of business processes. Though it is early days for this technology overall, all sell-side respondents are either actively considering ML's application or are piloting this technology in areas such as fraud and financial crime detection and trade analytics.

**Figure 12: Progress Toward Adopting ML Technology**



Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020

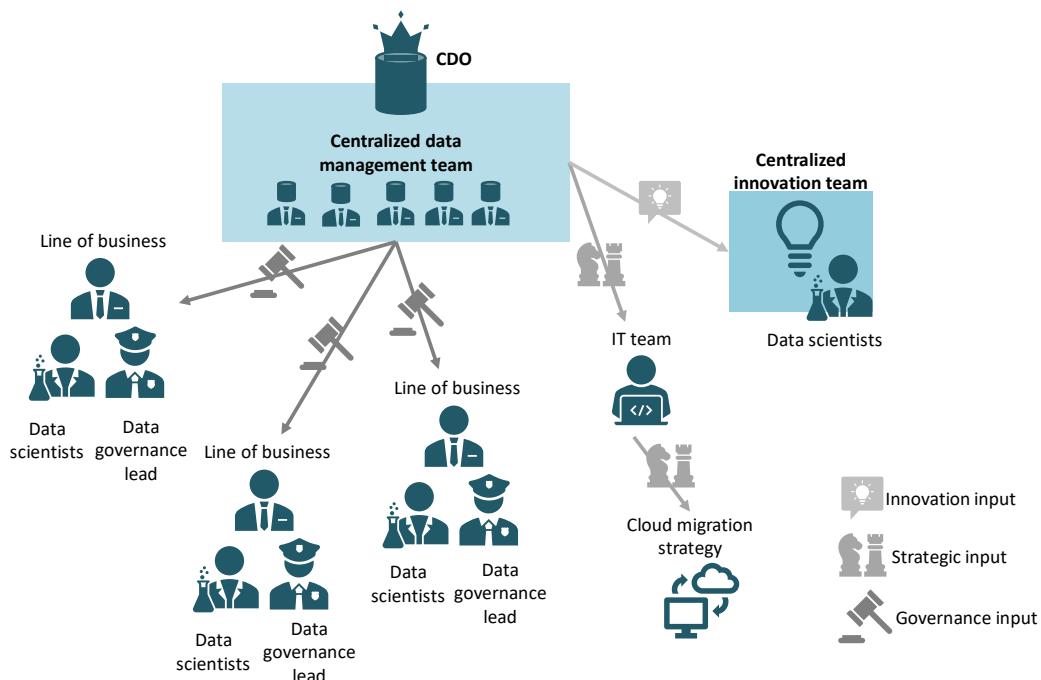
The true value of AI or ML technology for the front office or in generating client insights can only be realized if the underlying data that is fed into these systems is of sufficient quality and consistency. Data architecture and support is therefore crucial to the successful adoption of these technologies. To this end, a Tier-1 bank respondent indicates that the firm is keen to deploy ML technology in the trading area, but it doesn't have a sufficient corpus of multiyear consistent data over which to run these algorithms and produce valuable insights. The firm is also keen to augment its operational processes and improve business functions such as reconciliation by using ML technology to propose matches and eliminate manual tasks. The respondent feels that it will take another year or so before the firm is able to benefit from these technologies, after it has carried out some strategic work in addressing data limitations.

## FOLLOW THE LEADER

No one firm has addressed all its data architecture challenges—even the most sophisticated banks and brokers have some way to go before they have solved the majority of their issues. It can be helpful for firms, however, to examine how a market leader in data transformation has gone about tackling these challenges. Figure 13 shows how one such firm has tackled establishing a data governance framework and connected its line of business leaders with the CDO and data management team. The CDO's office sits at the top of the structure with a centralized data management team across all lines of business that coordinates IT strategy, including cloud migration, with the chief technology officer's team.

The CDO's most immediate focus after appointment was developing a model for cataloging and managing data for each division so that each data set could be held to a baseline standard per function. The CDO's team set up a stewardship program within each line of business and appointed individuals to enforce data governance and feedback into the centralized team. The data scientists within each line of business are also connected into the centralized function and provide a feedback loop in terms of data architecture challenges and requirements related to engineering and quantitative analysis functions. The team also works with a centralized innovation unit on projects related to business goals of creating differentiated insights for clients and lines of business.

**Figure 13: A Market Leader's Data Governance Framework**

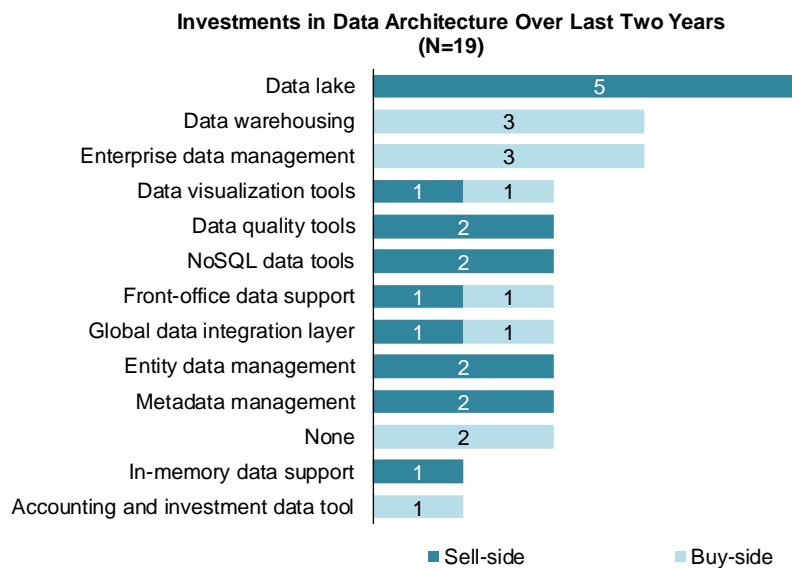


Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020

## RECENT AND FUTURE INVESTMENTS

Numerous sell-side firms have made public announcements about their investment in data lakes over the last five years, and Figure 14 indicates that respondent firms have also made these investments. A Tier-1 broker respondent indicates that it has built a Hadoop data lake environment but had to invest in further tools to manage metadata and track data lineage in order to make use of the data contained within the lake. Across the board, there has also been investment in tools to help cleanse, transform, and normalize data to make it fit for purpose for insights and analytics teams. A Tier-1 bank respondent indicates that the bank's recent data architecture investments have been defensive efforts to reduce risk by better assessing data quality and supporting functions within the front office. The firm is now turning to a more offensive strategy to better arm the business with data insights via analytics support.

**Figure 14: Recent Data Architecture Investments**

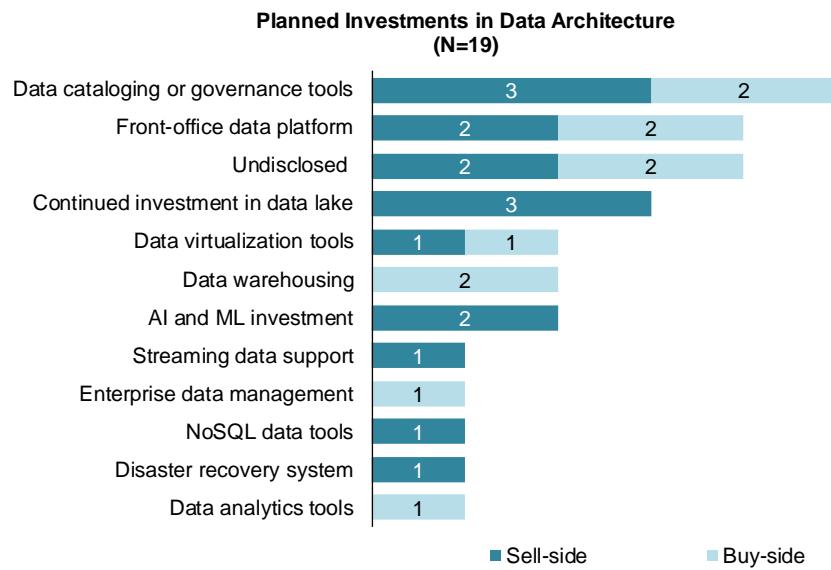


Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020

Future investments in data architecture by respondents (Figure 15) range from data cataloging to disaster recovery and highlight the different priorities and approaches that sell-side firms are adopting for data architecture improvement. Not all firms have a defined plan for investment at the moment, and some are instead reviewing their requirements and business plans before putting together a business case for investment in specific technology. As noted by one Tier-1 bank respondent, a key question that data teams need to ask themselves in this endeavor is, if your data strategy is not delivering a competitive advantage in some way—via cost reduction, revenue growth, or risk mitigation—then why are you doing it at all?

**Figure 15: Planned Investments in Data Architecture Over the Next 12 Months**

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*Source: Aite Group's interviews with 19 data management executives at capital markets firms, between Q3 2019 and Q1 2020*

## CONCLUSION

A coordinated enterprise data management strategy is one that can only start from the top. C-suite executives should focus on the following major findings when considering or prioritizing data management investments, especially in the context of digital transformation:

- **Get ready for real-time requirements with data management investments:** Sell-side firms need to invest, if they have not already done so, to maintain competitiveness and support the ever-increasing velocity of data and requirements, including the ingestion of real-time messages, data processing needs, and analytical requirements. High performance and stability, especially when workloads spike, are critical for future-proofing businesses.
- **Communication and consistency are the bedrocks of successful data governance strategies:** Communication of realized goals and strategic progress across the affected business units but also across the wider enterprise is important, but unless each unit is educated about the benefits at a local level, barriers and cultural resistance can increase. The introduction of governance frameworks and the appointment of data stewards are key components of these programs at the grassroots level, and a steering committee is a key component at the top level.
- **Data transformation is a marathon, not a sprint:** Newer technology implementations should be deployed alongside existing architecture and done so in manageable sizes to ensure operational gains can be delivered more quickly, rather than trying to deliver change through a big-bang approach that will likely lead to delays and loss of internal project support over time.
- **Next-generation technology and cloud adoption require data investment:** The true value of AI or ML technology for the front office or in generating client insights can only be realized if the underlying data that is fed into these systems is of sufficient quality and consistency. API strategies also often go hand in hand with cloud adoption programs, and cloud to legacy interoperability is much easier to achieve with an API-first adoption approach.
- **Regulatory compliance can be better supported by modern data architecture:** If the data underlying regulatory reports is not normalized and the systems from which these data sets must be pulled do not communicate in a timely manner, it can be impossible to fulfill the rule requirements. Lack of compliance can result in financial penalties, which impact a firm's reputation and competitive edge. Firms with robust data architectures and strong governance programs therefore tend to do better than peers when dealing with the ongoing barrage of regulatory changes.
- **Significant costs and risks can be avoided if data architecture is adequately supported:** A consistent metadata layer and data model across silos enables the integration and support of multiple data sources; hence, the lack of such a framework results in increased reconciliation and data cleansing activity. The higher the number of manual processes and bespoke technology workarounds used by a data management team, the higher the operational and key-person risk.

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