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Thought Leadership Paper  
Commissioned By Oracle

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# **Moving The Needle: Data Management For The Multi-Hybrid Age Of IT**

Build an effective data management strategy to thrive in a multi-hybrid world

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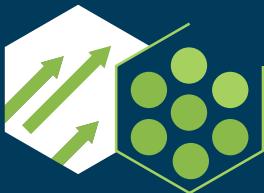
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82% of respondents recognize that the right data management strategy will lead to better business outcomes.

## Executive Summary

Digital business strategies depend on effective data management. In keeping up with customer needs, organizations have very quickly realized the importance of making data a central pillar of their business. In 2020, Forrester Research predicts that advanced firms will double their data strategy budget in order to build transformations and stay ahead of competitors.<sup>1</sup> While the intent remains grounded, organizations now must execute this vision in an increasingly complex and multi-hybrid IT environment. The advent of cloud adoption, alongside legacy systems, and a growing application landscape has made data acquisition, integration, and management more difficult.

The only way for organizations to move beyond this predicament is to build an effective data management strategy that encompasses the right facets of data unification, security, and governance within the multi-hybrid complexity of the IT environment. In August 2019, Oracle commissioned Forrester Consulting to evaluate the state of data management strategy, specifically in organizations across Asia Pacific (AP) and EMEA markets. Forrester conducted an online survey of 670 technology and business decision makers with responsibility over data infrastructure and data strategy, while also conducting exclusive interviews with 10 C-level executives across these respondents to dig deeper into their approach, drivers, and best practices of data management.

From this custom research, we can deduce that organizations have a moderate maturity in terms of data management practices. Unfortunately, moderate is not good enough to optimize the role of data in transforming businesses. Firms are approaching data management in the right way, simplifying processes and aligning data to business priorities, but more needs to be done in establishing frameworks, governance, and capabilities to truly realize its value.

### KEY FINDINGS

- › **Acknowledge IT complexity to manage future needs.** IT process complexity slows organizations' ability to deliver business and customer value. This complexity is compounded by organizations' increasingly hybrid IT environment. In fact, 64% are grappling with the challenge of managing a multi-hybrid infrastructure. So it's not a surprise if 70% of organizations consider the need to simplify their IT processes as a high or critical priority.
- › **Siloed data strategies hinder organizations' efforts to grow.** A vast majority of organizations (82%) want their data strategy to lead to a better understanding of the customer and a better customer experience (CX). However, 73% of organizations report disparate and siloed data strategies that stop them from achieving this goal. Organizations are still looking for the most effective approach, tools, and processes to overcome these siloes and better manage their complex data environments.



83% of respondents believe data protection and security is a high priority.

- › **Data security and governance remain at the forefront of priorities, as organizations struggle to comply with regulations.** Even though 83% of firms believe they need to keep up with data security needs as they advance on their data management roadmap, one in two respondents say they currently lack the ability to adequately manage data protection and security regulations. Similarly, 68% of organizations consider the need for data governance as they scale their use of data, building capabilities in rules checking, data quality, and risk management, however, 67% struggle to comply with data privacy and ethics law and regulations.
- › **Lack of talent and organizational siloes get in the way of future-ready, data-centric strategies.** While the need for building a more data-centric organization is recognized, 75% of firms believe that a lack of data integration experts as well as data scientists inhibits the definition and implementation of a successful data management strategy.

# A Multi-Hybrid World Is Challenging Data Management Strategy

## THE CURRENT STATE OF DATA MANAGEMENT

From hybrid infrastructures and data sources to hybrid hosting models, IT environments are becoming increasingly complex and multifaceted. Organizations are partnering with a large range of service providers, to enhance their capabilities, but this in turn, further complicates their IT landscape and operations. In this context, the foundational steps to building the right data management revolves around enabling simplicity and visibility for both IT and business processes entirely.

Drivers of creating an effective data management strategy lean on empowering business stakeholders to make more informed decisions when serving their customers. Our research shows that most organizations are still a work in progress when it comes to building their data management strategy. Recognizing this need is the first step to building the right foundations in security and governance, i.e., keeping the customer top of mind.

- › **Firms recognize the need to further build out their data management strategy.** Only 22% of AP respondents and 23% of EMEA respondents consider themselves to be in a mature and complete stage. On the other end of the spectrum, 41% of AP organizations consider themselves in the early stages of completeness. In comparison, the EMEA region considers themselves marginally more mature than its AP counterparts: with 38% of EMEA companies considering themselves in early or incomplete stages, and only 10% believing their data strategy is incomplete, compared to 16% of AP organizations (see Figure 1).
- › **Embedding a data-centric business culture is key to better customer experience.** In order for data to have a lasting effect on the whole of a business, 77% of decision makers believe it's important for their current data strategy to build a data-centric and customer-first organizational culture. Ultimately, data centricity in business practices must lead to better customer outcomes and enhance CX, as articulated by 82% of respondents.

## MULTI-HYBRID ENVIRONMENTS ARE HERE TO STAY

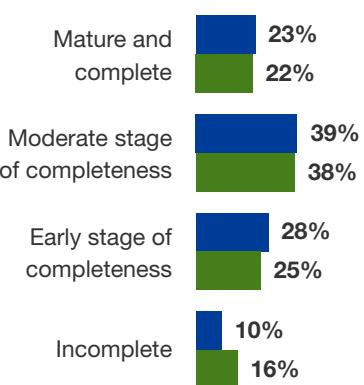
Firms acknowledge that their data strategy has to adapt to the evolving complexity of their IT environment, however, it is the very nature of this complexity that makes data strategy hard to execute. When we asked organizations about their challenges in defining their data strategy, overcoming disparate data stored across the organization, and then unifying it for insights generation, came out as the top challenges (see Figure 3). In our analysis, the most distinct challenges can be distilled into three major themes, all of which are a consequence of the multi-hybrid world that IT operates in today.

Figure 1

“How would you rate the maturity of your data strategy?”

■ Europe

■ AP



Base: 670 technology and business decision makers with responsibility over data infrastructure and data management strategy

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, August 2019

- › **Multi-hybrid data infrastructure.** Technology infrastructure for data spans across traditional on-premise, public cloud and multiple private clouds all the way to edge devices.

Our survey shows that data hosting is increasingly becoming multi-cloud in nature. While 36% of the data is still hosted on-premise, 19% is hosted on a public cloud and 18% on private cloud. (see Figure 2). This adoption of multi-cloud data hosting is driven by the need for both diversification as well as access to unique capabilities – 6 out of 10 respondents mentioned “avoiding platform lock-in”, and a similar number “accessing specific technology or capabilities” as drivers for their multi-cloud strategy. External technology providers play a key role in organizations’ innovation and differentiation capabilities. While organizations want to preserve these strategic partnerships, effectively managing a large array of service providers increases the complexity. As a result, 60% consider better handling their multi-vendor landscape a key priority (see Figure 4).

- › **Multi-hybrid data formats and origins.** Data used for generating insights spans structured and unstructured, streaming and bulk, internal and external, private and public data, across a diverse range of storage mechanisms most suited to each type.

Tabular, structured data makes up less than one third of the data inventory of organizations surveyed. The nature of the data collected by these organizations has considerably changed – with 31% being tabular/structured and the remainder being non-tabular/semi-structured or unstructured data. Of the latter, are 18% text data and the rest evenly distributed across images/video, machine generated data, streaming data, and others (see Figure 2). All of these data types are stored and managed by an array of technologies and platforms, and all valuable to generate business insights.

**Figure 3**

**Key challenges in defining data strategy**

77% Disparate and siloed data strategies across different lines of business

74% Challenges in data unification efforts

68% Lack of prioritization from business to focus on a holistic data strategy

67% Complying to data privacy and ethics laws and regulations

64% Complexity in managing our multi-hybrid infrastructure

Base: 670 technology and business decision makers with responsibility over data infrastructure and data management strategy

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, August 2019

**Figure 2: What Multi-Hybrid Looks Like**

“Which of the following deployment options form part of your data infrastructure today?”

■ On-premises ■ Public cloud ■ Private cloud



“Which of the following describe the nature of the data you are managing?”

■ Tabular/structured ■ Text ■ Images/video ■ Machine generated data ■ Streaming data ■ Other semi-structured data



Base: 670 technology and business decision makers with responsibility over data infrastructure and data management strategy  
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, August 2019

- › **Multi-hybrid data priorities.** Businesses want to garner and exploit as much data as possible to generate insights in order to optimize and innovate. However, increasingly strict regulations such as compliance and privacy laws, brand-damaging cyber attacks, and a steep rise in consumer concern over the ethic use of data are counterbalancing this desire.

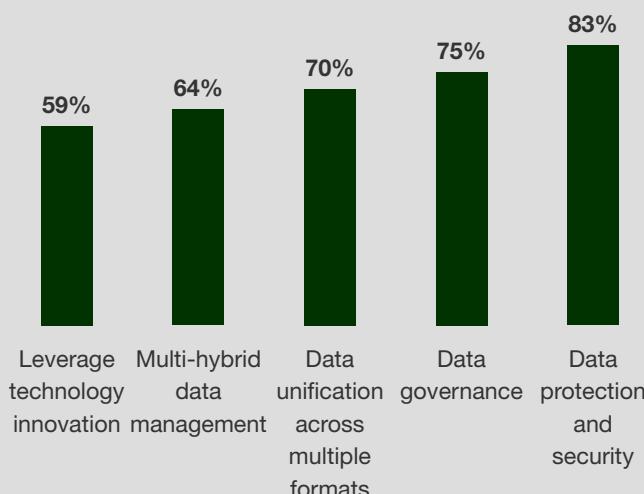
The surveyed organizations strive to simplify IT processes to optimize data management (see Figure 4). Business teams do not always find the data available to them to make relevant, contextual decisions in, or close to, real time. This leaves them having to rely on making decisions based on their “gut feeling,” which generates unclear business outcomes. The unavailability of relevant data is largely due to the complex data siloes that have yet to be truly managed. To address this need, 70% of technology leaders are looking to simplify their IT processes, and thereafter lay the groundwork for providing business stakeholders with the data they need (see Figure 4).

**Figure 4**

**Surveyed organizations see gaps in executing on data management priorities**

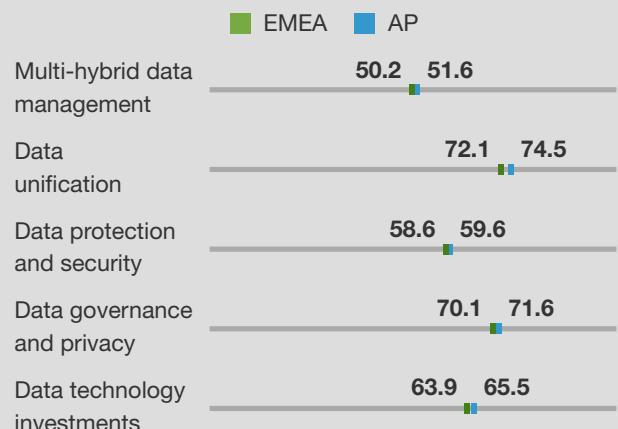
**Data management priorities**

**“To what extent does your organization prioritize the following data management strategy cornerstones?”**  
(Showing responses for high or critical priority)



**Maturity in data management execution**

**Data management maturity index: based on an average of responses to maturity-related questions in data management practices across cornerstones**



Base: 670 technology and business decision makers with responsibility over data infrastructure and data management strategy.  
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, August 2019.

# Master The Five Cornerstones For Data Management Strategy

Forrester Research prescribes that for the right data management strategy, companies need to incorporate: 1) elements that connect to the business objectives of the data; 2) the technical architecture that is built around relevant and secure data access; 3) a sound plan on when and how to implement the data architecture; and 4) access to the right data based on business imperatives.

## REFINE YOUR DATA MANAGEMENT STRATEGY AROUND FIVE CORNERSTONES

To enable such a strategy, businesses need to think through a host of technical management priorities that take into account a complex environment and data sources, while ensuring the right governance and security practices are in place for the future. To determine how ready organizations are to enable such an environment, this study delves into across five strategic cornerstones:

- 1.) **Data technology management across multi-hybrid deployments.** The ability to deploy and manage a variety of data management systems and platforms (such as data warehouses, NoSQL databases, streaming processing tools, Hadoop, in-memory databases) across a diverse range of deployment options (on-premises, private cloud, multi-public cloud, edge).
- 2.) **Data unification across multiple types and sources.** A large variety of data (structured, unstructured, streaming/real-time, internal, external) can be managed in a unified environment, with adequate data integration, virtualization, and distribution capabilities. Also, clear business directives on the data are required for tactical and strategic decision making.
- 3.) **Data protection and security.** The provisioning of advanced data protection and security frameworks (such as Zero Trust), with relevant data encryption, masking, and access controls capabilities, ensures the highest degree of resilience and protection against misuse, criminal activities, and data loss.
- 4.) **Data governance, ethics, and privacy.** The establishment of a data governance agenda balances an organizations' desire for data-driven insights with the privacy, ethical, and compliance interests of its customers, partners, and regulators.
- 5.) **Leveraging technology innovation.** The evaluation and leveraging of new technology capabilities (such as machine learning, AI, data virtualization, containerization) for data infrastructure enables new business capabilities for the organization.

## PRIORITIES AND MATURITIES ACROSS THE FIVE CORNERSTONES

In this study we asked organizations to outline their data management priorities across the five key cornerstones, while validating the specific practices they have in place to act on these priorities. Comparing priority versus their maturity in executing on these priorities made for an interesting snapshot of where organizations are in their data management strategy. For instance, data security and governance tops the priority chart (with 83% indicating it as either a high or critical priority), but it is scoring second lowest in maturity, out of all five cornerstones. Data unification sees the highest maturity score, and accordingly it ranks with medium priority. On the other end of the maturity spectrum, multi-hybrid data management is given the lowest maturity score by respondents, but is also second lowest on the priority scale. AP companies are marginally more advanced in these capabilities, as compared to their EMEA counterparts.

### › **Data protection and security are a top priority for organizations looking to significantly raise their maturity in these areas.**

Eighty-three percent of organizations across AP and EMEA markets considered data protection and security a high or critical priority in their data management strategy (see Figure 5). This was even more pronounced in both European companies (90%) and larger companies (93%) across the board, given the higher surface risk, exposure, and complexity they have to manage. In this paradigm, the fear of data leaks and external attacks take over in the prioritization of security. As the CIO of a property, manufacturing, and retail conglomerate based in Malaysia mentioned, “The rampant increase in breaches and attacks over the past couple of years has made security a top priority.” Firms show a consistent prioritization of security in their technology investment strategy as well – while 55% declare that they have already invested in data protection or security technologies, 78% plan to expand or upgrade their data security capabilities.

Given the ever-evolving complexity of the IT environment, investment in the security environment should also be consistent and all-encompassing across data and user groups. Systems need to be in place for enforcing access to data based on classification, particularly by privileged users. For 67% of surveyed organizations, data encryption — in industries that see the frequent flow of confidential customer information — has been leveraged by default in most data stores and pipelines.

To truly embed sustainable security practices, organizations need to concentrate on strengthening their corporate culture and governance practices on data protection. Less than half of respondents (48%) believe that their senior leadership will shape the culture to be security-first in nature, while data protection and security frameworks are only being sought by one in every two organizations.

**Figure 5**

**“What steps is your company taking to better optimize the data management strategy across your organization?”**

(Showing responses for high and critical priority)



**Invest in technologies** to fully support our data management strategy and execution

Base: 670 technology and business decision makers with responsibility over data infrastructure and data management strategy.

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, August 2019.

**“The No. 1 factor is security to ensure that data is not breached. Systems are assuming the level of security needed for the most exposed and hackable one.”**

*CIO, regional conglomerate, Malaysia*



- › **Gaining alignment with business needs and further complying with regulations drives investments in data governance, ethics, and privacy.** Three in every four companies consider governance and privacy practices a high-priority cornerstone of their data management, especially when ensuring the adequate data quality and acquisition measures across the value chain. The head of IT for a large food and beverage company in South Africa mentioned that, “In our order management, a lot of systems are still manual. The biggest challenge to automating this is in the global governance, [i.e.,] making sure that when capturing the orders, data quality is in place.”

Apart from building a system of quality control and data governance policies, which is currently carried out by 69% of surveyed organizations, a critical second pillar of data governance is in ensuring the linkage from data governance to business value and outcomes. There is a significant recognition of that as 65% have their data governance agenda linked to business value, data quality, and risk management principles. Nonetheless, firms are in the process of building better governance capabilities, as 65% said they intend to invest in technologies with data governance and data quality capabilities in the next three to six months. In this context, data governance also extends to non-production environments and cold backups, as to ensure that data is protected from tampering across the system.

From a regulatory standpoint, only 55% of organization have ensured that their data strategies have been complied with regional privacy and data protection acts, i.e., GDPR and PDPA.<sup>2</sup> While the intent of being conscious of data quality and governance is there, more maturity is needed when it comes to embedding those strategies in context across touchpoints.

- › **Data unification efforts are driven by the need to obtain a 360-degree view of the business.** The intention for making the best of the diverse data sources exists in organizations, as 70% believe that their business strategy articulates how their firm will use the data for competitive differentiation, and 66% say they have a 360-degree view of the business through their data infrastructure.

In terms of building technology capabilities, data unification is the foundational pillar that decision makers need to start with when building their data management architecture. Sixty-two percent of organizations have already implemented data integration technologies to extract and load jobs that support a variety of workloads. Organizations will also need to look at how they can minimize movement of data using data virtualization technologies, as data movement increases the risk of a security breach.

“Authentication and encryption are currently being taken care of, as we move to cloud it is an important discussion we are having with vendors, to make sure they are protecting our data today and in the future.”

*CIO, automotive and farming equipment manufacturer, India*



“Managing and sorting through the various data sources is the most important aspect. To do anything with the data, we need to be able to organize it.”

*CIO, multinational conglomerate, India*



- › **Data management across multi-hybrid infrastructure commands attention, but it starts from a position of low maturity.** As a strategic priority, 64% of enterprises considered this to be a high or critical priority in their data management strategy. Given the maturity of cloud adoption and multivendor adoption, this was much more pronounced in the EMEA region, where 71% of companies wanted to focus on this aspect of their data management, compared to 32% in AP. Furthermore, traditional sectors such as manufacturing (81%) and public services (49%) consider this a higher top priority across the cornerstones.

Organizations are still in the stage of ramping up capabilities to derive business value from a multi-hybrid infrastructure (other than initial cost savings) — amongst the five cornerstones, multi-hybrid data management scored the lowest maturity. For example, only one in two organizations have data preparation and pipelining that works with several stakeholders, while only 47% believe they have the right data office to lead innovation and sound operations.

While there is a strategic recognition of building a self-service framework for business and data users within organizations, only 35% of organizations can present data through managed APIs and quickly generate capabilities for pipelining through AI and machine learning models.

- › **Technology investments are made more surgical, improving on a perceived medium maturity.** Organizations are clearly focusing on technology investments which directly link to their top data strategy priorities. Technologies with the highest propensity to invest over the next three to six are those that drive data governance and data quality (with 65% likely to invest within three to six months), cloud-based platforms (69%), and integrated systems for data storage (70%). Data security technologies are only indicated by 40%, however, 55% have already invested in this technology, significantly more than for any of the priority technologies.

“Everyone wants different things... in fact, some departments won't know what (data) they want, or want everything.”

*CIO, industry conglomerate, India*



# What It Means

Organizations are making steady progress in defining an effective data management strategy; however, challenges remain in the implementation and execution.

## BALANCING YOUR PRIORITIES IS ESSENTIAL WHEN BUILDING OUT YOUR DATA MANAGEMENT STRATEGY

We see four areas that require attention when balancing priorities during execution:

- › **Data and technology infrastructure will remain multi-hybrid.** This increases complexity but will also allow you to select and prioritize based on use case, privacy requirements, and overall security considerations. Nearly two-thirds of organizations are prioritizing their ability to manage data across multiple systems and deployment options. Multi-hybrid infrastructure is here to stay, and organizations are leveraging this to their advantage. The inherent increase in complexity of managing the data in such a hybrid world is understood and a priority, but it also opens new possibilities.
- › **Data protection, security needs, and the overall ease of management will drive technology investments.** Even in a hybrid world, the challenge in data strategy has less to do with technology capabilities themselves, as it does with optimizing those capabilities for other strategic priorities. A significant 59% of decision makers consider leveraging technology innovation as a high or critical priority, however, relative to other cornerstones this is relatively low. This indicates that a majority of organizations are prioritizing to leverage technology innovation, but the focus is more on how technology can help them address the other cornerstones, in particular security, privacy, and data unification.
- › **Business needs to balance trust and value.** Data monetization must be weighed against data privacy and governance. Data unification across multiple formats is necessary to drive business results. More than two-thirds of organizations see data as high or critical, as value generation from data goes beyond single systems. However, data governance and privacy are clear concerns for three-quarters of organizations, indicating data governance as a high or critical priority. Any data management strategy must find an equilibrium between data value, data privacy, and data security — with the latter two predominantly anchoring the decision making.
- › **Address the skills gaps early and invest in training and upskilling.** The skills portfolio required to execute on a data management strategy in a multi-hybrid world has drastically increased. There is no “out with the old, and in with the new,” rather a talent strategy is required alongside a data management strategy which places equal focus on optimally leveraging existing skills, making investments in upskilling and building new skills, and adding new skills from the outside when necessary.

The good news is that most organizations are aware of this, with 60% regarding investments in people, education, and culture to embrace a data-first organization as a high or critical priority, just ahead of investments in technology (see Figure 6).

**Figure 6**

**“What steps is your company taking to better optimize the data management strategy across your organization?”**  
(Showing results for high and critical priority)



**Invest in people**, education, and culture to embrace data-first organization

Base: 670 technology and business decision makers with responsibility over data infrastructure and data management strategy.

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, August 2019.

# Key Recommendations

## FOUR STEPS TO EVALUATE AND IMPROVE YOUR DATA MANAGEMENT STRATEGY

The bottom line is that a successful data management strategy must provide businesses with quick and complete access to all of the data and analytics that it needs, both now and into the near future, all while balancing privacy and ethics regulations and consumer concerns.

A strategy is a high-level action plan, which must clearly align with the five cornerstones set forth in this report and with your specific data management goals. All stakeholders must be able to understand it, and everyone who will be involved with implementing it should be able to act on it. As with any strategic planning process, understanding the current state is first, followed by clear goals and what it takes to get there.

The four steps outlined below help to formulate your organization's immediate next steps to assess and optimize your data management strategy:



**Assemble the right data stakeholders.** The first step in formulating the strategy is to assemble a working group of data subject matter experts (SMEs) across all of the functions and divisions within the business. This working group will play a key role in helping to understand the requirements and identify ownership across the organization. This will help avoid creating yet another silo.

After the formation of this working group, IT or a data strategy department will need to make the effort to identify and understand specific business needs across teams and personas within the organization. This would allow them to determine the data points and systems that are relevant to each business use case, the data unification that needs to be met thereafter, and the technology architecture they need to build. Key cornerstones to engage: data unification and data tech management.



**Perform a needs assessment that aligns business and IT objectives.** Business SMEs will describe the current and future business processes that directly involve customers or prospects; this will reveal customer data needs and applications. It's valuable to have a technical SME in sessions with business SMEs to fill in the technical details of where the data lives and how it flows through the technical architecture, identifying any challenges and possible improvements.

To enable these objectives from a technology standpoint, storing the right data elements in a repository is important, as per its data structure, and intended use, with the right data virtualization layers to manage this repository well. Data correlation and mapping should enable decision makers to have data seamlessly available, but you should also ensure that these business users have the right skills and tools to truly leverage the data in their decision making. Key cornerstones to engage: data unification, data tech management, and data privacy.



**Building your implementation roadmap.** Key elements of the strategy include business imperatives, technology architecture, and the implementation roadmap. The business imperatives will include those changes that the various functional areas and divisions must make to streamline data access and sharing. The technology architecture will make it possible, and the implementation roadmap will capture what it will take to make it happen.

After aligning business goals, in building this roadmap technically, it's important to recognize that the value of data in an organization varies in importance across business functions, and relational databases should account for this in deciding the most valuable data to hold. Furthermore, in their technology investment priorities, organizations should consider the secure foundations their architecture and roadmap should be built on; for instance, the advanced data protection framework that keeps data systems available both in unplanned failures and planned downtime events. These frameworks should also ensure the prevention of data loss and fast recovery in case of failures. In this light, incorporating elements of Zero Trust in the IT ecosystem and ensuring the hardware infrastructure and cloud environments are secure themselves would be effective, with security software solutions and processes to secure data across environments. Key cornerstones to engage: data unification, data tech management, data privacy, data security, and technology innovation.



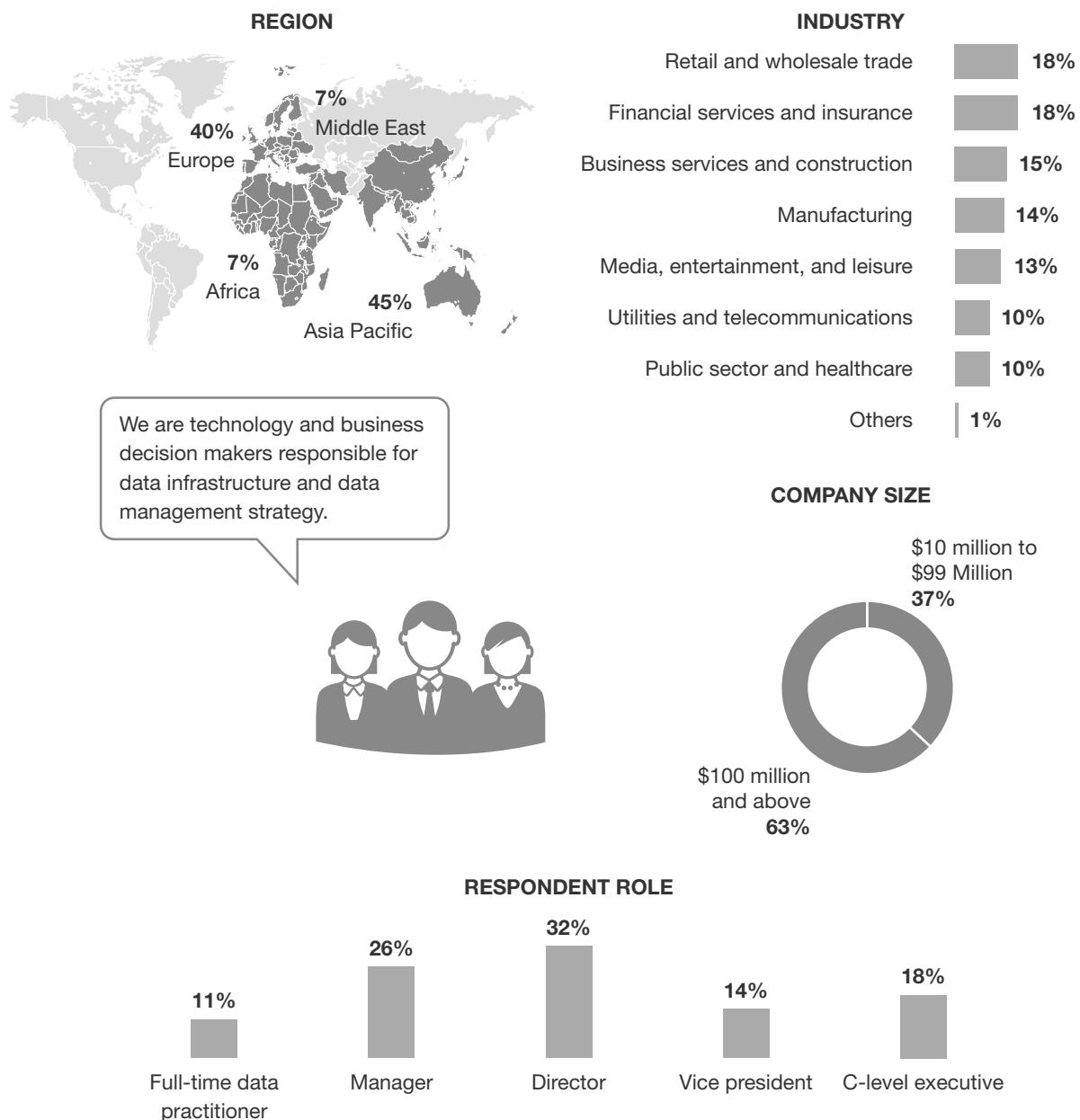
**Prioritizing options to build a holistic data strategy.** The final step in this strategic exercise resembles a road show to get stakeholders to choose from the two or three strategy options, which have been identified during the ideation step. Prioritize technology investment that address spots of low maturity but high priority, and include skills building, training, and culture and organizational change in the exercise.

In approaching the technology investments that address the gaps in data management maturity, it's important to find implementation solutions that simplify the IT environment. For instance, leveraging integrated platforms that can coexist and provide a consistent experience in a multi-hybrid-cloud world would be effective. Given the challenges that still remain in effective data management, organizations can look to their technology partnerships to build automation of governance, build end-to-end visibility across their multi-hybrid environments, and have the security foundations that are malleable to current and future data complexities. Key cornerstones to engage: data unification, data tech management, data privacy, data security, and technology innovation.

## Appendix A: Methodology

In this study, Forrester conducted an online survey of 670 business and IT decision makers in Australia, China, India, Japan, Singapore, Malaysia, Indonesia, Philippines, Vietnam, Thailand, South Korea, the UK, France, Germany, Italy, Spain, Russia, Turkey, Saudi Arabia, Bahrain, Oman, Kuwait, UAE, Nigeria, South Africa, and Kenya. Survey participants included decision makers in data management strategy. The study began in June 2019 and was completed in August 2019.

## Appendix B: Demographics/Data



Base: 670 technology and business decision makers with responsibility over data infrastructure and data management strategy  
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, August 2019

## Appendix C: Supplemental Material

### RELATED FORRESTER RESEARCH

“Four Steps To A Data Management Strategy In Light Of Big Data,” Forrester Research, Inc., November 16, 2018.

## Appendix D: Endnotes

<sup>1</sup> Source: “Predictions 2020: CIO,” Forrester Research, Inc., October 28, 2019.

<sup>2</sup> GDPR: General Data Protection Regulation; PDPA: Personal Data Protection Act.