CLOUD CONFIDENCE REPORT

451 Research®

SEAGATE

PART ONE

SECTION 1: BUILDING CLOUD CONFIDENCE

Hybrid IT has emerged as a leading strategy for deploying enterprise resources to deliver increased agility and security of applications and workloads. Within hybrid environments, data abounds in different forms and resides in a variety of locations, often with different access requirements. This complexity introduces challenges around the integration of data and applications across platforms. Organizations with a clearly defined data strategy understand that data management is a critical function in optimizing workloads in hybrid environments.

In the IT 4.0 era, automated data infrastructure, predictive artificial intelligence (AI), and Internet of Things (IoT) data analyzed near the edge of the network can enable organizations to support real-time, data-based decisions that benefit the business and the customer. Effectively reaching this state requires that an organization address advanced requirements for **data management, capacity** and **efficiency**.

SECTION 2: MASTERING MANAGEMENT, CAPACITY, AND EFFICIENCY

MANAGEMENT

Management mastery means demonstrating expertise in operating and optimizing data in a hybrid cloud infrastructure through in-house knowledge of private cloud and leveraging trusted partnerships. In this report, you will learn how to develop a data strategy that goes beyond managing data and includes recommendations to incorporate capacity planning and making data more efficient.

CAPACITY

Capacity consciousness means having a strong understanding of the data capacity needs of your organization today and a clear view into what those capacity demands will be in the future, even as your hybrid cloud infrastructure becomes more complex to meet the data-heavy demands of IT 4.0 technology like IoT and 5G.

EFFICIENCY

Efficiency expertise means your organization has built data processes and systems in your hybrid cloud environment that enable lines of business to leverage data and execute on new ideas quickly. In this report, you will learn more about how to develop a comprehensive data strategy that incorporates capacity planning and data management capabilities.

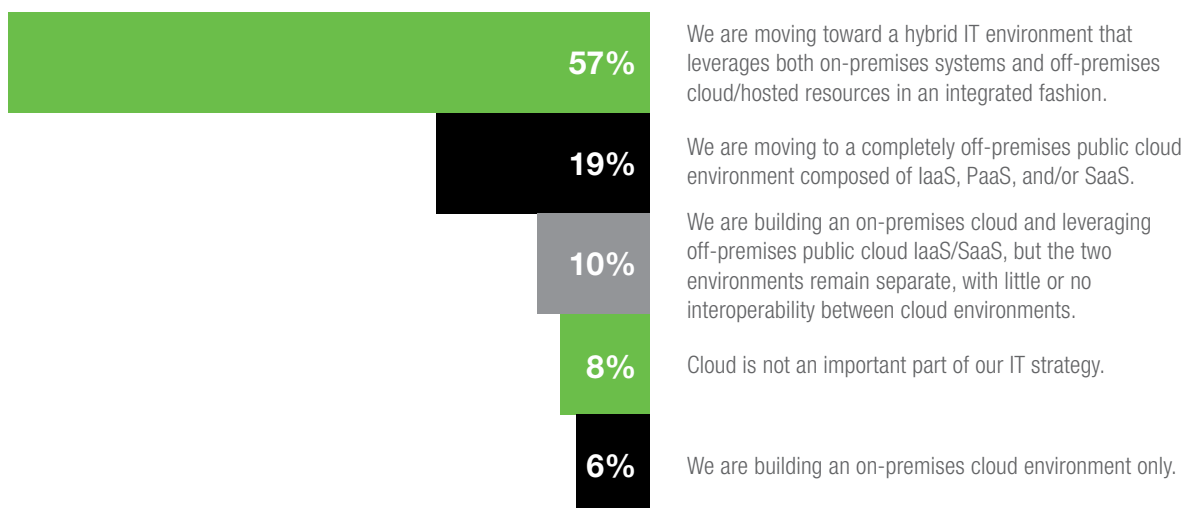## SECTION 3: CLOUD USE AND ADOPTION – TOWARD HYBRID

Organizations are increasingly reliant on a hybrid IT approach that sees workloads deployed across both on-premises and public cloud environments. A recent survey by 451 Research indicates that more than half of enterprises (57%) plan to implement hybrid cloud to integrate environments.

Many enterprises regard a hybrid strategy as the most effective means of achieving the benefits they intend from cloud adoption in general, including improvements to business agility, application availability and performance, information security, and operating cost.
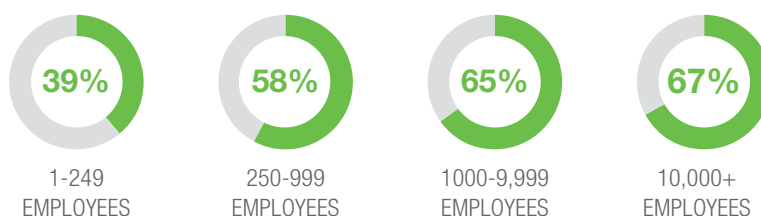
FIG. 1

The Future Is Hybrid for Most

Source: Voice of the Enterprise: Cloud, Hosting & Managed Services, Workloads and Key Projects 2019

57% — We are moving toward a hybrid IT environment that leverages both on-premises systems and off-premises cloud/hosted resources in an integrated fashion.

19% — We are moving to a completely off-premises public cloud environment composed of IaaS, PaaS, and/or SaaS.

10% — We are building an on-premises cloud and leveraging off-premises public cloud IaaS/SaaS, but the two environments remain separate, with little or no interoperability between cloud environments.

8% — Cloud is not an important part of our IT strategy.

6% — We are building an on-premises cloud environment only.

Hybrid intent by company size

39%	58%	65%	67%
1-249 EMPLOYEES	250-999 EMPLOYEES	1000-9,999 EMPLOYEES	10,000+ EMPLOYEES

Regardless of its motivations for pursuing a hybrid cloud strategy, an organization must consider not only the infrastructure component, but also the data management layer, particularly as hybrid cloud enables the creation of large volumes of data in on-premises, off-premises, and edge locations.

A comprehensive data strategy must account for the impact of 5G networks and edge computing, which will support the rapid growth of data and number of connected devices. IoT is rapidly accelerating the creation of data, and it's estimated that by 2025, 463 exabytes of data will be created each day. Mechanisms to gather, process, protect, and analyze data either in place or at a centralized location must be established, including at edge locations where data must be processed.

The business benefit of this growing pool of data is the ability to draw insights via analysis. Applications need to access data in a way that allows for businesses to move quickly to produce those insights and drive innovation. In a recent 451 Research survey, 91% of respondents said that at least some of their strategic decisions are driven by data, and 80% of respondents said data will be increasingly important to their organization 12 months from now.
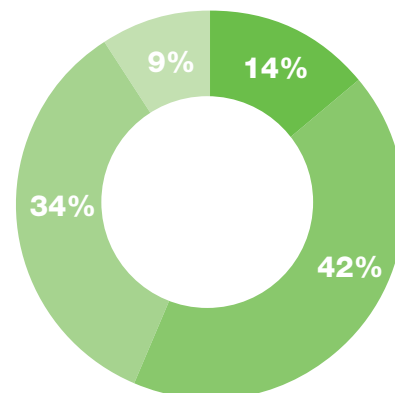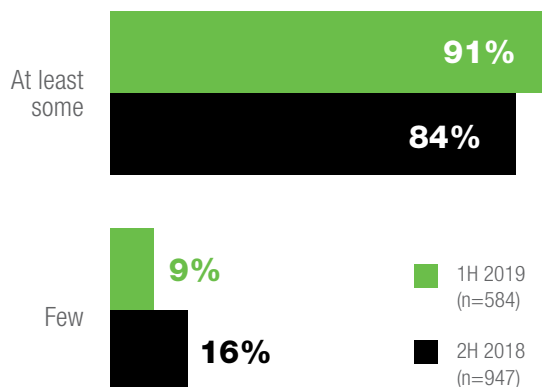
FIG. 2

Importance of Data in the Next Year

Source: 451 Research's Voice of the Enterprise: Data & Analytics, Workloads and Adoption Patterns, 1H 2019

USE OF DATA FOR STRATEGIC DECISIONS
% of respondents

91% of respondents say at least some of their strategic decisions are data-driven

At least some: 91% (1H 2019), 84% (2H 2018)
Few: 9% (1H 2019), 16% (2H 2018)

1H 2019 (n=584)
2H 2018 (n=947)

Donut chart: 14%, 42%, 34%, 9%

- Nearly all strategic decisions are data-driven
- Most strategic decisions are data-driven
- Some strategic decisions are data-driven
- Few strategic decisions are data-driven

A comprehensive data strategy that considers next-gen technology and effectively plans for management, capacity, and efficiency is necessary to successfully implement enterprise hybrid cloud environments, particularly as they become more complex.

PART TWO

SECTION 4: SIGNS YOU'RE ALREADY A MASTER

THE LOOK OF MANAGEMENT MASTERY

When your organization has mastered management, you're able to manage data across a hybrid cloud environment. You make strategic hires in your organization to gain the skills and expertise you need in-house to build and operate the private cloud components for your data requirements.

When you opt to complement the DIY approach to building private cloud by turning to trusted partners, you have a strong understanding of where these partners can add value. Specifically, partners can provide solutions and expertise that enhance compliance or security and improve performance, all significant data storage pain points for organizations.

Management masters also understand that private cloud remains the best execution venue for certain workloads and data. Many organizations continue to select on-premises environments as the execution venue of choice for relational operational databases and data warehouses due to cost, availability, and security benefits.

A study by 451 Research shows that after cost and security, application performance and platform reliability are key factors in workload placement, and companies that leverage private cloud want to be able to monitor these factors. Like your peers, you understand that visibility into infrastructure is critical in managing data across your hybrid environment.

Hybrid cloud architecture and management are specific engineering and operational challenges that many organizations struggle to solve, but your organization has developed the internal capabilities to do this effectively. You have laid the groundwork that gives your organization a firm grasp on where data resides across on-premises and off-premises environments. You also are equipped to accurately measure operating costs, which ensures full visibility into how much you are spending to process, store, and analyze data as part of your hybrid cloud strategy. These insights are delivered through a centralized dashboard that presents clear visualizations so your team can monitor how your hybrid infrastructure supports the company's data needs.

Your organization demonstrates expertise in understanding the full breadth of data in your hybrid IT environment. This visibility will be of increasing value as more data is added through connecting IoT endpoint devices and edge locations to your network, and as big-data analytics and machine learning applications produce data-heavy workloads.

Further, your organization understands the criticality of incorporating analytics that reflect the entire hybrid IT environment as an important function in ensuring that your data is organized and available to business leaders. Having a framework and organizational structure in place to deliver insights that data produces is key as data multiplies in your hybrid IT environment.

If you're a capacity-conscious organization, then you understand the full scope of your data footprint in your hybrid cloud environment. Your organization has developed internal resources with a strong focus on capacity and an explicit understanding of the future capacity demands that will come from new data that will be generated as more devices are connected to your network, creating the potential for more business insights.

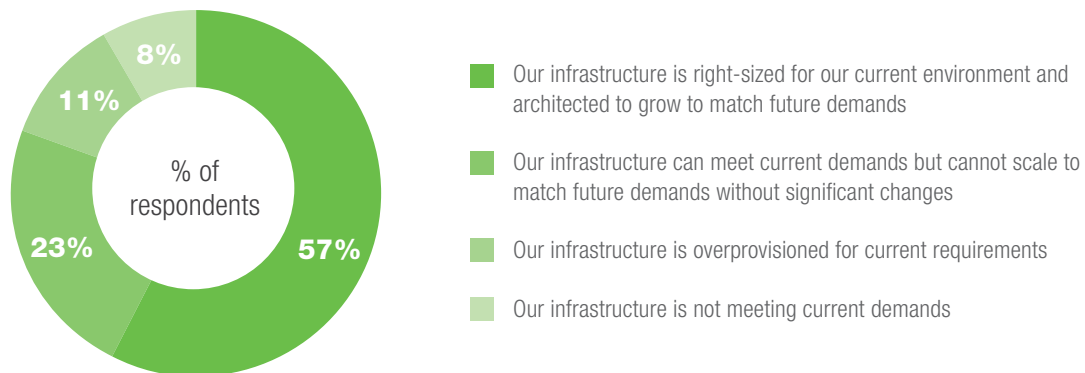Like your data-driven peers, you understand that data is essential to your business and will only grow more important in the future. However, you are equipped with infrastructure capacity that is structured to support the transformation that data will require from your business.

In a recent survey conducted by 451 Research, 57% of respondents said their infrastructure is right-sized for their current environment and ready to meet future capacity demands, while 23% are able to meet current demands but will not be equipped to meet application demands in the future.

FIG. 3

Infrastructure Ability to Meet Workload/ Application Growth Expectations

Source: Voice of the Enterprise: Storage, Workloads and Key Projects, Quarterly Advisory Report

% of respondents

8%
11%
23%
57%

■ Our infrastructure is right-sized for our current environment and architected to grow to match future demands

■ Our infrastructure can meet current demands but cannot scale to match future demands without significant changes

■ Our infrastructure is overprovisioned for current requirements

■ Our infrastructure is not meeting current demands

In addition to understanding capacity requirements, your organization has built systems and policies that allow you to retain data for as long as needed. Long-term data storage capabilities can be critical for regulatory compliance, but access to more historical data can also help your business identify patterns that help to shape your roadmap. Your organization also has the

capacity plans in place to accommodate the growth of IoT workloads. According to data from 451 Research, organizations using IoT report plans to increase related storage by 35% over the next 12 months. To support the growth of data as it is ingested from IoT endpoints, you will also have to anticipate how to set up your hybrid cloud infrastructure to support artificial intelligence and machine

learning (ML) functions for analyzing the data your organization is collecting.

With the capacity in place to meet current data requirements, and the means to increase capacity as needed, your organization also has a strong understanding of the associated costs. This means you are unlikely to suffer unexpected cost based on over-provisioning of public cloud resources, or from I/O costs associated with accessing data run in public cloud.

THE LOOK OF EFFICIENCY MASTERY

Efficiency experts build data processes and systems with a strong focus on agility, which enables innovators within your organization to bring new projects to market without unnecessary barriers to data access and creates a competitive advantage.

You have designed systems that provide users within your organization fast access to datasets, which eliminates one of the key bottlenecks associated with implementing an effective data strategy. You enable administrators to apply controls in a centralized manner, which saves time over more ad hoc approaches. Efficiency expert organizations eliminate the friction typically associated with enterprise administration of data access controls and empower business users to leverage the organizational data for analytics-driven initiatives.

Data analytics drives further efficiency improvements. In a survey by 451 Research, 55% of respondents said their data and analytics platforms have led to improvements in operational efficiency, which make it easier for business users to get the data they need, when they need it to make faster decisions that lead to business outcomes.

Your focus on efficiency is also driving benefits to your organization's bottom line.

You possess a solid understanding of what your organization's data storage costs will be in the future, enabled by systems that you have built that offer complete visibility into data, including how much it costs to store data and how that data is being accessed by business users.
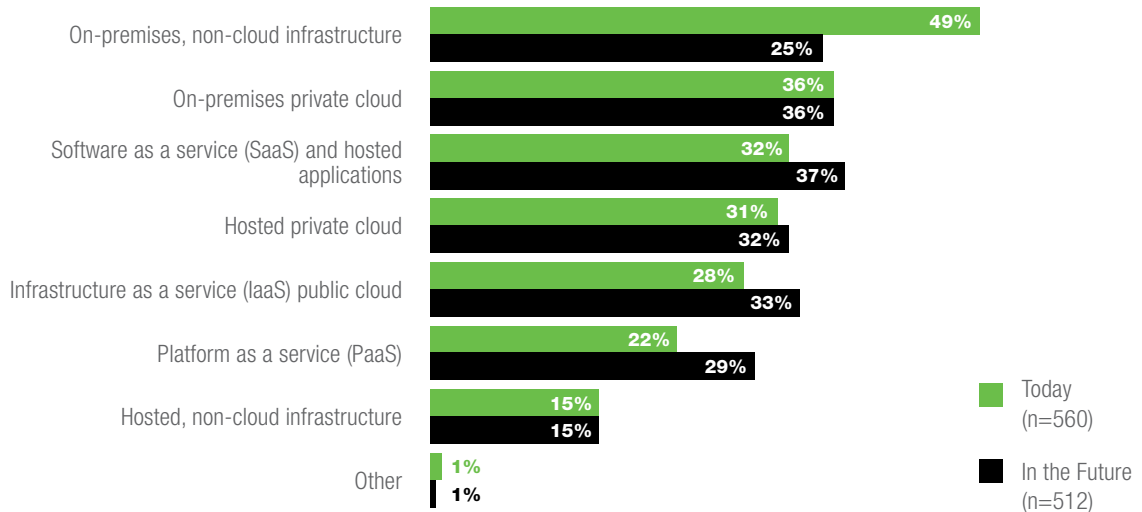
The flexible infrastructure environment you operate will make it easier to support your future data requirements. Your organization emphasizes a hybrid cloud infrastructure that supports new application development, the operation of production applications in multiple environments, and the migration of those applications to the right environments when priorities change regarding cost, performance, and security.

Many organizations are increasingly reliant on cloud infrastructure and plan to deploy data platforms and services in cloud environments in the next two years. In a recent survey by 451 Research, 49% of respondents said they deploy data platforms and services in on-premises, non-cloud infrastructure environments today. That number falls to 35% of respondents two years from now. The percentage of businesses running data platforms in SaaS, IaaS/public cloud, and PaaS environments are all expected to increase during that time.

FIG. 4

Enterprises Are Moving Data Platforms Away from Legacy Environments

Source: 451 Research's Voice of the Enterprise: Data & Analytics, Workloads and Adoption Patterns, 1H 2019

On-premises, non-cloud infrastructure
- 49%
- 25%

On-premises private cloud
- 36%
- 36%

Software as a service (SaaS) and hosted applications
- 32%
- 37%

Hosted private cloud
- 31%
- 32%

Infrastructure as a service (IaaS) public cloud
- 28%
- 33%

Platform as a service (PaaS)
- 22%
- 29%

Hosted, non-cloud infrastructure
- 15%
- 15%

Other
- 1%
- 1%

■ Today (n=560)

■ In the Future (n=512)

Your organization's skill in data efficiency is complementary to the overall benefits of hybrid cloud. Agility is one of the top reasons that organizations that consider themselves digital transformation leaders cite for using cloud infrastructure. In a survey by 451 Research, 35% of overall respondents said that agility is the top reason to use public cloud, while 45% of digital leaders said agility is the top business case for cloud.

FIG. 5

Cloud Drivers – Digital Transformation Leaders vs. Laggards

Source: 451 Research's Voice of the Enterprise: Cloud, Hosting and Managed Services, Workloads and Key Projects

Faster time to market/agility
- 45%
- 17%

■ Digital transformation leaders (n=149)

■ Digital transformation laggards (n=118)
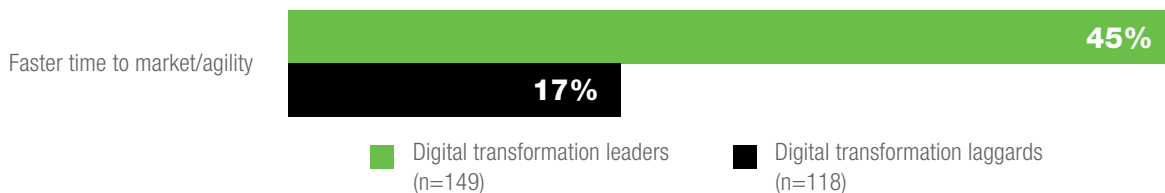
With efficiency a top priority for your organization, you have optimized data to work across your hybrid cloud environment and have built systems to eliminate roadblocks that typically hinder access to data for business users.

SECTION 5: OVERCOMING CHALLENGES AND OPTIMIZING OUTCOMES

IMPROVING YOUR MANAGEMENT PLAN

Organizations that fall into the management master category are skilled at building and operating private cloud infrastructure to support data on-premises. These organizations extend management operations beyond private cloud to ensure visibility into the full breadth of hybrid cloud systems and enable interoperability across public cloud, private cloud, and the edge. Many of these organizations have invested in developing the skills necessary to manage and operate cloud infrastructure. Management masters

that lack in-house talent are able to identify the right partners and managed services to supplement and help develop internal skill sets, and have a strong understanding of where partners can add value.

To improve your organization's capabilities around data management, ensure that you have the right tools in place that enable full visibility into hybrid cloud environments, and set up systems for creating insights into infrastructure, data location, and costs.

YOU'VE MASTERED MANAGEMENT. NOW WHAT?

Despite having demonstrated strong capabilities in building, operating, managing, and monitoring data systems and cloud infrastructure, management masters must also address a complex set of other architectural and operational requirements and build on these other areas in order to effectively implement a next-generation data strategy as part of their plans for hybrid cloud.

While data management is a critical piece, a comprehensive data strategy in a hybrid cloud environment includes other key factors

in addition to data management. A plan of action for data in the hybrid cloud context must also consider data capacity, along with factors that improve efficiency so business leaders can access the data required to make quick decisions that benefit the customer and bring a competitive edge to your organization. Data is integral to your business, and a data strategy that addresses advanced requirements for data management, capacity, and efficiency is achievable if you invest in building these capabilities.

IMPROVING YOUR CAPACITY PLAN

A capacity-conscious organization can store large volumes of data internally and keep data for as long as it is needed for compliance or business reasons. These firms have an existing architecture that means the business doesn't have to be concerned

about cost constraints or limitations associated with public cloud, such as I/O charges. These companies have internal private cloud systems that play a central role in their overall data management strategy.

Organizations that are clear on the capacity of data storage within their hybrid IT infrastructure understand the data demands of emerging technology and are prepared to ensure their private cloud environments can handle AI and machine learning use cases, which will only become more prevalent. These organizations also have the capacity to accommodate the growth of IoT workloads.

According to data from 451 Research, organizations that use IoT reported plans to increase IoT storage by 35% over the next 12 months. Organizations that have the ability to store data long term are well-equipped to meet the demands of IoT data, which in many cases must be stored for longer periods to glean historical insights or comply with industry practices or regulatory requirements.

YOU'VE MASTERED CAPACITY. NOW WHAT?

You have successfully demonstrated a focus on building out the internal capacity required to accommodate the growing production of data, the requirements for data storage, and the capacity to support the future use of that data via AI and ML efforts. Implementing an effective end-to-end data strategy will include

applying management and operational systems that will enable your organization to effectively take advantage of data and to do so quickly in order to create competitive advantage in the markets in which your company operates.

IMPROVING YOUR EFFICIENCY PLAN

Organizations that fall into the efficiency experts category are known for their business agility, having created systems that enable lines of business to deploy new applications quickly. These firms have empowered users within the business to access datasets as needed while ensuring the proper security permissions are in place. This level of efficiency is supported by flexible infrastructure and data systems that enable

new applications and support the entire application development lifecycle end to end.

Strong expertise in efficiency is only attainable with complete visibility into data systems. This visibility enables organizations to measure capacity, cost, and usage so the company is aware of how data is currently used by the business and how much it will cost to store data in the future.

YOU'VE MASTERED EFFICIENCY. NOW WHAT?

Efficiency experts have designed cloud systems that prioritize data efficiency, which enables groups within their organization to quickly access infrastructure resources and datasets. This capability arms innovators within an organization to shorten

time to market and creates potential for competitive advantage. Despite these strengths, Efficiency Experts must also address the complex requirements around data management and visibility into these systems, and effectively meet the capacity

requirements that the growth of new data will create for hybrid cloud environments.

Data will only become more important to your business. We recommend investing in developing a data strategy and capabilities that address advanced requirements spanning efficiency, data management and capacity.

SECTION 6: LOOKING AHEAD

Mastering management and efficiency will empower you to bring valuable expertise in data and hybrid IT environments that will help you be successful as the growing volume of data presents greater challenges. As you build capabilities to improve capacity and efficiency, you will be able to serve internal requirements while facing competitive pressures from external sources head-on.

The opportunities presented by IoT bring real challenges to data storage and management. In a recent 451 Research survey, respondents indicated IoT data already takes up 45% of their enterprise data storage. To serve future data needs, organizations will need to either add more storage or store less data, decisions that are only possible with full transparency into the environment.

The more capacity conscious your organization is, the better prepared you'll be to support the future capacity requirements of the growing volume of data in your hybrid cloud environment.

An incomplete data strategy means your organization will be unable to support the data needs brought forth by emerging technologies and may also run into challenges meeting compliance requirements. Hybrid IT presents an opportunity for flexibility, but only if the data in the environment is used effectively, which requires strategies for tools to gather, process, protect, and analyze data regardless of where it is stored.
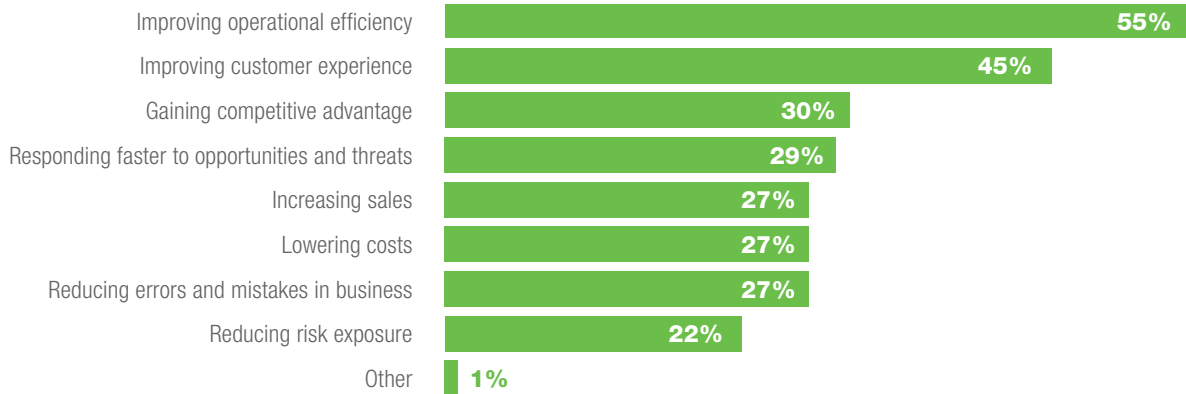
Data-driven organizations are bullish on the strategic value of data. But an effective hybrid cloud strategy must fully address requirements for efficiency, capacity, and management as well. Anything less could fail to future-proof your infrastructure investments as complexity and data volume increase.

A next-generation data strategy that delivers analytics in a hybrid cloud environment will offer benefits to your organization. A separate survey by 451 Research shows that improving operational efficiency and improving customer experience are two of the most significant benefits to organizations that use data analytics.

FIG. 6

Benefits of Using Data Analytics

Source: 451 Research's Voice of the Enterprise: Data & Analytics, Workloads and Adoption Patterns, 1H 2019

Benefit	Percentage
Improving operational efficiency	55%
Improving customer experience	45%
Gaining competitive advantage	30%
Responding faster to opportunities and threats	29%
Increasing sales	27%
Lowering costs	27%
Reducing errors and mistakes in business	27%
Reducing risk exposure	22%
Other	1%

SECTION 7: RECOMMENDATIONS

Expertise in managing data, understanding capacity, and developing data efficiency are complementary to one another. To develop a comprehensive data strategy, consider specific objectives around data operations that can benefit your hybrid cloud posture. Continue taking concrete steps that evolve your capability to manage, monitor, and store data across your hybrid cloud environment to optimize business outcomes in the IT 4.0 era.

- Outline and formalize a framework for identifying the best venues in which to store data, including systems for tiering data and applying the framework over the full lifecycle of data. Workloads and applications have different data storage needs, so your organization must develop criteria to ensure data is stored, processed, and analyzed in the best possible venue.

- Develop and create a clear understanding of the relative costs of storing and accessing data in various infrastructure environments. As your organization builds out on-premises infrastructure components of hybrid cloud, ensure cost efficiency is a key factor in this exercise. Hybrid IT supports flexibility and portability for workloads, but data costs can get out of hand if there is no transparency into the cost factor.

- Improve and harden security by making choices about hardware, software, processes, and partners that make data protection, privacy, and compliance a core consideration. In a hybrid IT environment, data must be secure within every infrastructure component and at every step, including in transit, regardless of whether it is managed on-premises by internal staff or by a trusted partner in a hosted environment.

- Continue to build a data management strategy that takes full advantage of the cost and capacity advantages presented by on-premises infrastructure components. Private cloud environments are the best execution venue for a lot of different workloads and can offer improved performance and cost efficiencies over public cloud in many cases. Knowing the specific data needs and the limitations of different infrastructure components will benefit the organization.

- Make infrastructure and hardware choices based on the criteria you have outlined in your hybrid cloud and data management strategies. Present your vision to vendors and ensure they are in alignment with the intended outcomes, relying on performance metrics to meet objectives and optimize your data.

- Rely on professional or managed services where necessary to supplement your existing capabilities and address skills gaps. Understand where you can bring in complementary skill sets that deliver support for hybrid cloud and activate knowledge transfer over time to build on internal expertise.

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