MODERNIZATION AND THE OPERATION OF HYBRID DATA ECOSYSTEMS

EMA Research for Analytics and Data Management

EMA
*IT & DATA MANAGEMENT RESEARCH,
INDUSTRY ANALYSIS & CONSULTING*

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EXECUTIVE SUMMARY

Executive Summary

Digital leaders guide their organizations on a journey toward the insight-driven enterprise, but struggle to keep up with the speed of innovation. The success of analytics in the last decade has fueled a hunger for more different kinds of data at a faster pace. Because of this hunger for insight, innovation cycles that used to be measured by decades are now measured by years or months. Business requirements continue to drive the need for new data platforms.

This research from EMA unearths trends in modernization, business and technical drivers for modernization initiatives, best practices for the operation of hybrid data ecosystems, cultural and organizational shifts that drive innovation cycles, and top requirements for interoperability and innovation.

WHY YOU SHOULD READ THIS RESEARCH
CxOs, CIOs, CDOs, CAOs, leaders, analytics leaders, IT leaders, business analysts, and line of business leaders should read this research report for the following outcomes:

- Understand the importance and urgency of technology modernization
- Identify drivers and priorities for analytics and data management modernization
- Learn best practices for the efficient operation of hybrid data ecosystems
- Plan wisely for your next series of modernization efforts

HOW TO USE THIS RESEARCH
It is important to recognize that every organization is different, with a unique set of analytic and business requirements. As such, EMA strongly recommends that each organization conduct its own market evaluation to identify solutions that will best align with the business. This research will assist with this process by providing insight on strategy development for technology modernization and hybrid data ecosystem operations.

In this research, EMA provides the following insight:

- **Trends** – EMA research identifies adoption trends and drivers for modernization and the operation of hybrid data ecosystems. Adoption trends can serve as a benchmark for your organization's maturity and as a guide for your technology capability roadmap.

- **Priorities** – EMA research identifies priorities for technology adoption in the modernization of analytics and data management. It is important to understand what matters to the market in general, and more important to understand your own priorities.

- **Drivers** – EMA research identifies the overall drivers for analytic technology modernization and the adoption of hybrid data ecosystems. Combine this research data with your own business requirements to better understand how to move forward with data platform expansion or consolidation.

- **Best Practices** – EMA research identifies best practices around the operation of hybrid data ecosystems, with a drilldown into the emerging category of DataOps. Use this research to identify possible ways to streamline and accelerate analytics delivery.

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INTRODUCTION TO MODERNIZATION AND HYBRID DATA ECOSYSTEMS

Introduction to Modernization and Hybrid Data Ecosystems

Digital transformation is creating data at a pace faster than it can be consumed. The result is increasingly complex information systems to handle a diversity of data types and analytics. As companies modernize to pursue insight-driven strategies, it becomes vital to find ways to connect and operate in multiplatform environments. New technology emerged across the entire insight supply chain to abstract away underlying complexity. This created a shift from data management to interoperability, data pipelines, and the API economy. Another shift occurred from business intelligence and analytics to automated and assisted insight. Shifts are occurring across every category of analytics.

Because of the digital shift, traditional methods and tools created over the past two decades are now producing questionable results. The modernization movement emerged ten years ago with a slow, incremental approach. Today, insight-driven companies have accelerated the pace of modernization and need to adopt continual innovation programs to keep up with the competition. Cycles of innovation have gone from several years to several months.

At the same time, the entire data technology landscape has changed. Modern data integration is now enabling largescale interoperability, hyperspeed, and simplified management of complex, multidirectional data pipelines. Modern data warehouses now support delivery acceleration, agility, elasticity, extensibility, interoperability, unified security, performance, deep analytics, and multi-model adaptability. Modern business intelligence, analytics, and AI are all blending together around self-service and the automation of almost every aspect of data exploration and explanation formerly driven by human interaction.

WHAT IS MODERNIZATION?

The speed of disruption and innovation creates a competitive climate that requires continual advancement of analytics and data management technology. The failure to keep up with competitors' analytic prowess can have drastic consequences. Modernization

is the continual advancement of analytics and data management technology necessary to attain and sustain competitive advantage.

For example, an insight-driven organization might move to modern analytics platforms to accelerate the delivery of analytic applications for more business areas. To simplify the processing and analysis of semi-structured data, others are moving to modern big data platforms in the cloud. AI-enabled data integration and preparation platforms are changing the speed at which data is readied for analytics and the volume of data being processed. Automation and real-time engagement are driving new capabilities in business intelligence and metadata management platforms.

MODERNIZATION HIGHLIGHTS

- Analytics remains the #1 target for modernization as a priority for 48% of participants

- Both executives and business professionals have big data platforms on their radar as a priority for modernization

- 52% of participants want to modernize data integration and preparation by moving to the cloud

- Automation is the #1 priority for the modernization of data warehouses and big data platforms

- Real-time analytics tops the list of priorities for business intelligence platform modernization

- Almost 4 out of 10 respondents prioritize the automation of metadata ingestion in order to speed time to insight

- Executives remain surprisingly cautious on moving analytics programs to the cloud

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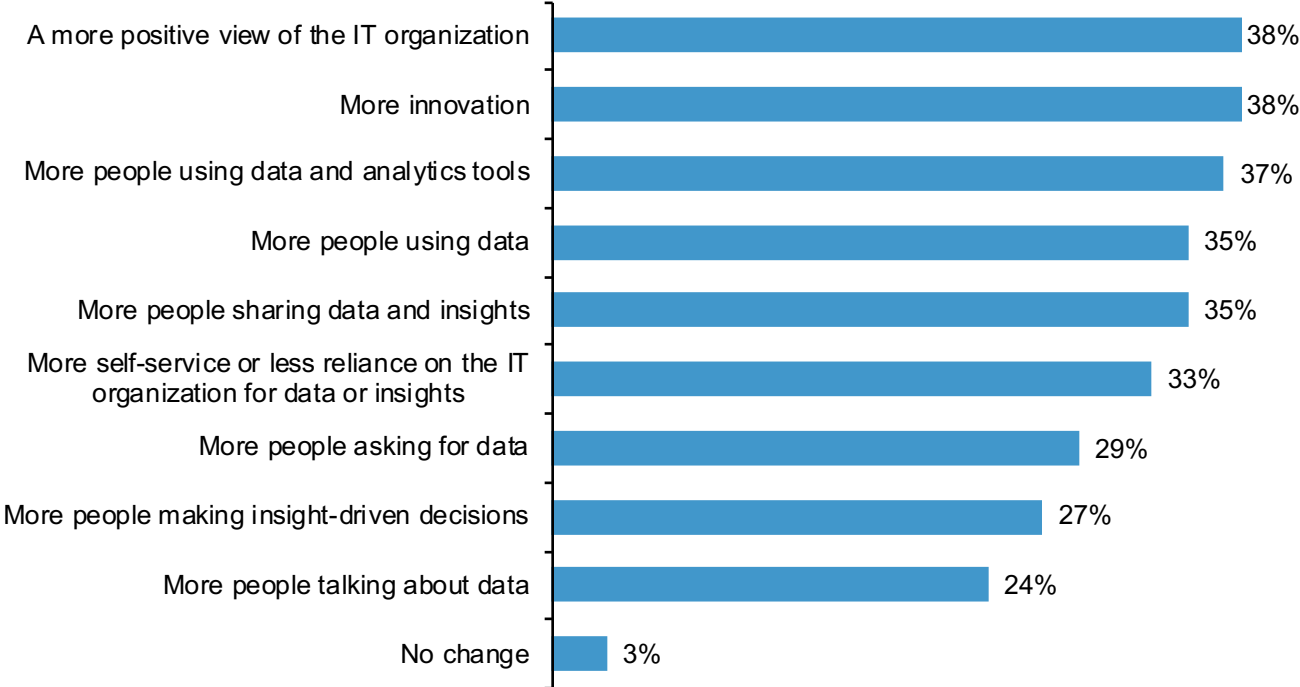# Introduction to Modernization and Hybrid Data Ecosystems

THE CULTURAL IMPACT OF MODERNIZATION

Organizations engaged in modernization are seeing positive cultural shifts and progress toward more insight-driven decisions as a result of their activities. The most significant impact of modernization is a more positive view of the IT organization, with 38% of participants indicating a shift in this direction. This perspective is more prominent among business professionals than in IT. Forty-eight percent of business professionals see the positive change, while only 31% of IT professionals see the change.

Likewise, with a 38% response rate, respondents are seeing an increase in innovation. There also seems to be a trend toward more analytic activity. More people are utilizing data and analytics tools, using data, and sharing insight. In short, investments in modernization are paying off.

WHAT CULTURAL CHANGES ARE YOU SEEING IN YOUR ORGANIZATION AS A RESULT OF MODERNIZATION, A HYBRID DATA ECOSYSTEM, AND DATAOPS?

Cultural Change	Percentage
A more positive view of the IT organization	38%
More innovation	38%
More people using data and analytics tools	37%
More people using data	35%
More people sharing data and insights	35%
More self-service or less reliance on the IT organization for data or insights	33%
More people asking for data	29%
More people making insight-driven decisions	27%
More people talking about data	24%
No change	3%

#1
2019

IMPACT OF MODERNIZATION

A more positive view of the IT organization.

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Introduction to Modernization and Hybrid Data Ecosystems

From the IT perspective, the number-one impact of modernization is more innovation, with 40% of IT participants seeing this as positive change. New analytics technology enables innovation because of new capabilities in the products and because of time savings that free up resources to work on more innovative projects.

40%
OF IT PARTICIPANTS SAY MORE INNOVATION IS A POSITIVE CHANGE

WHAT CULTURAL CHANGES ARE YOU SEEING IN YOUR ORGANIZATION AS A RESULT OF MODERNIZATION, A HYBRID DATA ECOSYSTEM, AND DATAOPS?

Cultural Change	Technical	Business
More innovation	40%	34%
More people sharing data and insights	39%	30%
More people using data and analytics tools	37%	37%
More people using data	33%	37%
More self-service or less reliance on the IT organization for data or insights	32%	36%
A more positive view of the IT organization	31%	48%
More people making insight-driven decisions	28%	24%
More people asking for data	27%	32%
More people talking about data	22%	24%
No change	3%	3%

■ Technical ■ Business

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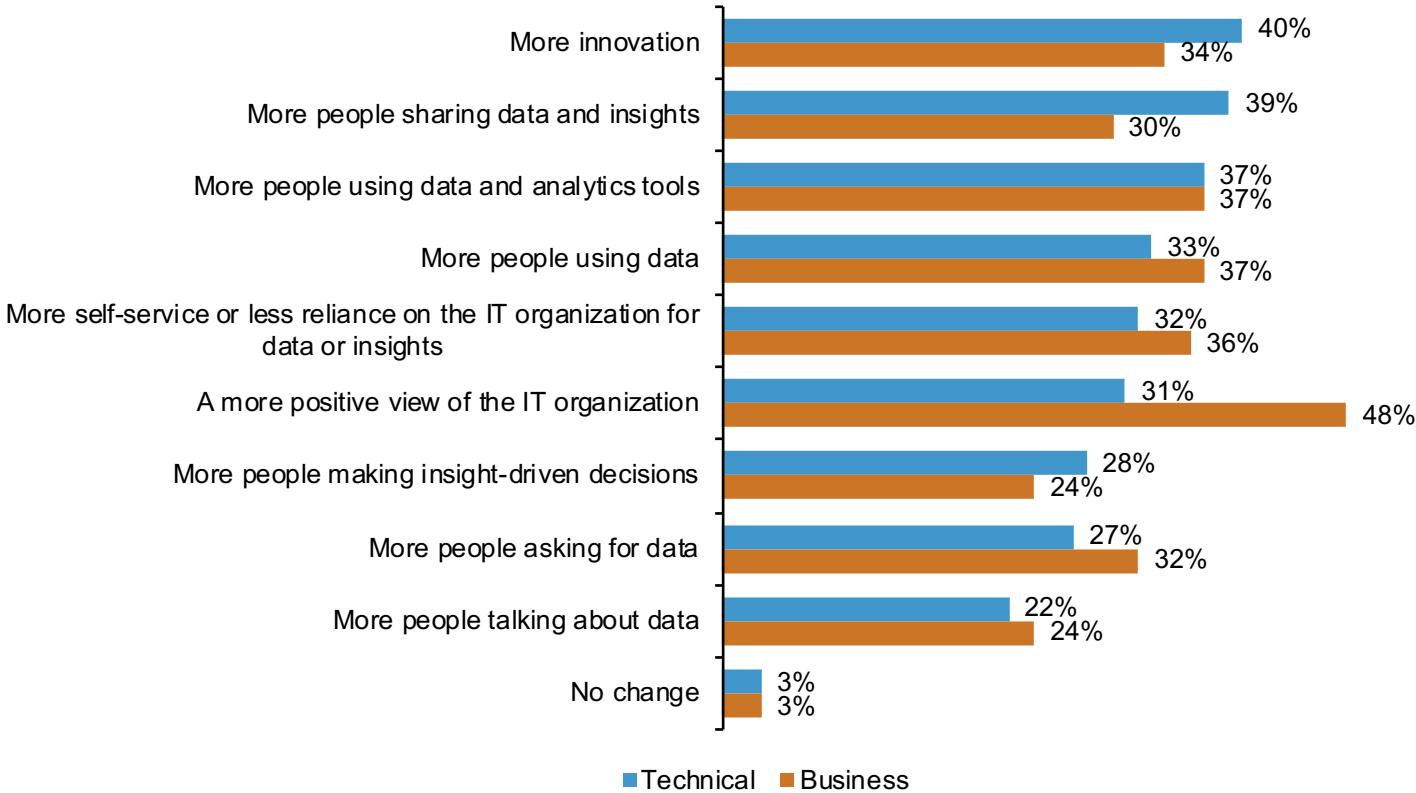
Introduction to Modernization and Hybrid Data Ecosystems
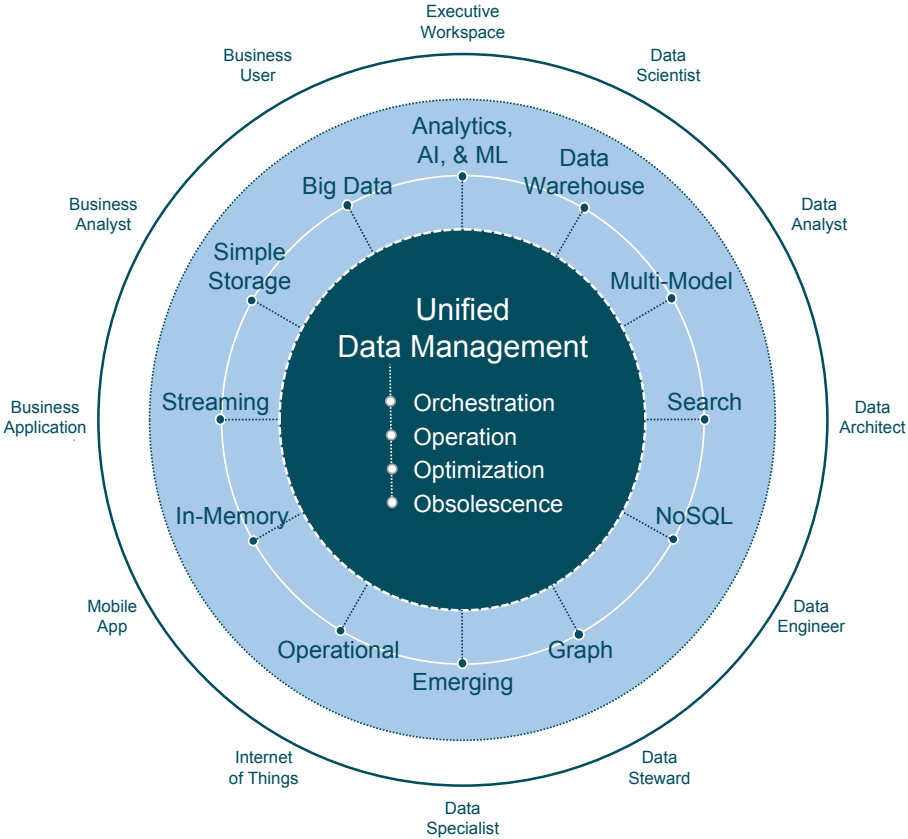
WHAT IS A HYBRID DATA ECOSYSTEM?

One single platform that is designed to handle all the different digital workloads required by the business ecosystems does not exist. In the real world, most organizations operate two to eight different platforms. For large organizations, critical platforms like analytical databases can have more than 700 instances. A hybrid data ecosystem (HDE) is the full set of various platforms an entity manages.

For example, an insight-driven entity might run critical applications on operational databases and their mobile or internet apps on NoSQL distributed databases. Multifaceted analytics and business intelligence programs require a combination of analytic databases, data warehouse platforms, and big data platforms. Because of cost constraints, IT leaders are moving data onto simple storage or deploying multi-model platforms for consolidation. In order to facilitate intelligent responses to real-time engagement, search platforms speed the discovery of insight and streaming platforms become the data nervous systems of HDEs for both integration and analytics. In-memory databases are changing the entire emerging data landscape with multi-use capabilities. Emerging platforms address specialized use cases, like graph databases for analyzing networks of networks and complex ecosystems like markets or the human body.

MOST ORGANIZATIONS OPERATE 2-8 DIFFERENT PLATFORMS AND HUNDREDS OF INSTANCES IN THEIR HYBRID DATA ECOSYSTEM.

Modernization and the Operation of Hybrid Data Ecosystems: EMA Research for Analytics and Data Management

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Introduction to Modernization and Hybrid Data Ecosystems

Developed, refined, and supported with end-user insights since 2012, the EMA hybrid data ecosystem architecture provides guidance for insight-driven organizations. In order to achieve deep interoperability, EMA recommends working toward a unified data management strategy, represented in the center of the diagram.

- Orchestration defines how to acquire, prepare, provision, and adapt data for consistent use across the entire data landscape.

- Operation is the delivery, administration, security, availability, and automation of all platforms within the ecosystem.

- Optimization is the process of continually improving operations and orchestration.

- Obsolescence is the means by which legacy systems reach end of life migrate to new systems.

Surrounding unified data management are the HDE data platforms, including space for emerging data platforms. Shared workspace includes data access via a broad range of end-user platforms, not mentioned in this research. Additionally, between the data and users is technology for data security and privacy, collaboration, storytelling, and sharing insight.

The most important part of an HDE is outside the technology circle: the consumers. These are the people, processes, and machines that utilize the information resident within an HDE. Development of new services takes place from the outside in, with business requirements driving all portfolio management. Delivery takes place from the inside out, with technology innovation leading the way.

HYBRID DATA ECOSYSTEM HIGHLIGHTS

- 38% of participants have 4-8 platforms in their hybrid data ecosystem

- 55% of participants are expanding to add more platforms in the next 12 months

- Analytic and data warehouse platforms are the #1 and #2 platforms in HDEs

- 33% of participants are adding big data platforms in the next 12 months

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MODERNIZATION TRENDS

Modernization Trends

MODERNIZATION PRIORITIES

OVERALL ANALYTICS AND DATA MANAGEMENT PRIORITIES

Analytics and data warehousing continue to be top priorities for modernization, indicating that analytics are core to the business and data warehousing has become a trusted source for mission-critical analytics. Both analytic and data warehouse platforms have been in place in older organizations since the 1990s and in new organizations since their inception. Modernization is well underway and continues to be a priority.

WHICH OF THE FOLLOWING TECHNOLOGIES ARE IMPORTANT TO YOUR MODERNIZATION EFFORTS?

Analytics 48%	Data Integration for Data (ETL, ELT) 38%	Data Warehouse or Infrastructure Automation 36%	Data Preparation 34%	Big Data Platforms (Hadoop, Spark, etc.) 34%
Analytic Databases 44%	Business Intelligence 38%	Data Science 34%	SQL Databases 33%	Data Integration for APIs 31% · Data Cataloguing/Reference Data Management 31%
Data Warehousing 42%	Artificial Intelligence 38%	Master Data Management 34%	Data Governance 31% · Simple Storage (Amazon S3, etc.) 29%	Machine Learning 29% · NoSQL Databases 15%

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Modernization Trends

DATA WAREHOUSE AND BIG DATA PLATFORM PRIORITIES

Data warehouse modernization has been in motion since the late 2000s when Gartner's Mark Beyer began talking about the need to move on from monolithic, highly processed data storage. Since then, the traditional data warehouse merged with data lakes and simple storage to optimize cost without compromising performance. Modernization continues to be a top concern for both IT and business, with innovation constantly changing the data landscape.

Out of 12 modern data warehouse capabilities, the top seven capabilities were validated as important by approximately one-third of all participants. The spread between the top seven was tight, ranging from 30-35%. These close scores for a high number of capabilities signify a speed of innovation that is not present in other analytics and data management technology areas.

Data warehouse and data lake automation top the list as the most important aspect of modernization in 2019, with support from both business and IT. Automation offerings currently exist in three focus areas: data warehousing, data lakes, and IT process automation. There is an opportunity for partnerships and consolidation among these three automation camps. In 2019, customers will demand a more integrated automation solution.

TOP7

The top seven modern data warehouse and big data capabilities have a spread of only 5 percentage points, indicating rapid innovation in this area.

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Modernization Trends

Automation
35%

Support for a variety of data
34%

Analytics embedded in the data platform
32%

Multidimensional agility (new data, new queries, new users, etc.)
32%

Unified security and privacy
32%

Multi-workload support (operational, analytical, streaming, etc.)
32%

Delivery acceleration
29%

Automated performance tuning
25%

Interoperability with other platforms and applications
30%

Automated documentation
25%

Multi-model adaptability
23%

Elasticity
15%
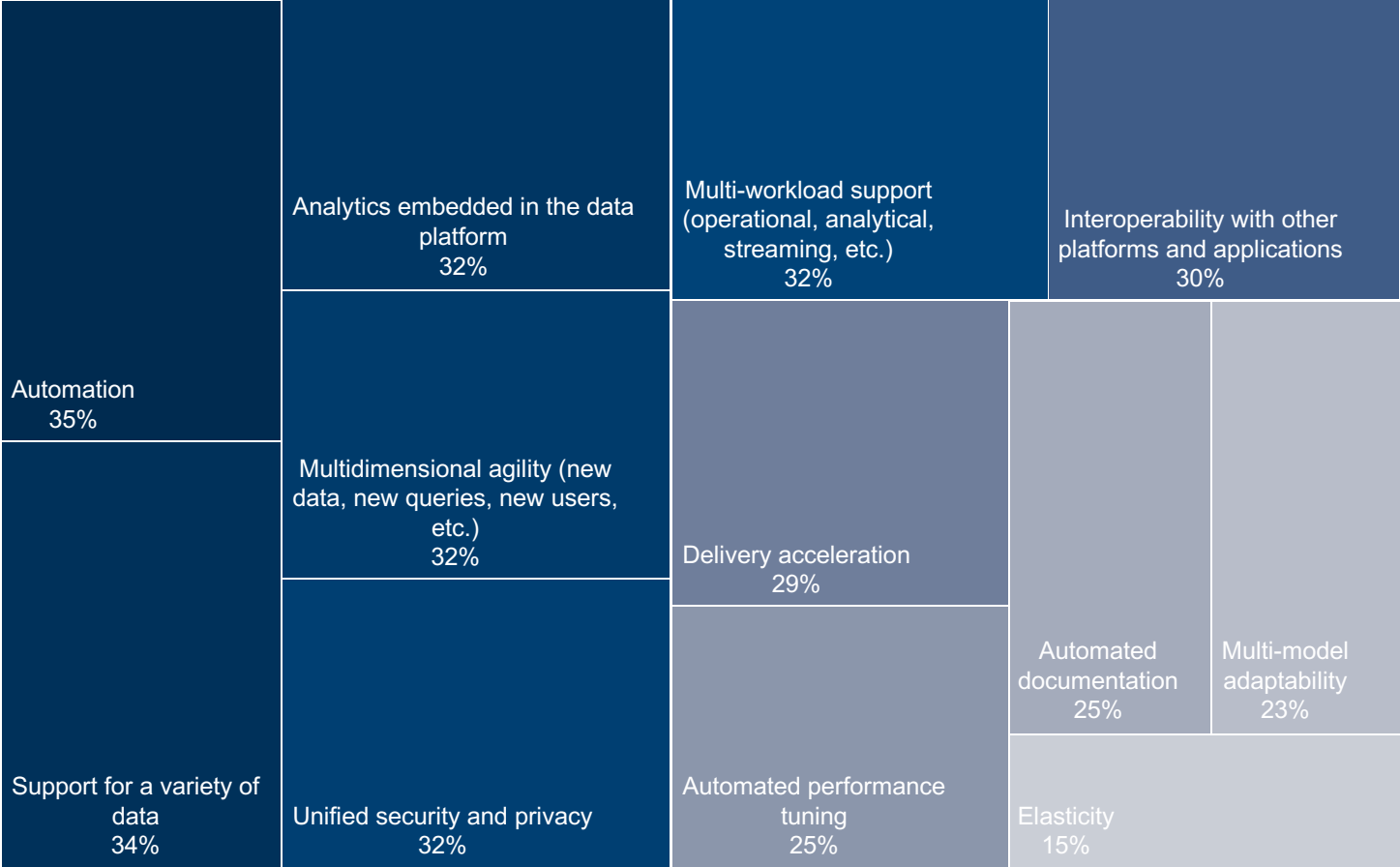
Modernization Trends

CLOUD ANALYTICS AND DATA MANAGEMENT PRIORITIES

In the recent EMA research, "Data Lakes for Business," 87.4% of respondents indicated that the cloud was a strategic component for their big data programs. However, this HDE research indicates that only a very small percentage (14%) are looking to move all analytics and data management to the cloud. On the flip side, almost half of all participants in this research indicated that they want to keep a significant portion 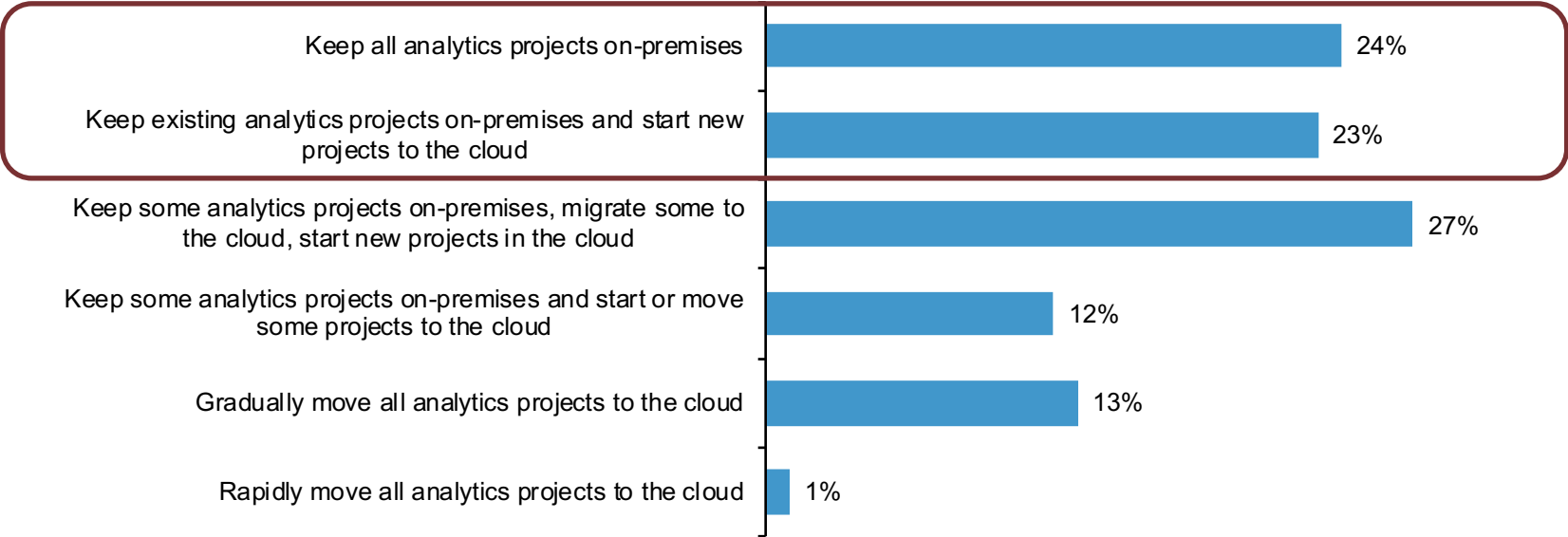of their analytics on-premises. Because of these two points on cloud adoption, EMA stresses the importance of hybrid cloud analytics solutions.

47%

With 47% of all participants keeping a significant portion of their analytics on-premises, hybrid cloud analytics solutions are vital.

WHICH OF THE FOLLOWING BEST DESCRIBES YOUR CLOUD STRATEGY AS IT RELATES TO MODERNIZATION OF ANALYTICS AND DATA MANAGEMENT?

Keep all analytics projects on-premises	24%
Keep existing analytics projects on-premises and start new projects to the cloud	23%
Keep some analytics projects on-premises, migrate some to the cloud, start new projects in the cloud	27%
Keep some analytics projects on-premises and start or move some projects to the cloud	12%
Gradually move all analytics projects to the cloud	13%
Rapidly move all analytics projects to the cloud	1%

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Modernization Trends

MODERNIZATION DRIVERS

To better understand modernization, EMA asked participants about the most important drivers behind their modernization efforts. The number-one answer was "cost savings," followed by "increased innovation" and "time savings." Motivation for modernization boils down to time and money. Modern technology enables organizations to save time and money compared to their legacy systems. These savings enable organizations to invest more in innovation and innovate at faster speeds. All three of these drivers provide organizations with a competitive advantage, the fourth-place answer in the research.

EMA recommends that organizations manage their modernization effort as a portfolio and measure projects against actual time and cost savings. To measure innovation, new projects can be measured in service delivery terms, such as mean time to delivery or mean time to insight.
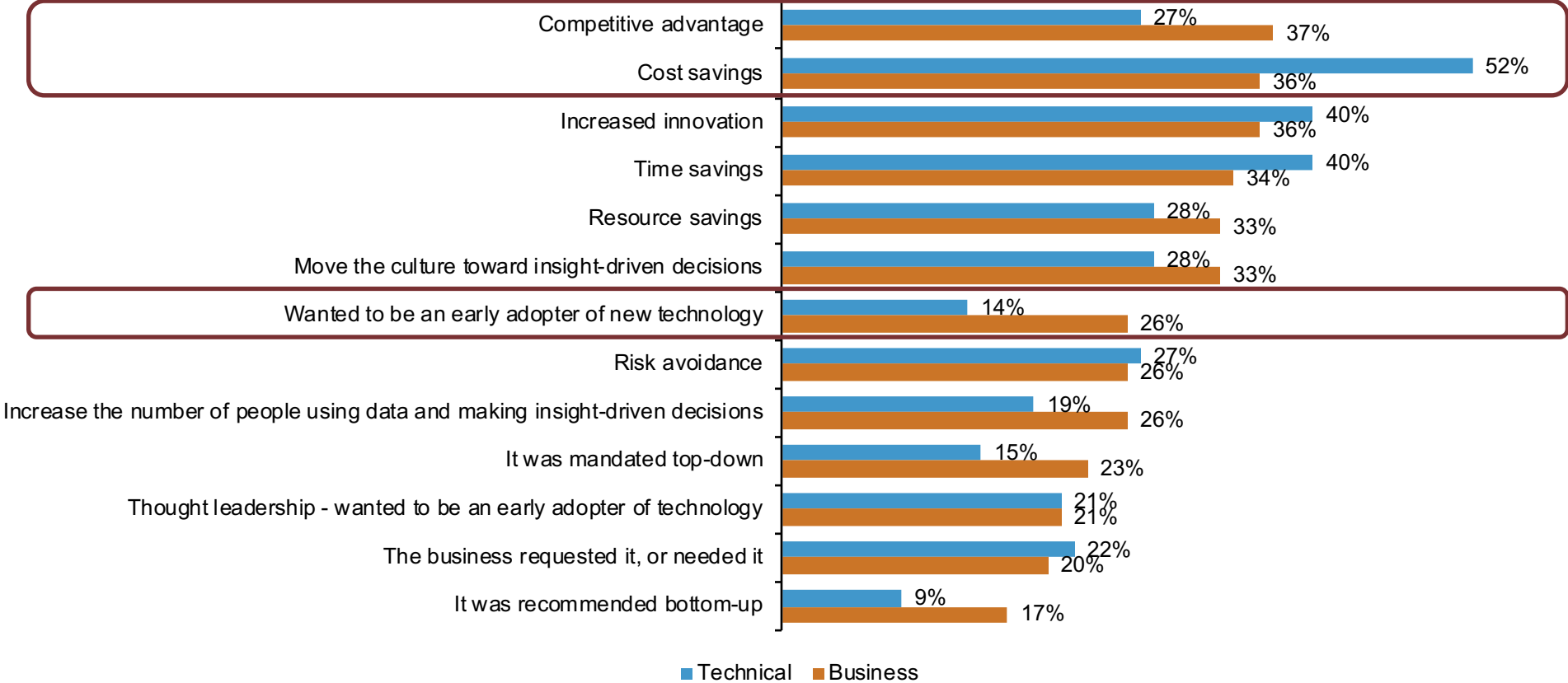
COST, TIME, AND INNOVATION ARE THE PRIMARY DRIVERS BEHIND MODERNIZATION.

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Modernization Trends

While the end result is the same, there is a small, but significant, divide between what matters most to the business and to IT. Cost savings primarily drive IT. The number-one driver for business is competitive advantage. More than half of IT participants (52%) selected cost savings as a top driver. Thirty-seven percent of business participants selected competitive advantage as a top driver.

Also, while there is agreement on the importance of innovation as a driver for modernization, EMA believes IT and business professionals practice and think of innovation differently. IT innovation focuses on the use of technology, while business innovation focuses on the development of new products and business models.

WHAT ARE THE MOST IMPORTANT DRIVERS BEHIND YOUR MODERNIZATION EFFORTS?

Driver	Technical	Business
Competitive advantage	27%	37%
Cost savings	52%	36%
Increased innovation	40%	36%
Time savings	40%	34%
Resource savings	28%	33%
Move the culture toward insight-driven decisions	28%	33%
Wanted to be an early adopter of new technology	14%	26%
Risk avoidance	27%	26%
Increase the number of people using data and making insight-driven decisions	19%	26%
It was mandated top-down	15%	23%
Thought leadership - wanted to be an early adopter of technology	21%	21%
The business requested it, or needed it	22%	20%
It was recommended bottom-up	9%	17%

■ Technical ■ Business

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HYBRID DATA
ECOSYSTEM TRENDS

Hybrid Data Ecosystem Trends

38%
of participants have 4-8 platforms in the hybrid data ecosystem.

HDE COMPOSITION

The need to better understand new types of data that were not well-supported in relational databases drove much of the initial phase of modernization. As a result, many organizations added new data platforms, like Apache Hadoop and Spark, to their technology environments. New data was followed by more advanced analytic algorithms and the embedding of analytics in mobile and internet applications. Both moves required the addition of new platforms, and each new platform added both cost and complexity.

How many different platforms do organizations have in their data centers? Forty-seven percent of participants indicated that they currently have 2-3 platforms in their hybrid data ecosystem. Thirty-eight percent indicated that they currently have 4-8 platforms.

Is this number growing? EMA asked participants how many platforms they planned to have in the next 12 months. The results show that there is a continual move toward more platforms. Participants with 4 to 8 platforms grew from 38% to 42%. Participants with 9+ platforms grew from 5%-8%.

HOW MANY DIFFERENT PLATFORMS DO YOU CURRENTLY HAVE IN YOUR DATA ECOSYSTEM?

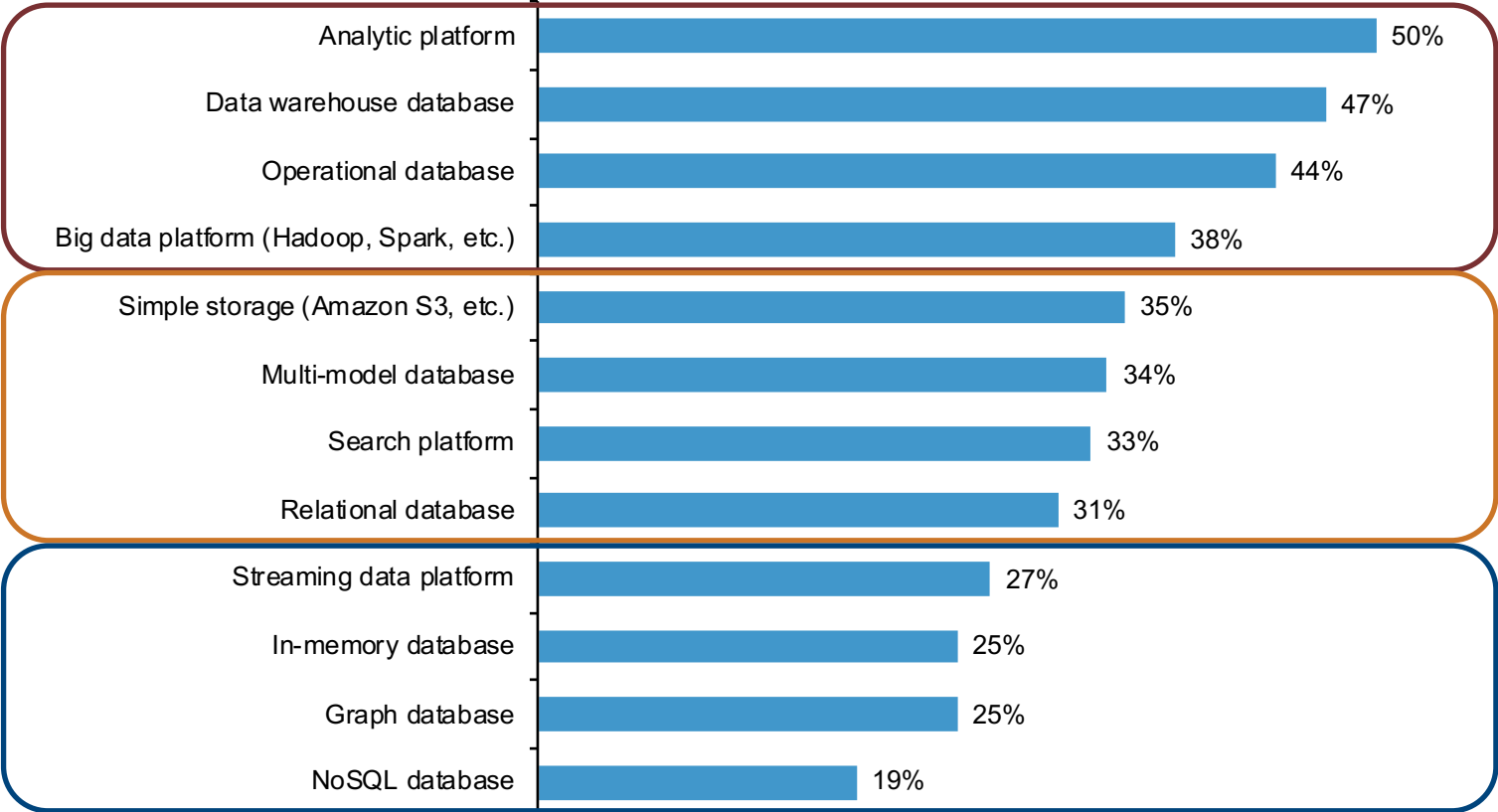| Platforms	Current	Next 12 Months
1	8%	8%
2 to 3	47%	40%
4 to 8	38%	42%
9+	5%	8%

■ Current ■ Next 12 Months

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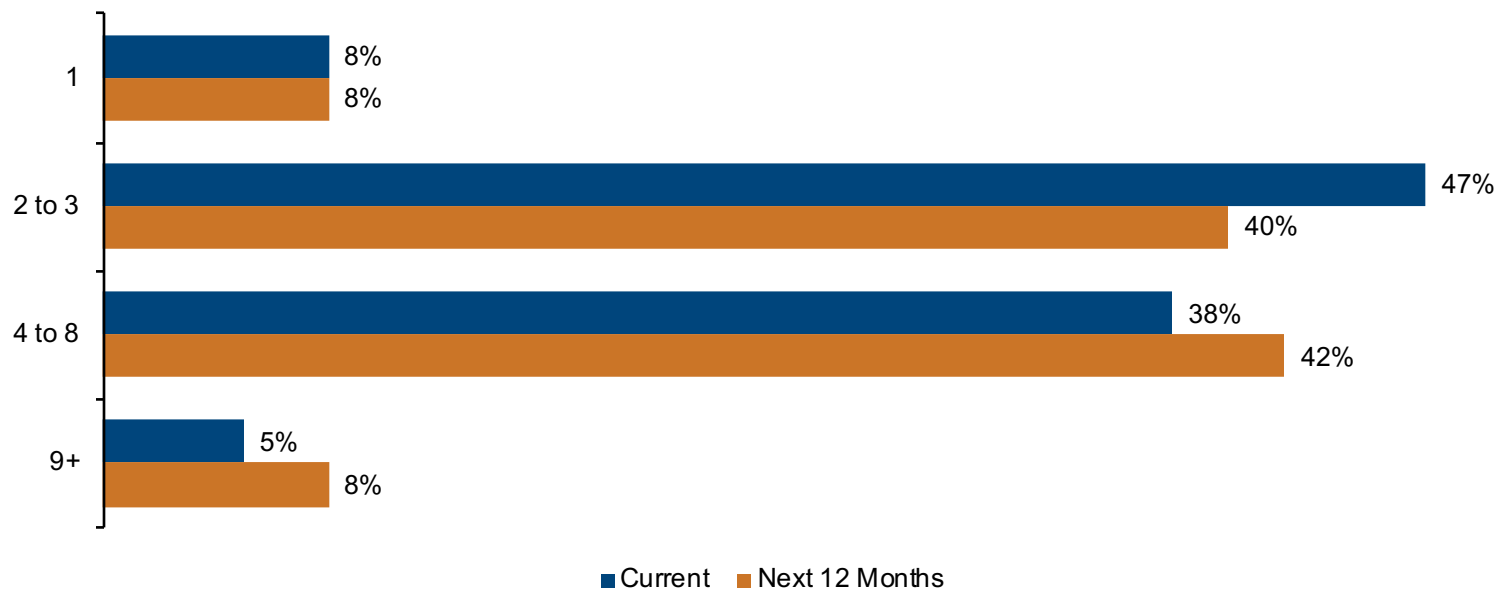
Hybrid Data Ecosystem Trends

When looking at platforms currently in hybrid data ecosystems, there is a natural breakdown of those platforms into three categories: strong adoption, moderate adoption, and early adoption. Platforms with strong adoption, 38% to 50%, include analytic platforms, data warehouse databases, operational databases, and big data platforms like Hadoop and Spark. There

is moderate adoption, 31% to 35%, for simple storage, multi-model databases, search platforms, and relational databases. Platforms with early adoption, 19%-27%, include streaming data platforms, in-memory databases, graph databases, and NoSQL databases.

WHICH OF THE FOLLOWING DATA PLATFORMS DO YOU CURRENTLY HAVE IN YOUR DATA ECOSYSTEM?

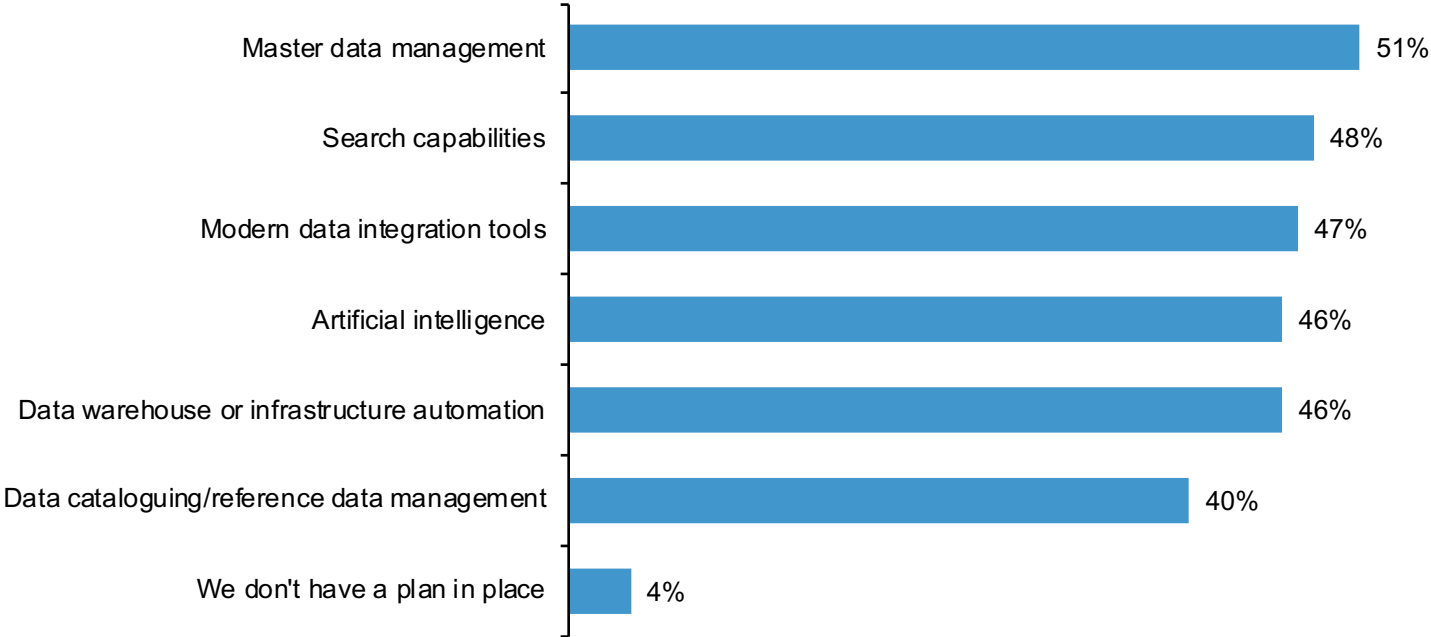| Platform	Percentage
Analytic platform	50%
Data warehouse database	47%
Operational database	44%
Big data platform (Hadoop, Spark, etc.)	38%
Simple storage (Amazon S3, etc.)	35%
Multi-model database	34%
Search platform	33%
Relational database	31%
Streaming data platform	27%
In-memory database	25%
Graph database	25%
NoSQL database	19%

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Hybrid Data Ecosystem Trends

BEST PRACTICE FOR EXPANSION

HDE expansion requires several tools for efficient operations.

Because of the intricacies of bringing new platforms into a hybrid data ecosystem, there is not one single approach to managing new complications. EMA asked participants how they were planning on managing their expansion. There was a high concentration of respondents in all six choices. This consistency indicates that HDE expansion drivers are multifaceted. Insight-driven organizations adopt several different approaches to managing the complexity of HDEs. Therefore, the results show high adoption for master data management, search, modern data integration, AI, data warehouse or infrastructure automation, data cataloguing, and reference data management.

51%
of participants of participants plan to use master data management to manage the expanding complexity of HDEs.

IF YOUR DATA ECOSYSTEM STRATEGY IS TO EXPAND AND ADD MORE DATA PLATFORMS, HOW DO YOU PLAN ON MANAGING THE EXPANDING COMPLEXITY OF YOUR ENVIRONMENT?

Category	Percent
Master data management	51%
Search capabilities	48%
Modern data integration tools	47%
Artificial intelligence	46%
Data warehouse or infrastructure automation	46%
Data cataloguing/reference data management	40%
We don't have a plan in place	4%

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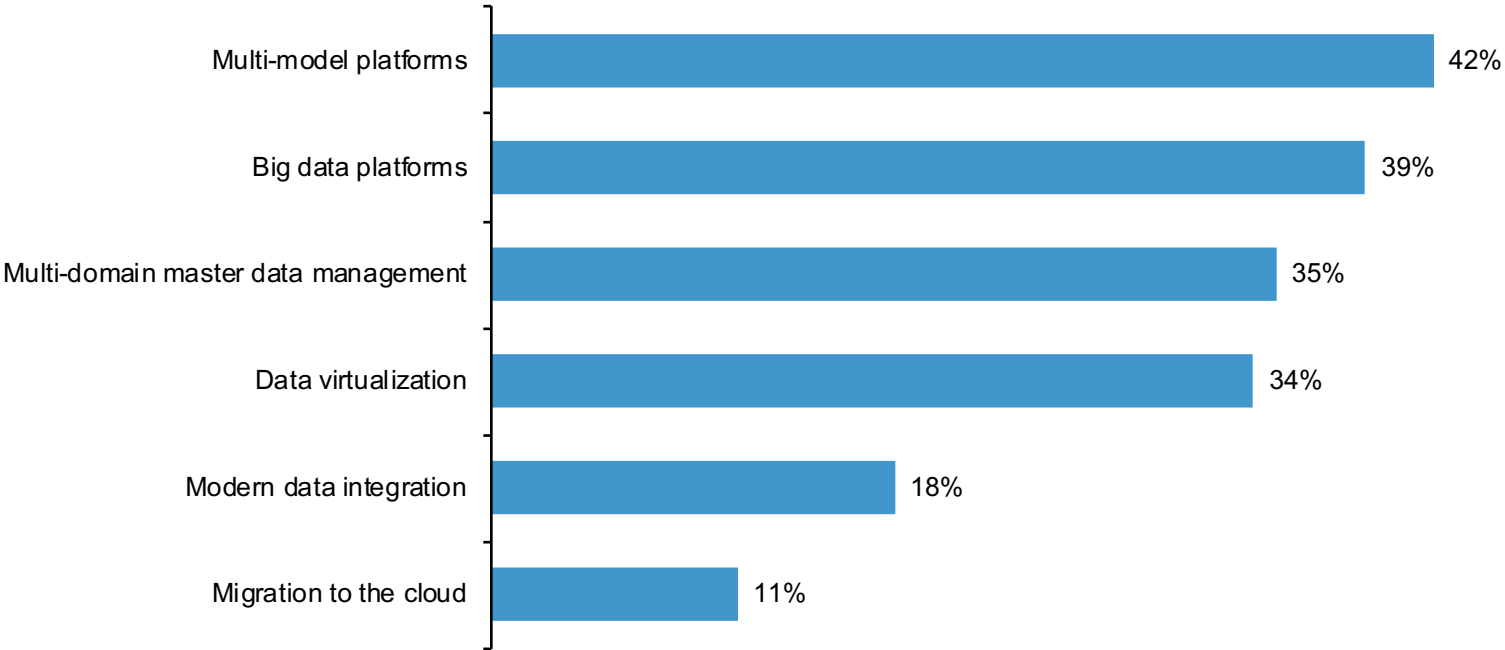# Hybrid Data Ecosystem Trends

BEST PRACTICES FOR CONSOLIDATION

1. Choose both a platform and data strategy to consolidate legacy systems.

Multi-model platforms like in-memory databases and big data platforms based on Apache Hadoop and Apache Spark are the primary choices for consolidation, with 42% and 39%,

respectively. Not far behind, with 35% and 34%, are master data management and data virtualization. They showed strongly as secondary choices for consolidation.

EMA recommends that insight-driven organizations consolidate with both platform and data strategies.

IF YOUR DATA ECOSYSTEM STRATEGY IS TO CONSOLIDATE AND REDUCE THE NUMBER OF DATA PLATFORMS, HOW DO YOU PLAN TO CONSOLIDATE?

Category	Percentage
Multi-model platforms	42%
Big data platforms	39%
Multi-domain master data management	35%
Data virtualization	34%
Modern data integration	18%
Migration to the cloud	11%

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Hybrid Data Ecosystem Trends

2. Begin planning for the adoption of multi-model platforms.

Because of the rising adoption of multi-use and multi-model platforms, EMA also asked participants about the likelihood of using these innovative platforms. A surprising 99% said they would likely use these platforms, with almost half of respondents indicating they are highly likely to consider their use.

99%
of consolidation respondents indicated they are likely to use multi-use or multi-model platforms to consolidate their hybrid data ecosystems.

AS MULTI-USE AND MULTI-MODEL PLATFORMS GROW IN MARKET ACCEPTANCE, HOW LIKELY ARE YOU TO CONSIDER USING THESE PLATFORMS TO CONSOLIDATE YOUR DATA ECOSYSTEM?

Not likely
1%

Likely
26%

Certain
25%

Very likely
48%

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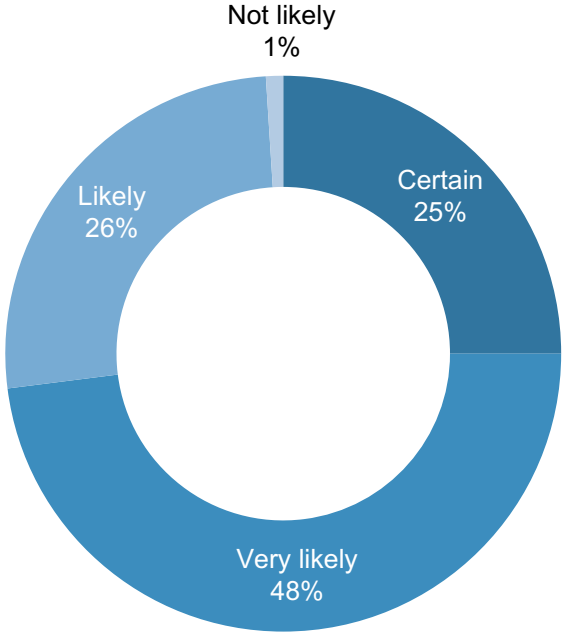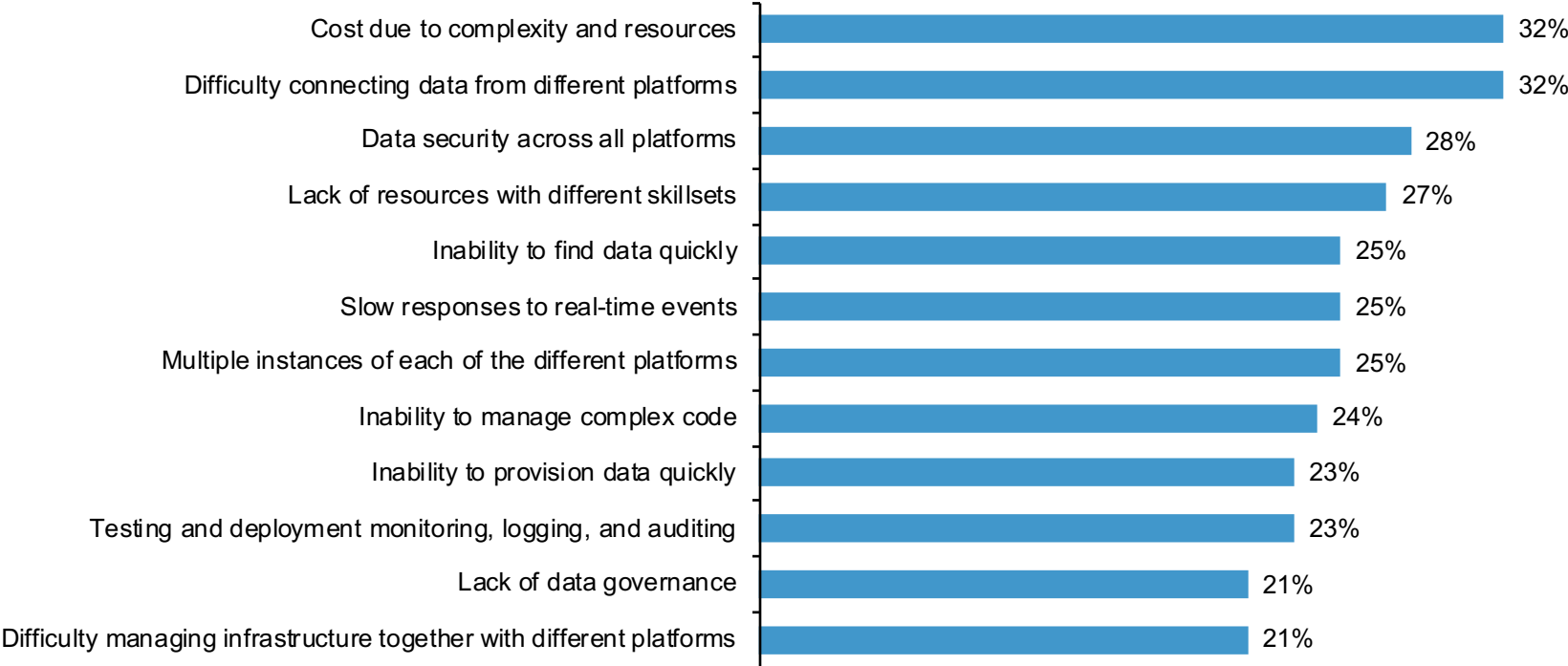
HYBRID DATA
ECOSYSTEM OPERATIONS

Hybrid Data Ecosystem Operations

HDE OPERATIONAL CHALLENGES

Since the HDE trend is toward expansion to more platforms and new platforms multiply challenges, it is important to understand common HDE operational challenges. The greatest challenges are cost and data integration, with 32% of participants in agreement.

Whereas, 47% of participants indicated that they currently have 2-3 platforms in their hybrid data ecosystem and 38% indicated that they currently have 4-8 platforms. However, the number of platforms is only the beginning of compounded struggles. Large organizations can have hundreds of instances of each platform. For example, a single database platform could have 700-800 instances. While not a top selection, 25% of participants are also struggling with "multiple instances of each of the platforms."

WHAT ARE THE GREATEST CHALLENGES YOU FACE IN RUNNING DATA OPERATIONS ACROSS MULTIPLE PLATFORMS?

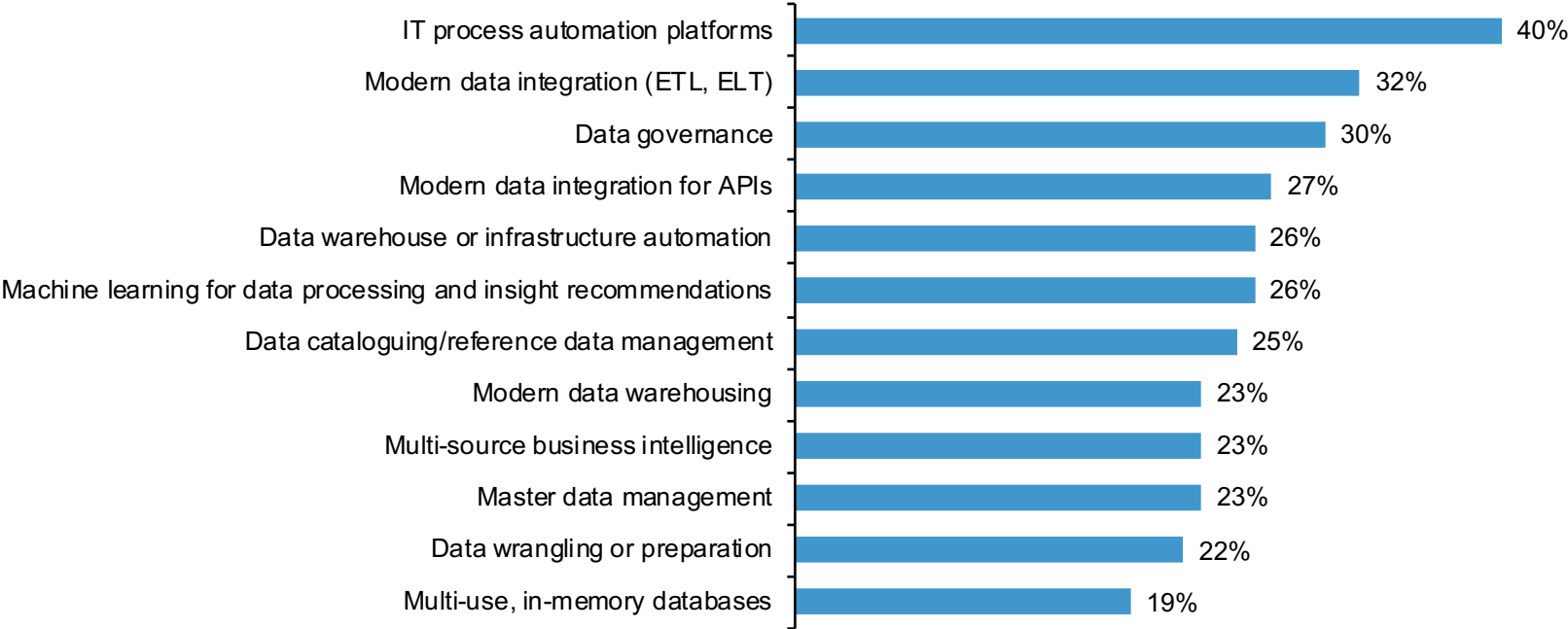| Challenge	Percentage
Cost due to complexity and resources	32%
Difficulty connecting data from different platforms	32%
Data security across all platforms	28%
Lack of resources with different skillsets	27%
Inability to find data quickly	25%
Slow responses to real-time events	25%
Multiple instances of each of the different platforms	25%
Inability to manage complex code	24%
Inability to provision data quickly	23%
Testing and deployment monitoring, logging, and auditing	23%
Lack of data governance	21%
Difficulty managing infrastructure together with different platforms	21%

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Hybrid Data Ecosystem Operations

HDE OPERATIONAL PRIORITIES

To address the challenges of operating an HDE, EMA also asked participants, "Which of the following technologies are most important for operating your hybrid data ecosystem?" The number-one answer given by participants was IT process automation platforms. This priority signals three interesting trends in the analytics arena:

1. DevOps is entering the analytics and data management space.

2. Data professionals place greater importance on the automation of IT processes than data processes.

3. Automation of all aspects of data and IT continue to grow in importance and value.

40% of participants selected IT process automation as a top priority for operating their HDE.

WHICH OF THE FOLLOWING TECHNOLOGIES ARE MOST IMPORTANT FOR OPERATING YOUR HYBRID DATA ECOSYSTEM?

Technology	Percentage
IT process automation platforms	40%
Modern data integration (ETL, ELT)	32%
Data governance	30%
Modern data integration for APIs	27%
Data warehouse or infrastructure automation	26%
Machine learning for data processing and insight recommendations	26%
Data cataloguing/reference data management	25%
Modern data warehousing	23%
Multi-source business intelligence	23%
Master data management	23%
Data wrangling or preparation	22%
Multi-use, in-memory databases	19%

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Hybrid Data Ecosystem Operations

HDE OPERATIONAL PRACTICES
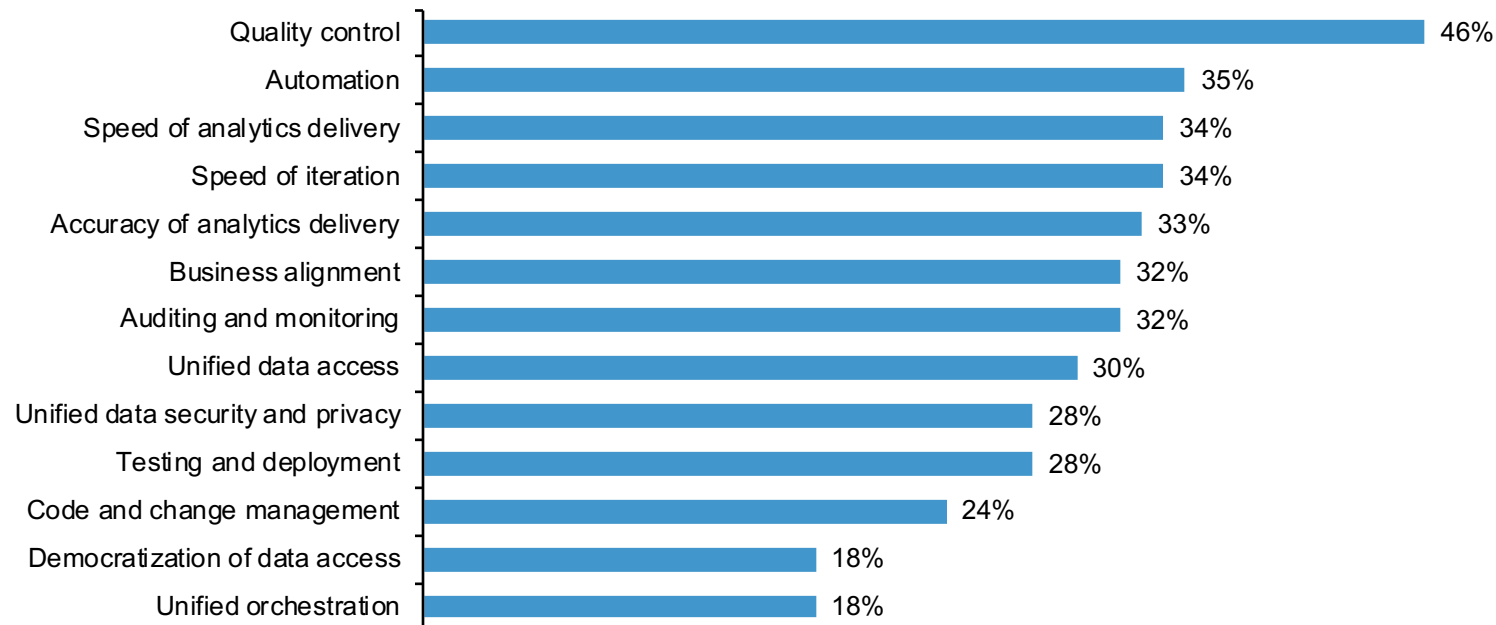
THE PRIORITIES OF DATAOPS

In the last 9-12 months, the growth of IT automation and DevOps spilled over into the data world. To orchestrate, operate, and optimize hybrid data ecosystems, mature organizations are now instituting DataOps. Organizations are tired of the back-and-forth finger-pointing that goes on between IT and data teams. The bottom line is that business sponsors want a single point of responsibility for the timing and accuracy of data or insight delivery.

EMA research looked at 13 of the goals typically associated with DataOps. According to research participants, speed and accuracy are the most important aspects of DataOps when running a hybrid data ecosystem. Forty-six percent of participants indicated that "quality control" is of top concern for DataOps. To further support this focus on accuracy, 33% indicated that "accuracy of analytics delivery" is a top concern. Quality and accuracy both point to the importance of standard operations that drive decisions based on the best possible data.

Along with accuracy, every DataOps leader should measure time saved by automating repetitive tasks typically done manually by people in the organization. The goal of automation is always to do more with less, speed delivery, condense iteration cycles, and drive innovation.

WHICH ASPECTS OF DATAOPS ARE IMPORTANT TO THE OPERATION OF YOUR HYBRID DATA ECOSYSTEM?

Aspect	Percentage
Quality control	46%
Automation	35%
Speed of analytics delivery	34%
Speed of iteration	34%
Accuracy of analytics delivery	33%
Business alignment	32%
Auditing and monitoring	32%
Unified data access	30%
Unified data security and privacy	28%
Testing and deployment	28%
Code and change management	24%
Democratization of data access	18%
Unified orchestration	18%

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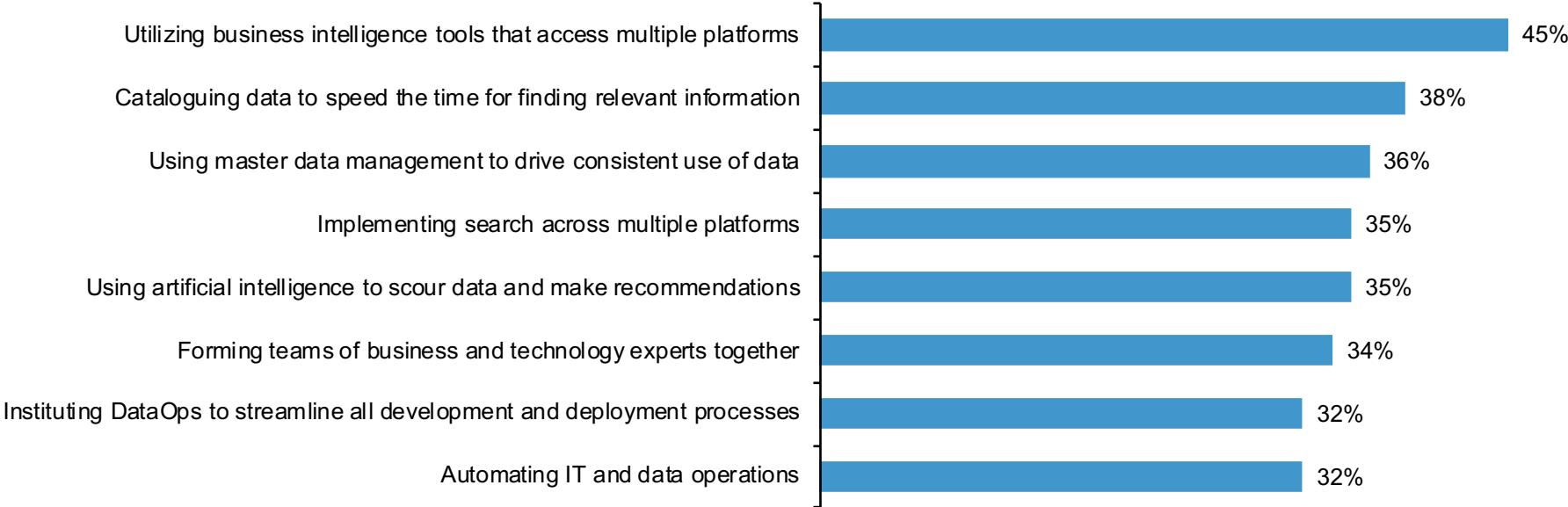
THE PRACTICE OF DATAOPS

EMA asked participants which best practices they were implementing to better operate their HDEs. The high-concentration participants indicate that all practices are important. A solid HDE program leader will practice all the following:

- Utilize business intelligence tools that access multiple platforms
- Catalogue data to speed the time for finding relevant information
- Use master data management to drive consistent use of data
- Implement search across multiple platforms
- Use artificial intelligence to scour data and make recommendations

- Form teams of business and technology experts together
- Institute DataOps to streamline all development and deployment processes
- Automate IT and data operations

EMA recommends selecting three of the options based on which best practices have the best chance of impacting the bottom line of the business. This is not an IT decision; it is an IT and business decision. The one place where there is some misalignment between business and IT is in the use of artificial intelligence and machine learning to drive more speed and reach in analytics and data management tools. There is an opportunity to educate business sponsors about the use of AI and ML to speed and extend the reach of analytics and data management tools.

WITH DATA SPREAD ACROSS YOUR ORGANIZATION IN DIFFERENT SYSTEMS, WHICH PRACTICES ARE MOST IMPORTANT TO MAKING THE SYSTEMS WORK TOGETHER?

Practice	Percentage
Utilizing business intelligence tools that access multiple platforms	45%
Cataloguing data to speed the time for finding relevant information	38%
Using master data management to drive consistent use of data	36%
Implementing search across multiple platforms	35%
Using artificial intelligence to scour data and make recommendations	35%
Forming teams of business and technology experts together	34%
Instituting DataOps to streamline all development and deployment processes	32%
Automating IT and data operations	32%

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# Hybrid Data Ecosystem Operations

HDE OPERATIONAL MATURITY

EMA research concludes that the operation of hybrid data ecosystems is currently in its infancy. Most organizations continue to add data platforms to their ecosystem and manage them as separate systems. As a result, they also continue to incur high management costs, resource shortages, and have difficulty connecting and finding data in their diverse systems. Current

investments in integration technology provide some help, but they do not provide the speed necessary to run a digital business.

In the following spider chart, maturity is indicated on the right side of the chart. Maturity in the operation of hybrid data ecosystems is clearly in the beginning stages, with only 7% of participants managing most or all of their platforms in a unified manner. An opportunity remains for vendors to provide multiplatform services.

WHICH OF THE FOLLOWING BEST DESCRIBES HOW YOU CURRENTLY MANAGE DIFFERENT PLATFORMS AND TOOLS IN YOUR DATA ECOSYSTEM?
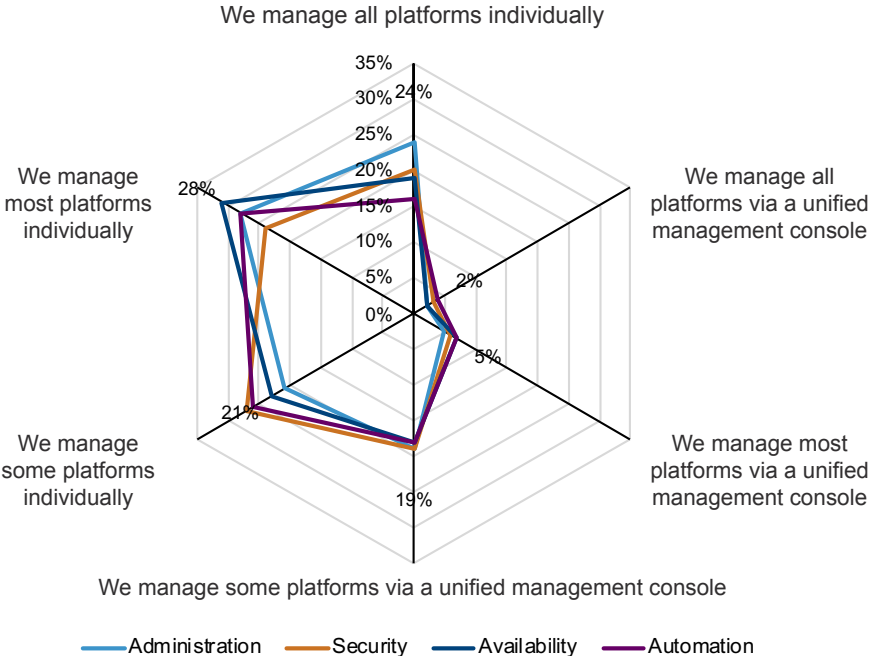
9% On average, only 9% of participants manage most or all of their platforms in a unified management console.

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RESEARCH METHODOLOGY AND DEMOGRAPHICS

Research Methodology and Demographics

METHODOLOGY

All research results in this report are based on EMA's survey of 202 randomly selected North American enterprise and midmarket data and analytics professionals. EMA research identified trends, adoption, drivers, and priorities for the use of AI and ML in five categories: 1) data preparation and integration, 2) data warehousing and big data platforms, 3) business intelligence, 4) analytics and data science, and 5) data catalog, master data management, and data governance. For each of the five categories, EMA identified 10-12 key AI or ML capabilities. The research provided input regarding the capabilities that were most important to the participants.
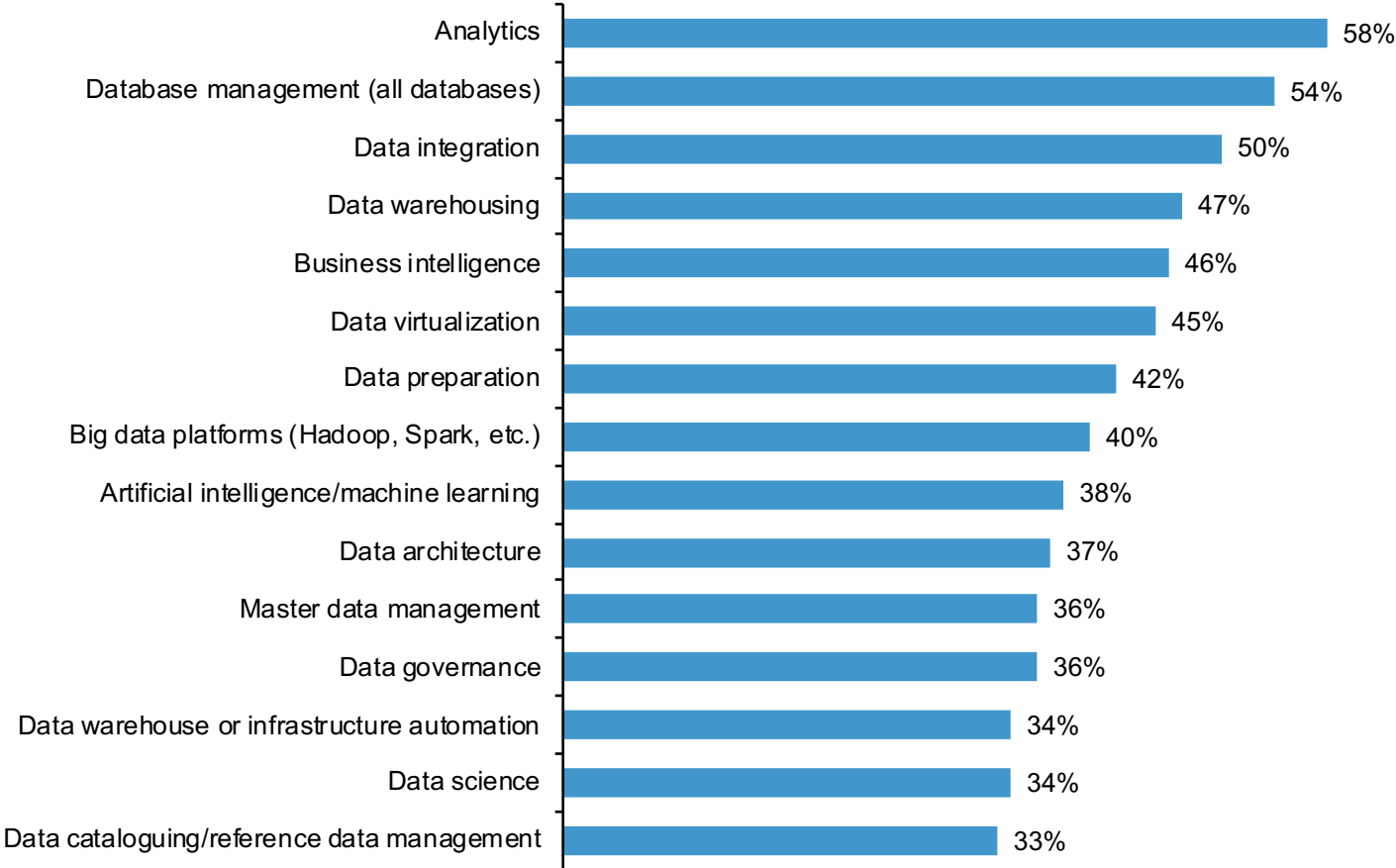
Research Methodology and Demographics

DEMOGRAPHICS

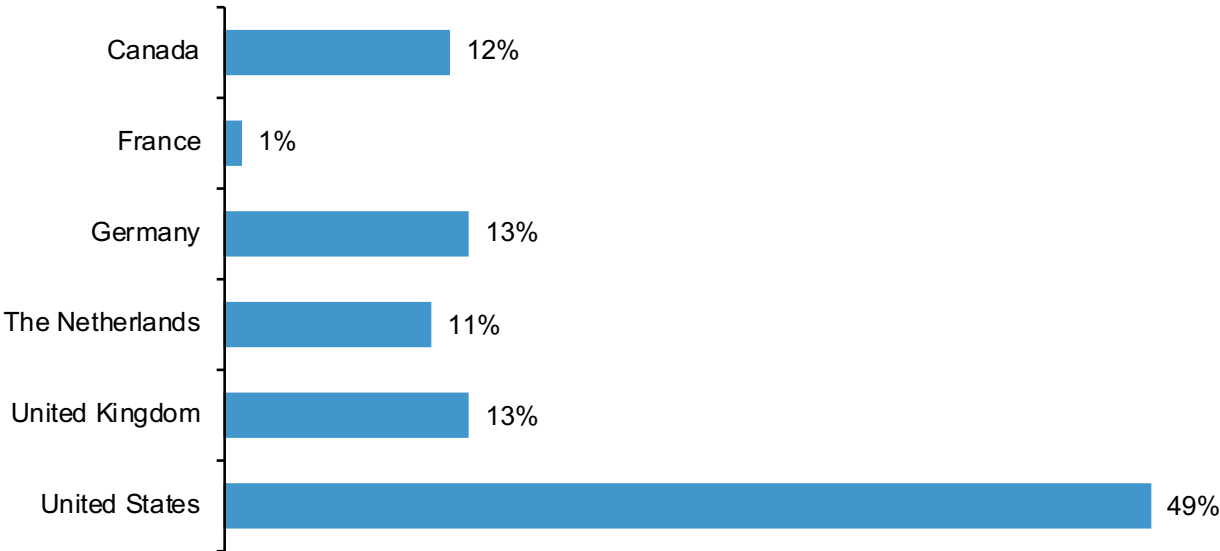The following is a demographic overview of 202 randomly selected data, analytics, and business professionals. The first question was used as primary qualification. If the survey candidate did not indicate awareness or involvement in any of the data and analytics activities in that question, they were not included in the survey results.

WHICH OF THE FOLLOWING DATA AND ANALYTICS ACTIVITIES ARE YOU AWARE OF OR INVOLVED IN WITHIN YOUR ORGANIZATION?
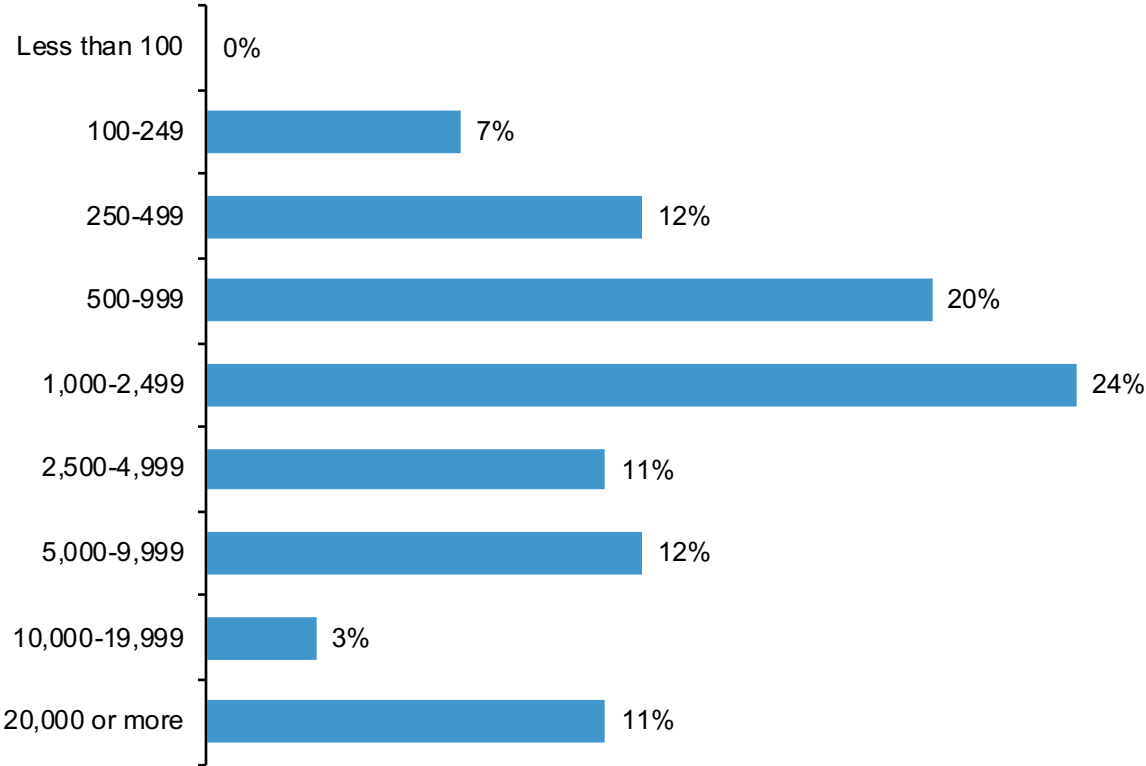
Activity	Percentage
Analytics	58%
Database management (all databases)	54%
Data integration	50%
Data warehousing	47%
Business intelligence	46%
Data virtualization	45%
Data preparation	42%
Big data platforms (Hadoop, Spark, etc.)	40%
Artificial intelligence/machine learning	38%
Data architecture	37%
Master data management	36%
Data governance	36%
Data warehouse or infrastructure automation	34%
Data science	34%
Data cataloguing/reference data management	33%

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Research Methodology and Demographics

Canada — 12%
France — 1%
Germany — 13%
The Netherlands — 11%
United Kingdom — 13%
United States — 49%

Modernization and the Operation of Hybrid Data Ecosystems: EMA Research for Analytics and Data Management
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Research Methodology and Demographics

Company Size	Percentage
Less than 100	0%
100-249	7%
250-499	12%
500-999	20%
1,000-2,499	24%
2,500-4,999	11%
5,000-9,999	12%
10,000-19,999	3%
20,000 or more	11%

Research Methodology and Demographics

Function	Percentage
IT Leader/Executive	36%
IT Administrator	26%
IT Specialist	26%
Data Analyst	20%
CIO/CTO/CAO/CDO	19%
Business Analyst	17%
Database Administrator	15%
Data Engineer	15%
Data Architect	12%
Business Executive	11%
Data Scientist	10%
Data Integration/Preparation Specialist	10%
Data Warehousing Leader	10%
Business Line Leader	9%
Data Steward	8%
Business User	8%
Business Intelligence Specialist	7%
Analytics Leader/Executive	7%
Other	2%

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Research Methodology and Demographics

Research Methodology and Demographics

Role	Percentage
IT Leader/Executive	36%
IT Administrator	26%
IT Specialist	26%
Data Analyst	20%
CIO/CTO/CAO/CDO	19%
Business Analyst	17%
Database Administrator	15%
Data Engineer	15%
Data Architect	12%
Business Executive	5%
Data Scientist	4%
Data Integration/Preparation Specialist	3%
Data Warehousing Leader	2%
Business Line Leader	2%
Consulting: Computer- or Networking-Related	1%
Hospitality/Entertainment/Recreation/Travel	1%
Manufacturing: Computer Hardware- or Networking-Related	1%
Marketing/Advertising/PR Agency/Market Research	1%
Meda/Entertainment: Publishing/Broadcasting	1%
Utilities/Energy	1%
Other	1%
Aerospace/Defense	0%
Life Sciences (Pharmaceutical, MedTech, BioTech)	0%
Legal	0%
Nonprofit/Not for Profit	0%
Oil/Gas/Chemicals	0%

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Research Methodology and Demographics

Category	Percentage
Less than $1 Million	6%
$1 Million to less than $5 Million	12%
$5 Million to less than $10 Million	13%
$10 Million to less than $25 Million	22%
$25 Million to less than $50 Million	17%
$50 Million to less than $100 Million	13%
$100 Million or more	13%
Don't know	3%

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About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA's clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals, and IT vendors at www.enterprisemanagement.com or blog.enterprisemanagement.com. You can also follow EMA on Twitter, Facebook, or LinkedIn.

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