A Forrester Consulting
Thought Leadership Paper
Commissioned By IBM

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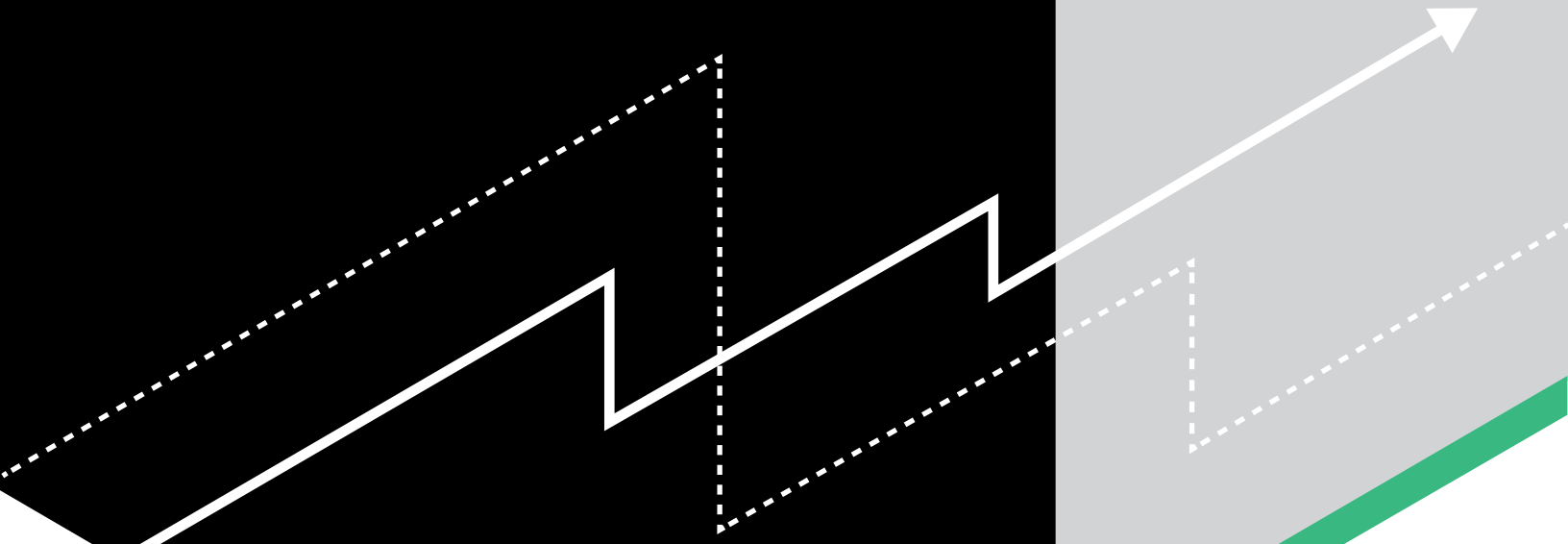
Leverage Data Where It Originates To Drive Substantial Business Benefits

Embrace Data Gravity To Better Serve Modern Applications And Enhance Analytics And AI For Better Insight



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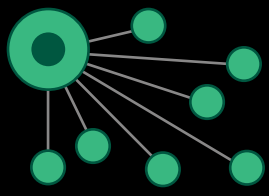


The concept of data gravity maintains that the larger the amount of data, the more applications, services, and other data will be attracted to it.

Embracing a data gravity strategy has the potential to be a game changer for the modern, data-driven business.

Executive Summary

There is perhaps nothing more valuable to an organization than its data. Unfortunately, while many firms are feasting on data, they're still starving for insights.[1] In the age of digital transformation and the empowered customer, organizations must be able to generate real-time insights based on accurate and high-quality data. But to do that, firms must modernize, simplify, and automate their data management processes. Enter the concept of data gravity: the ability of bodies of data to attract applications, services, and other data. By embracing a data gravity strategy, and leveraging data intelligence and AI technology, teams can minimize data movement and cost effectively leverage data where it originates in real time, to better serve modern applications and insights.

IBM commissioned Forrester Consulting to evaluate the market's awareness of data gravity by surveying 300 data and analytics decision-makers at global enterprises across industries. We found that data gravity has the potential to be a transformative concept to firms' data, analytics, and AI initiatives, but firms will still need an education.

KEY FINDINGS

- **Data gravity could be transformative for firms.** Organizations are looking to improve their strategic planning and gain efficiencies by not only facilitating data-driven decision-making across the enterprise, but also by making data more accessible overall. Most have also embraced a hybrid cloud strategy to modernize operations and take advantage of the benefits of cloud computing. But this modern environment introduces complexities. Teams often deploy analytic workloads in specialized environments rather than on the operational platform where it originated. This necessitates extensive copying and transfer of data, which creates the potential for performance, security, governance, and quality issues. Firms could avoid these problems if they embraced a data gravity strategy, but unfortunately, this concept is not very well understood.
- **Firms are fighting against data gravity when they should be working with it.** Due to large data volume, overly manual processes, and integration challenges, most firms are spending too much time and effort readying their data for analytic and AI work. The need to copy, move, refresh, and integrate data slows processing and results in latency, increased time-to-value, and more operational risk. Ultimately, data teams are simply wasting energy on tactical problem-solving and tedious operational tasks when that time could be better spent innovating.
- **A data gravity strategy delivers outsized returns exceeding expectations.** Whether or not to embrace data gravity should be an easy decision. The returns to the business are staggering and the technical benefits of leveraging data where it originates help data teams overcome many of their greatest challenges. Enterprises that embrace a data gravity strategy experience better customer experience (CX), improved employee productivity, reduced risk, revenue growth, and competitive differentiation. In fact, data gravity investments tend to exceed expectations: those that have already implemented this strategy see greater returns than expected.

Data Gravity — Critical Yet Misunderstood

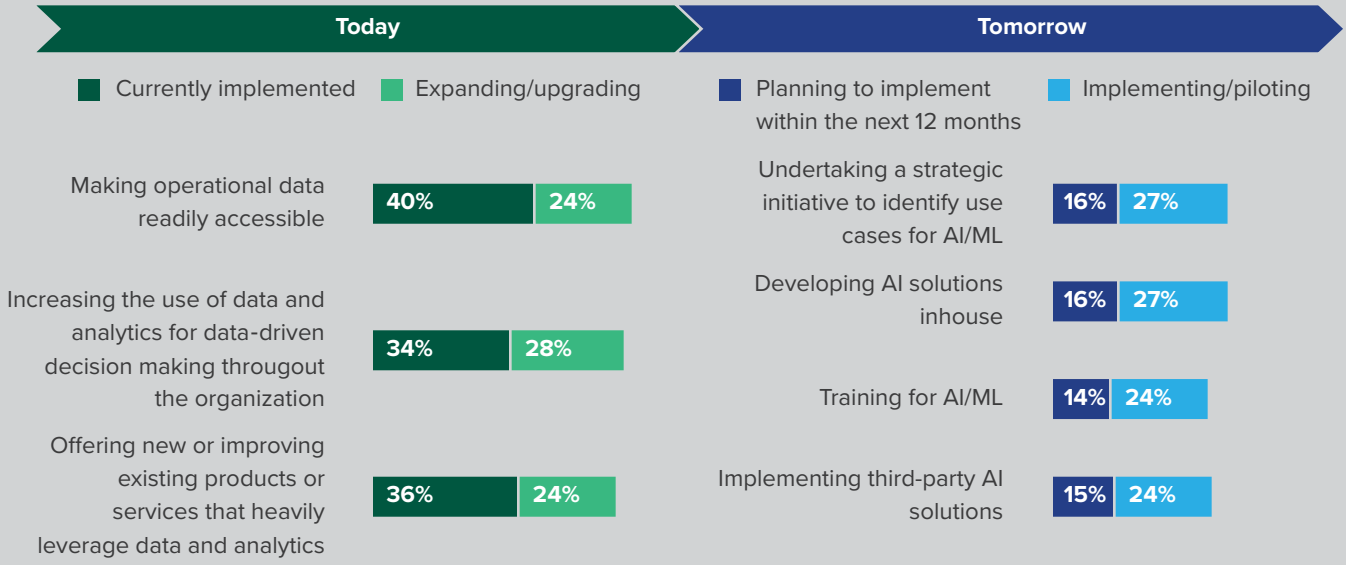
Data is the lifeblood of a successful business. As organizations move forward with their continuous efforts to digitally transform, data and insights will only become more important. However, data is only as good as the insights it produces, the actions it influences, and the results it fosters; and insights are only as good as the data it leverages.

Forrester believes that data is the first stop in your digital business transformation journey. In the age of the empowered customer and the cloud, executives, employees, partners, and customers are connected and encouraged to access information and communicate. This open, always-on, and always-ready ecosystem demands real-time access to trusted data.[2] To that end, organizations are looking to modernize and improve insight and efficiency to impact business results by making data more accessible. Our study found:

- **To gain efficiencies and work strategically, firms prioritize accessibility and data-driven decisioning.** In order to improve analytic, data management, and business efficiency, firms have implemented or are expanding a slew of data-centric initiatives (see Figure 1). Making operational data readily accessible (64% implemented/expanding), increasing data-driven decision-making throughout the organization (62%), and offering new and improved products and services based on data and analytics (60%) are the focus today. These top priorities will also assist with organizations' other key goals: improving strategic planning and customer experiences.

Figure 1

"What are your firm's plans to adopt the following data, analytics and AI initiatives?"



Base: 300 global data and analytics enterprise decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

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- **AI use will expand in the coming year.** Though the focus today is on data and analytics broadly, firms plan to expand their use of AI in the coming year (see Figure 1). Thirty-one percent of firms are currently undertaking or planning strategic initiatives to identity AI and machine learning (ML) use cases, and another 33% are training for AI/ML. Firms are also arming themselves with the right tools for AI: More than one-third are currently developing or planning to develop AI solutions in-house and implement third party AI solutions.
- **Real-time insights are critical to firms' top initiatives.** It's clear that organizations have big plans for data, analytics, and AI, and real-time insights are a make-or-break issue. For the purposes of this study, the term real-time is being used to mean relating to a system in which input data is processed within milliseconds so that it is available virtually immediately for use in business and operational processes. Given this definition, over 80% of respondents agreed that real-time insights are important to their ability to successfully carry out all their top initiatives (see Figure 2). Without real-time insights, many of these business-critical initiatives would fail.

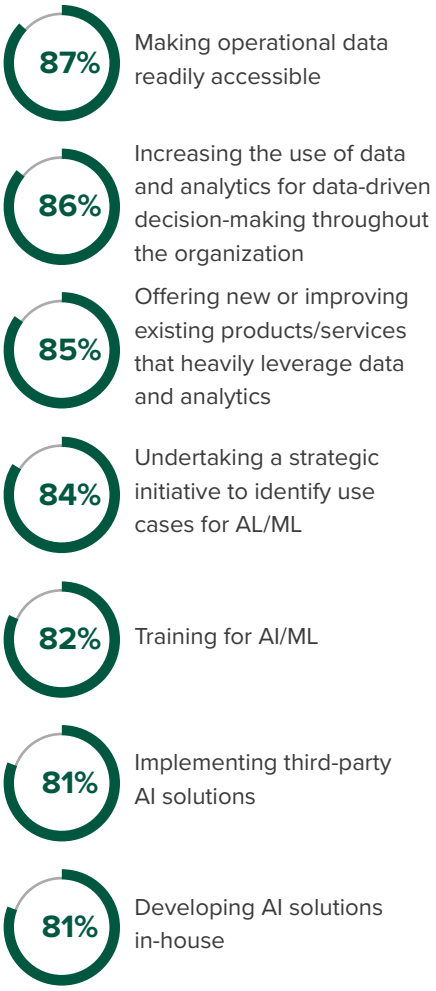
A BETTER UNDERSTANDING OF DATA GRAVITY WILL HELP FIRMS SUCCEED, BUT THEY NEED EDUCATION

Changing business requirements and new technologies drive constant change in data management architectures. To modernize processes and push forward with business-critical digital transformation initiatives, organizations must, in turn, modernize these data management strategies. Today, data is distributed across multiple data centers, data repositories, in the cloud, and at the edges as well. With the growing distribution of data and volume, centralizing data for aggregation and integration has become impractical.[3]

Firms use a variety of environments for data and analytics. Today, about two-thirds of companies store their data in a hybrid environment, incorporating both cloud and on-premises storage environments. Of those organizations which leverage hybrid environments, 95% incorporate their transactional data into their hybrid cloud strategy. Environments grow more varied when looking at where particular analytics and AI workloads are deployed. Though operational analytics are most often run on the specific platform in which the data was generated (i.e., an operational platform, either mainframe or non-mainframe), business analytics tend to follow a more traditional model. These workloads are more frequently moved to specialized analytics platforms, relational databases, or enterprise warehouses. Overall, firms must contend with a variety of different environments which often necessitates migration of applications and data. This can become time-consuming, difficult, and costly. Recalling how important real-time insights are, firms simply can't afford to have latency impede important data initiatives.

Figure 2

"How important are real-time insights to your firm's ability to successfully carry out your data, analytics, and AI initiatives?" (Very important/important)



Base: 300 global data and analytics enterprise decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

However, the concept of data gravity — the ability of bodies of data to attract applications, services, and other data — can help. The concept of data gravity maintains that the larger the amount of data, the more applications, services, and other data will be attracted to it. Therefore, considering where an application lives can be incredibly important to the ultimate success of that workload. Unfortunately, our study found that data gravity is:

- **Not well understood.** Prior to being shown a definition, respondents were asked to explain what data gravity means to them. In general, responses indicate that there is widespread confusion. Some responses were reasonably accurate: "Data gravity refers to the way that data tends to attract other data and services to itself." Most, however, indicate a need for better education: Data gravity was defined as everything from, "the ability to retain information generated, without it being exposed to unauthorized sources," to, "It means that we are responsible for moving the data rather than it being pulled automatically." Many of these definitions have accurate aspects, but very few respondents display a level of complete understanding.
- **Adopted sparingly.** Very few — 12% — of survey respondents report having fully embraced a data gravity strategy. However, significantly more have adopted portions of this strategy (43%) or are planning to adopt within the next two years (34%). Happily, the fact that only a few organizations have no plans to adopt a data gravity strategy indicates that most organizations understand its importance.
- **Rarely considered.** Only 21% of respondents in our study consider where the application runs when deciding where to deploy associated analytics and AI workloads. Data gravity was well behind other criteria like security, performance, and cloud compatibility. While all those criteria are important, failing to take data gravity into account when making these critical decisions can lead to unnecessary trouble down the line such as higher costs, increased complexity, and high levels of latency.

Embracing a data gravity strategy has the potential to be a game changer for the modern, data-driven business.

Enable a data gravity strategy by processing data at the source, primarily to support real-time, trusted, and consistent data across applications and insights.

Preparing Data For Analytics And AI Is Challenging For Firms

Insights are only as good as the data they leverage. Data and analytics teams understand that preparing their data for advanced analysis is crucial to good results, but the time and effort it takes to do this is slowing firms down and holding them back. Overall, respondents in our study seemed confident in their ability to carry out their key data and analytics initiatives, but there is trouble lurking beneath the surface. In reality, we found:

- **Teams struggle with latency.** Here again there seems to be a disconnect for many firms. Over three-quarters of all respondents say they are satisfied with the current levels of latency for each of the AI and analytics workloads they are currently running. However, 49% of these same respondents admit that getting insights where and when they are needed is a big challenge, and 46% struggle with managing network performance and latency. In this study, we define latency as the time from which a transaction occurs to the time when the data is available for query. If teams were really as satisfied with latency levels as they claim to be, would getting real-time insights be such a challenge? Probably not.
- **Keeping data secure and of high quality is difficult.** When incorporating data into analytics and AI initiatives, over half of decision makers are challenged by security concerns around data transfer and data governance. In fact, most tasks associated with moving, integrating, or preparing data prove challenging for many firms: 48% struggle while incorporating new data to analyze, 47% find exploring data to be challenging, and 41% are burdened by the cost of copying and moving data.
- **Manual processes cause integration problems.** Today, 90% of data teams leverage at least some manual component when integrating data for analytics and AI initiatives. This lack of automation is keeping firms from analyzing their data more effectively: Difficulty integrating data from multiple sources is the number one technical challenge. And this trouble leads to a lot of wasted energy. Sixty-nine percent of study respondents expend more time and effort accessing and connecting multiple data sources than they would prefer, and 34% report that these overly manual efforts lead to inefficient data management.
- **Immature AI programs foreshadow future technical challenges.** Because many AI initiatives are still in their infancy at the firms we surveyed, the challenges experienced while deploying AI models are mostly ethical: 47% of respondents report that ethical and regulatory issues keep them from deploying AI models into production. Once these firms address the ethical issues and more AI initiatives are deployed and reach desired scale, firms will likely run into the preceding issues around latency, integration, data preparation and automation — as they are in other data access and analytic scenarios. Teams looking to avoid this additional trouble should look for ways to alleviate these problems now so that they don't become a hinderance in the future.

Over two-thirds of study respondents expend more time and effort accessing and connecting multiple data sources than they would prefer, and 34% report that these overly manual efforts lead to inefficient data management.

ANALYTICS CHALLENGES HURT THE BUSINESS

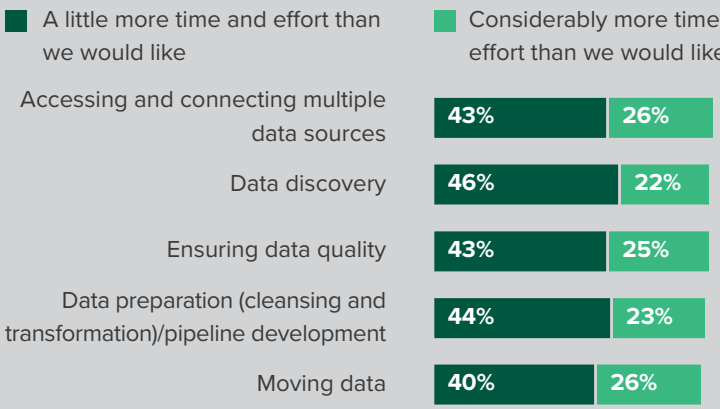
In general, firms are spending too much time and effort readying their data for analysis. Every single step in the process to make data both, AI- and analytics-ready — from data discovery and pipeline development to moving data and ensuring consistent data quality — is overly time consuming for the surveyed firms. And for about one-quarter of firms, each of these steps takes considerably more effort than is preferable (see Figure 3).

The result of all these struggles are tangible, negative consequences for the business (see Figure 4). These issues:

- **Leave firms with less time to innovate.** The most common result of these issues is that firms are simply spending too much time on either tactical problem solving or necessary operational tasks. This, in turn, leaves little time for working strategically and innovatively.
- **Lead to increased risk and lost opportunity.** Wasted resources aren't the only consequence of these challenges. Teams also suffer from increased operational risk, increased time-to-value, and decreased productivity. Ultimately, these issues trickle down to impact the customer and the bottom line: More than one-quarter of firms experienced poor customer experiences and others saw losses due to fraud and lost revenue.

Figure 3

"Think about all the time and effort being spent readying your data for analytics/AI. Which of the following best describes how you feel about each of the following tasks?"



Base: 300 global data and analytics enterprise decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

Top technical challenges when analyzing data:

1. Integrating data from multiple sources
2. Large data volume
3. Time it takes to assemble data
4. Too many data formats to integrate effectively

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Figure 4

"What are the consequences of these challenges you encounter while analyzing data?"

41% Too much time spent on tactical problem solving and not enough time working strategically

40% Too much time/energy spent on necessary operational tasks which leaves no time for innovation

34% Increased operational risk

34% Too much manual effort required to manage data (e.g., inefficient data management)

33% Increased time-to-value

27% Decreased employee productivity

26% Poor customer experiences/lost opportunity

24% Fraud losses

18% Lost revenue

Base: 300 global data and analytics enterprise decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

Analyze Data Where It Originates To Drive Better Business Benefits

Though there may be confusion around the term data gravity, decision-makers do instinctually understand the value of leveraging data where it originates. This ability to leverage data in real time is seen as valuable for all currently running workloads. In fact, more than 88% of respondents think data gravity is valuable for the workloads with direct ties to key customer and business outcomes – like asset tracking and monitoring, fraud detection, and customer 360. Recall how important real-time insights are to firms' priority initiatives and it's clear that embracing a data gravity strategy has the potential to be a game changer for the modern, data-driven business.

It's not just the real-time capability of data gravity that is important though. The true value of data gravity comes from the transformative business benefits it creates. We found that embracing a data strategy that accounts for the concept of data gravity:

- **Helps firms overcome key challenges.** Data gravity alleviates some of the respondents' major issues while also helping to deliver on the initiatives' original goals (see Figure 5). Organizations that have embraced this strategy experience improved data management and analytic efficiency, better performance, data quality and governance, and increased data security. These firms also see decreased infrastructure complexity, cost, and latency. Considering that more efficient analytics and data management were two of respondents' top three outcomes they wanted to create from data, analytics, and AI initiatives, these technical benefits are critically important.
- **Drives customer and business benefits.** It's not just the technical side that sees improvement; data gravity also drives better business results (see Figure 6). More than 40% of firms experienced improved CX, customer acquisition, and retention, as well as increased revenue growth (all also key goals of analytics initiatives). Businesses also see reduced operational risk, improved decision-making, and an increase in innovation due to greater agility. All of this change can be differentiating for firms: About one-third of respondents have gained an advantage over their competitors from their data gravity strategy.

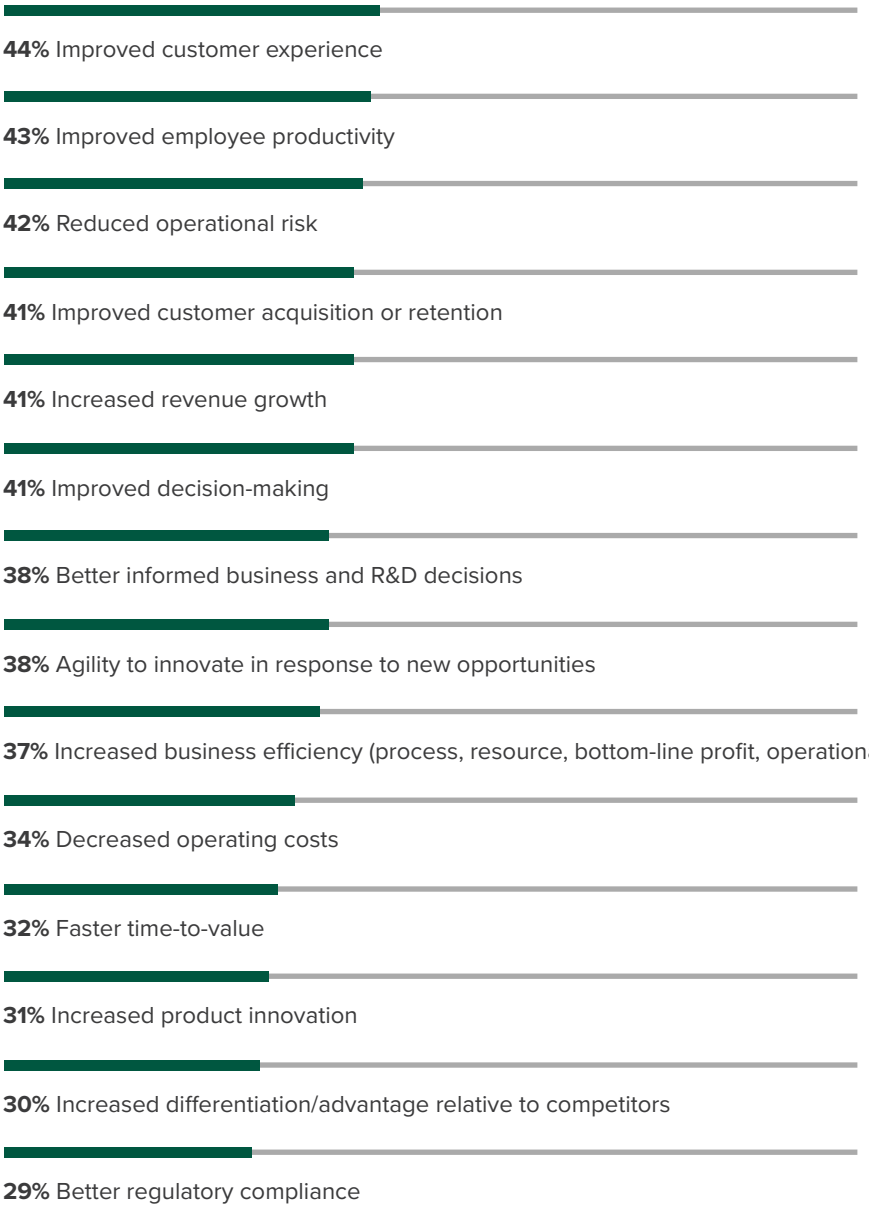
Figure 5

Technical Benefits Of Data Gravity

Base: 300 global data and analytics enterprise decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

Figure 6

"What business benefits have you experienced as a result of embracing a data gravity strategy?"



Base: 300 global data and analytics enterprise decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

In fact, data gravity tends to overdeliver. Our study found that those that have already implemented this strategy see greater returns than they expected (see Figure 7). This is especially telling when it comes to business benefits. In the survey, 44% of respondents experienced improved customer experience, however only 29% actually expected that benefit. This same large gap exists for customer acquisition and retention, improved employee productivity, and reduced operational risk. Decision-makers also underestimate how helpful embracing a data gravity strategy can be for data management. It seems again that education is of the utmost importance here. Firms must understand that embracing a strategy that accounts for data gravity is not only going to help solve for their latency issues and help firms accomplish their prioritized initiatives; but it is also capable of producing benefits for their customers and their bottom line.

Data gravity provides critical technical and business benefits that don't just help firms overcome challenges, they help firms thrive.

Figure 7

Data Gravity Overdelivers: Firms See More Benefits Than They Expected

Base: 164 global data and analytics decision-makers who have implemented data gravity strategy, 136 global data and analytics decision-makers who have not implemented data gravity strategy
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

Key Recommendations

Today's business professional understands that data and insights are critical to success. Unfortunately, data distribution, data movement, and distributed data processing are slowing down on-demand and real-time insights that support critical modern business requirements. To be successful, enterprises must better leverage data where the data originates in order to close the gap between data generation, insight, and decision-making processes. This means the modern business must embrace a data gravity strategy as part of their larger hybrid cloud initiatives.

Forrester's in-depth global survey of data and analytics decision makers yielded several important recommendations:

Be conscious of data gravity. Analytics and insights are best done where the data lies. It is easier to bring the analysis to the data set where it originates, rather than paying the cost and time penalties of data ingest, data movement, and data integration. The expense of moving data could outweigh the potential speed advantages, if any. Look at data sets you leverage today, or where they will be stored, and consider data processing and transformation there. Keep the data in place when it makes sense.

Remember that hybrid cloud initiatives require a data gravity strategy. While organizations are moving their applications to the public cloud, many still have mission-critical systems running on-premises. Moving large amounts of data in a hybrid-cloud environment not only slows down data processing and application access, but it also results in poor customer experience and impacts real-time insights. Enable a data gravity strategy by processing data at the source, primarily to support real-time, trusted, and consistent data across applications and insights.

Leverage data gravity to improve data security and governance. When data moves between systems, it creates a security risk. With a data gravity strategy, you minimize data movement and remote processing. Data gravity leverages local data access and security controls at the source, ensuring only authorized processes and users access sensitive data for applications and insights.

Consider data virtualization technology. Data virtualization tools allow access to data where it originates instead of moving it off platform. Data virtualization technologies can offer a simplified approach to accessing disparate data sources, reducing programming efforts in addition to achieving the other benefits of data gravity.

Push AI/ML scoring to the transactional processing platform. To accelerate your data gravity initiative, use AI/ML automation locally for your system. This minimizes human error, delivers self-service capabilities, improves productivity, and lowers cost by optimizing data processing and access. Leveraging ML algorithms and models at source systems can help with aggregation, summarization, integration, and transformation for data to support quicker analysis. Ultimately, build ML/AI models wherever it makes the most sense, but consider scoring close to the transactional application to decrease scoring latency.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 300 enterprise decision makers in the US, Germany, Brazil, Mexico, the UK, China, Japan, Australia, and Canada. Survey participants included those in IT, data, and analytics roles from a variety of industries. Respondents were offered an incentive as a thank you for time spent on the survey. The study began in and was completed by July 2020.

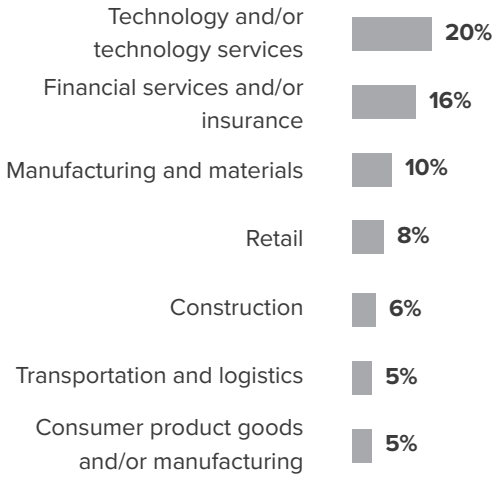
Appendix B: Demographics/Data

COUNTRY

NA: **25%** EMEA: **25%** APAC: **25%**

LATAM: **25%**

TOP INDUSTRIES



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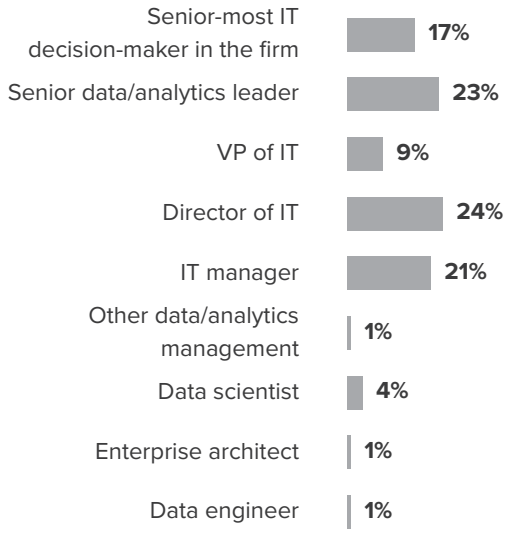

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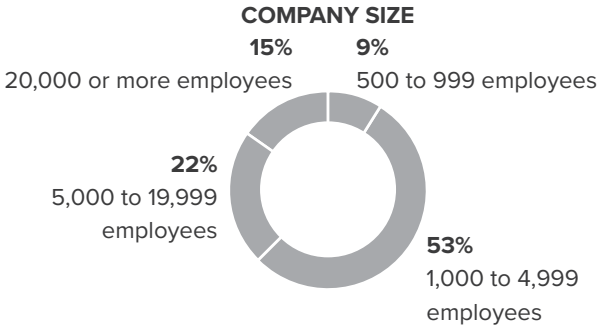

Base: 300 global data and analytics enterprise decision-makers
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, July 2020

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Appendix C: Supplemental Material

RELATED FORRESTER RESEARCH

"The Forrester Tech Tide™: Data Management, Q1 2020," Forrester Research, Inc., January 23, 2020.

"Future-Proof Your Data Management Architecture," Forrester Research, Inc. March 13, 2019.

"Your Business Is Only As Fast As Your Data," Forrester Research, Inc. November 13, 2019.

Appendix D: Endnotes

[1] Source: "Build An Insights-Driven Business," Forrester Research, Inc. December 10, 2019.

[2] Source: "Your Business Is Only As Fast As Your Data," Forrester Research, Inc. November 13, 2019.

[3] Source: "Future-Proof Your Data Management Architecture," Forrester Research, Inc. March 13, 2019.