Going Big Data? You Need A Cloud Strategy

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Table Of Contents

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Contributing Research: Forrester's Enterprise Architecture research group

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Executive Summary

In the age of the customer, businesses realize the need to take their big data insights further than they have before, in order to win, serve, and retain their customers. Today's modern company has more data than ever before and is now looking to derive insights from the data that will help propel it forward. As firms move data analytics to the cloud, there is a new set of challenges and barriers to overcome, but with the help of insights-platforms-as-a-service, companies will be able to innovate with data and drive business forward.

In October 2016, Oracle and Intel commissioned Forrester Consulting to evaluate the effect of the cloud on firms' plans for big data. Forrester believes that customers are demanding more agile platforms to take advantage of the insights locked in bigger, more diverse data sets, which is leading them to shift more big data analytics into the cloud.

In conducting 431 in-depth surveys with IT, line-of-business, and data science professionals in global enterprises, Forrester found that these companies that move more into the cloud for big data analytics achieve greater innovation, increased integration, and higher levels of security. Furthermore, shifting the entire technology stack to a one-cloud solution that Forrester calls an "insights-platform-as-a-service" is the approach most buyers prefer.

> **Eighty-four percent of IT professionals agree that having all layers of the technology stack in one cloud is a critical or important requirement.**

KEY FINDINGS

Specifically, Forrester's study yielded four key findings:

› **Big data investment is in high gear but is yielding benefits slowly.** Ninety-eight percent of companies are benefiting from their current data and analytics investments, but it takes time and maturity to realize these benefits. A common platform for data science, shared across teams, and the ability to operationalize results at scale are both essential data science capabilities to ultimately deliver against top-line business priorities like revenue growth and improved customer experiences.

› **Firms are moving more big data analytics into the cloud.** A relatively small amount of data management and processing is currently happening in the cloud today;

however, 80% of companies want to move their big data and analytics into the cloud. While some decision-makers anticipate integration and security challenges, they believe these are not insurmountable as cloud capabilities continue to mature.

› **Insights-platforms-as-a-service provide the capabilities to meet firms' needs.** As organizations increase cloud adoption and gain big data analytics experience, they recognize they need an insights platform — an integrated stack of data management, analytics, and insight execution tools provided by a single vendor. In fact, 84% of IT professionals we surveyed said that having their technology stack in one cloud was a critical or important requirement.

› **Firms are interested in cloud-based data labs to accelerate innovation.** Our survey found that a majority of enterprises are interested in a data lab to further advance data management and processing initiatives. Sixty-two percent of enterprises would consider buying a data lab now.
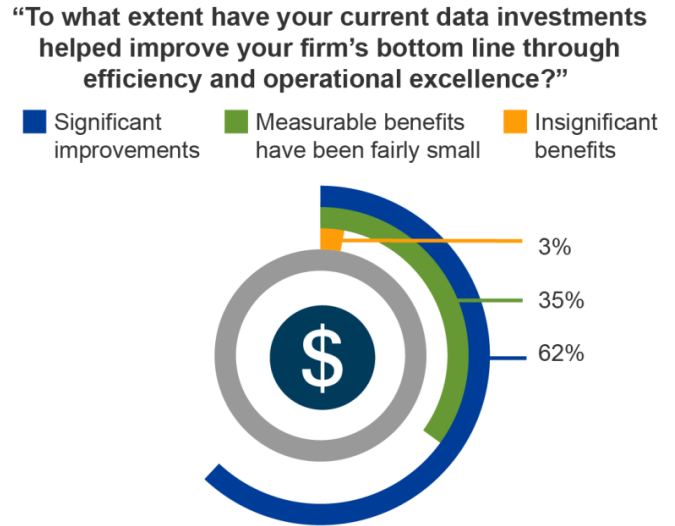
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Big Data Investment Shifts Into High Gear

Our study found that most firms are well into their big data investments. Fifty-five percent of the companies surveyed reported having an existing enterprise big data and analytics strategy that they've made significant progress executing against, and 37% have at least started their execution; a mere 8% have no coordinated enterprise strategy regarding big data and analytics.

Our study examined respondents' big data journeys and found:

› **Investments are not delivering as strongly against top business priorities.** Businesses are clearly not satisfied with current big data progress. According to Forrester's Global Business Technographics® Priorities And Journey Survey, 2016, the top drivers of big data investment are top-line focused (e.g., growing revenue, improving customer experiences); however, our study revealed that early gains are mostly bottom-line benefits like efficiency and operational excellence (see Figure 1).

FIGURE 1

Big Data Solutions Deliver Bottom-Line Benefits

"To what extent have your current data investments helped improve your firm's bottom line through efficiency and operational excellence?"

■ Significant improvements   ■ Measurable benefits have been fairly small   ■ Insignificant benefits

3%
35%
62%

Base: 431 IT, line-of-business, and data professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016

FIGURE 2

Big Data Investments Drive Revenue Growth
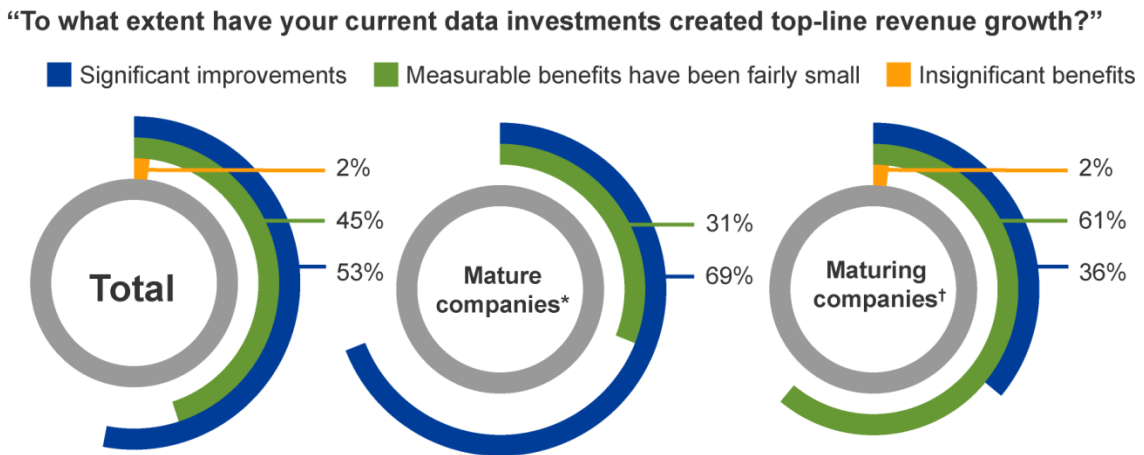
"To what extent have your current data investments created top-line revenue growth?"

■ Significant improvements   ■ Measurable benefits have been fairly small   ■ Insignificant benefits

Total
2%
45%
53%

Mature companies*
31%
69%

Maturing companies†
2%
61%
36%

Base: 431 IT, line-of-business, and data professionals responsible for big data in global enterprises

*Base: 235 IT, line-of-business, and data professionals responsible for big data in global enterprises with an enterprise-level big data and analytics strategy and that have made significant progress executing against it

†Base: 161 IT, line-of-business, and data professionals responsible for big data in global enterprises with a big data and analytics strategy and that have started to execute against it with some process

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016
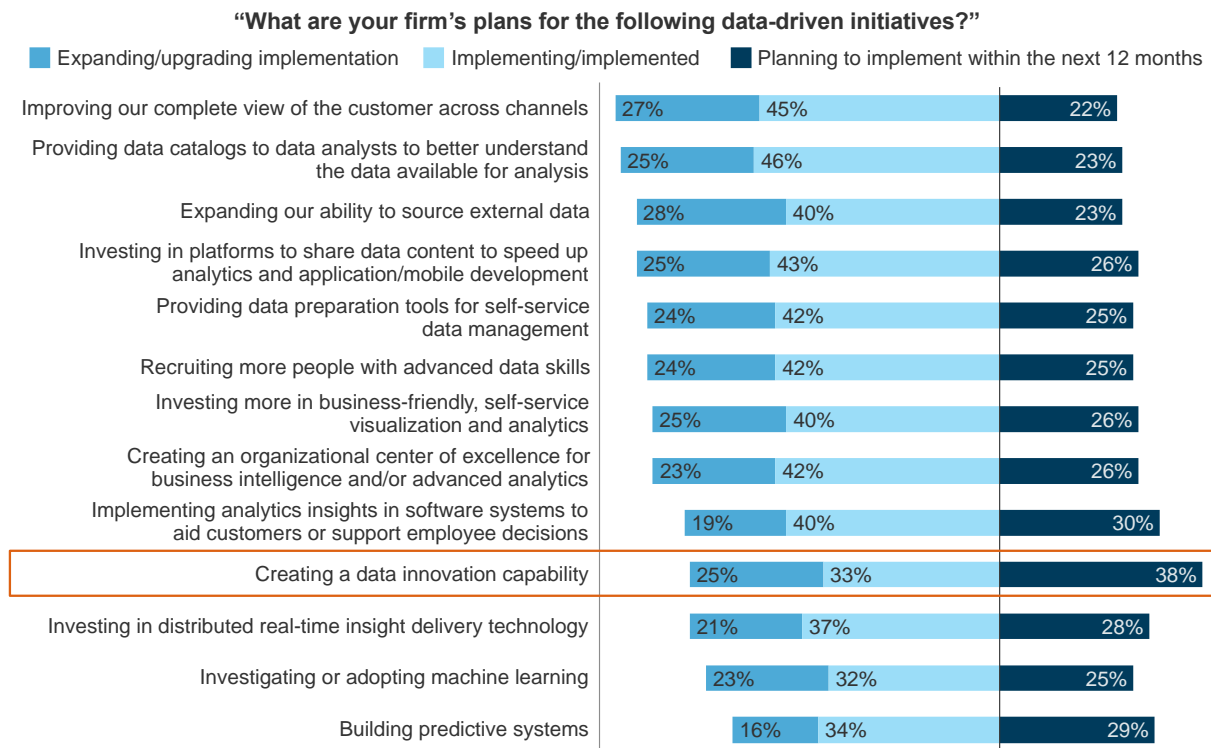
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› **However, mature firms are seeing top-line benefits.** Ninety-eight percent of respondents reported that their current data and analytics investments are creating benefits. Firms reporting mature big data and analytics strategies were also two times more likely to say they were seeing significant improvements to their top-line revenue growth (compared with organizations that are still maturing) (see Figure 2). Big data can greatly benefit people, process, and technology, so be patient.

› **Data science and insight execution are most important today; innovation is a big deal for the future.** The majority (78%) of firms said enabling a common platform for data science and operationalizing the results at scale (80%) were the most important data science capabilities to their organizations. In addition, our survey respondents said creating a data innovation capability will be the most important data analytics initiative in the coming year (Figure 3). Forrester believes this is because they expect data innovation to create the

FIGURE 3
Enterprises Plan For Data-Driven Initiatives

"What are your firm's plans for the following data-driven initiatives?"

■ Expanding/upgrading implementation　■ Implementing/implemented　■ Planning to implement within the next 12 months

Initiative	Expanding/upgrading implementation	Implementing/implemented	Planning to implement within the next 12 months
Improving our complete view of the customer across channels	27%	45%	22%
Providing data catalogs to data analysts to better understand the data available for analysis	25%	46%	23%
Expanding our ability to source external data	28%	40%	23%
Investing in platforms to share data content to speed up analytics and application/mobile development	25%	43%	26%
Providing data preparation tools for self-service data management	24%	42%	25%
Recruiting more people with advanced data skills	24%	42%	25%
Investing more in business-friendly, self-service visualization and analytics	25%	40%	26%
Creating an organizational center of excellence for business intelligence and/or advanced analytics	23%	42%	26%
Implementing analytics insights in software systems to aid customers or support employee decisions	19%	40%	30%
Creating a data innovation capability	25%	33%	38%
Investing in distributed real-time insight delivery technology	21%	37%	28%
Investigating or adopting machine learning	23%	32%	25%
Building predictive systems	16%	34%	29%

Base: 431 IT, line-of-business, and data professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016

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revenue and customer experience benefits they're not seeing to date.

Firms Are Looking To The Cloud

Our study found that when looking to improve their data analytics capabilities, 82% of respondents felt they needed even more data to stay competitive, and 79% said they needed more agility. The cloud excels at both, which is why 80% of firms said they want to move in that direction (Figure 4).
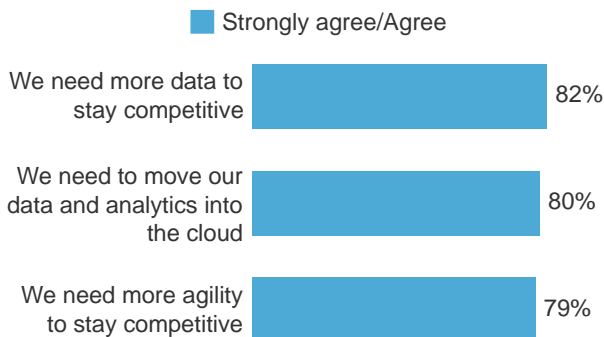
We sought to understand this more deeply and found:

› **Relatively little data management or analytics is happening in the public cloud today.** Our survey found that an average of 15% of data management/processing is happening in the public cloud today. Furthermore, only 13% of data analytics is happening in the public cloud today, on average, because most firms began their big data investment strategies when the cloud capabilities

FIGURE 4

Organizations Need More Data And Greater Agility To Stay Competitive

"Please rate how much you agree or disagree with the following statements regarding data analytics."

■ Strongly agree/Agree

We need more data to stay competitive — 82%

We need to move our data and analytics into the cloud — 80%

We need more agility to stay competitive — 79%

Base: 431 IT, line-of-business, and data professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016

were less mature.

› **The faster firms grow, the faster they move to the cloud.** Over 70% of respondents reported that their data
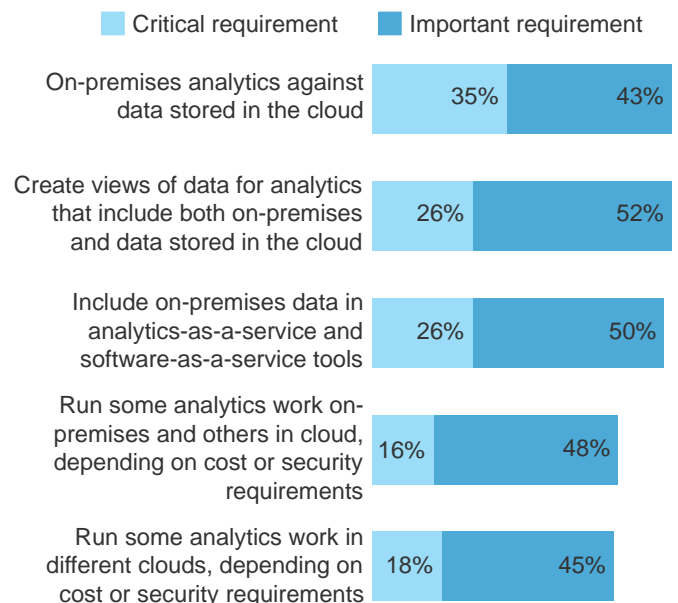
analytics hosted in the cloud is expected to increase by 5% or more in the next 12 months. In fact, one in five IT professionals surveyed expects data analytics and data management and processing in the cloud to increase by more than 10% over the next year. Interestingly, across the board, high-growth organizations (those defined as experiencing more than 10% year-over-year growth) are more likely to be increasing their use of the public cloud over low-growth companies.

› **Firms want hybrid capabilities as they move into the cloud.** Survey respondents were unanimous in their demand to enable their existing applications with insight from big data. The problem is that many of these apps will remain on-premises even if the analytics are done in the cloud, which means that firms need hybrid capabilities. Pure public cloud is not enough to satisfy the typical

FIGURE 5

Hybrid Cloud Capabilities Are Critical

"How important are each of the following mixed and hybrid cloud capabilities to your organization?"

■ Critical requirement   ■ Important requirement

On-premises analytics against data stored in the cloud — 35% | 43%

Create views of data for analytics that include both on-premises and data stored in the cloud — 26% | 52%

Include on-premises data in analytics-as-a-service and software-as-a-service tools — 26% | 50%

Run some analytics work on-premises and others in cloud, depending on cost or security requirements — 16% | 48%

Run some analytics work in different clouds, depending on cost or security requirements — 18% | 45%

Base: 166 IT professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016

enterprise, as respondents expressed a strong demand for all types of hybrid cloud options (see Figure 5).

BARRIERS TO CLOUD FOR BIG DATA ARE MANAGEABLE

We inquired about the barriers firms saw in moving their big data analytics to the cloud. While our respondents did select from a wide range of typical barriers, the response levels were low for any one barrier — the top-cited barrier, hybrid integration, was only selected by 35% of respondents. In comparison with other research we have done into cloud obstacles, the relatively low response rate for any individual barrier indicates to us that respondents felt that the obstacles are not insurmountable.

Looking at the obstacles overall, three major themes emerge: integration between cloud services and between on-premises and cloud; maturity of technology; and security (see Figure 6). Likewise, when we asked respondents about their biggest challenges in executing their big data strategies, 44% reported security concerns around data transfer as a top challenge, and 39% reported the maturity of technology around security as a challenge.

FIGURE 6
Integration And Security Are Barriers To Shifting Data To The Public Cloud

"What are your main barriers to moving all your organization's data into an enterprise public cloud platform?"

Barrier	%
Tools and solutions for integrating cloud and on-premises data and analytics capabilities are not mature enough	35%
Tools and solutions for integrating cloud components are immature	34%
Our security and compliance organizations are still not onboard	33%
Cloud data management tools are still not robust enough for our needs	30%
We do not think that cloud providers can meet our security needs	30%

"What are/were the biggest challenges in executing your vision for big data?"

Challenge	%
Security concerns around data transfer	44%
Maturity of technology around security	39%
Data silos created by technology implementation	30%
Lack of business competency to deal with data that is messy, diverse, or large	29%
Maturity of technology around governance and metadata management	29%

Base: 431 IT, line-of-business, and data professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016
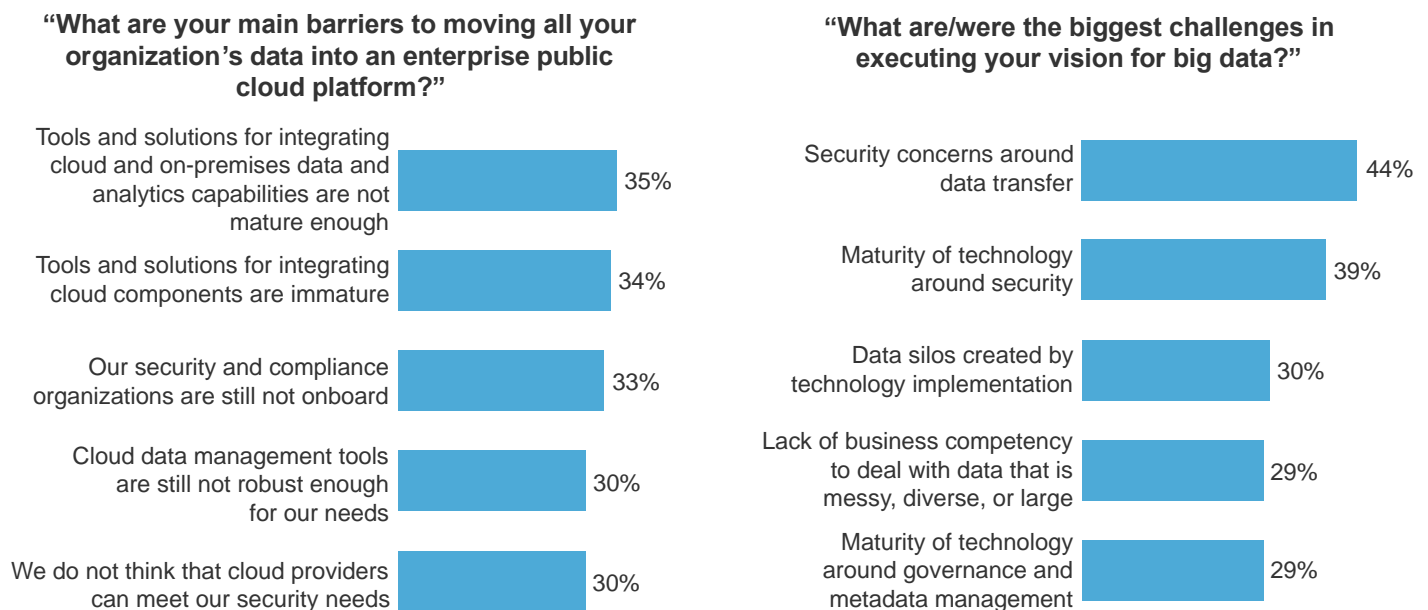
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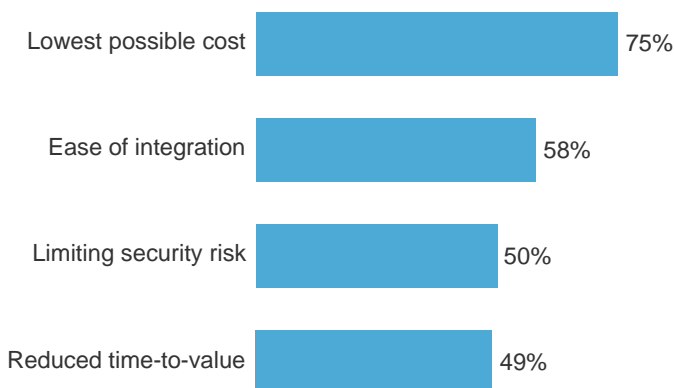# Insights-Platforms-As-A-Service Help Firms Grow And Innovate

Eighty-four percent of respondents confirmed that having the entire layer of data analytics technology in one stack was a critical or high priority in their plans. Furthermore, confidence that a single vendor solution can meet their needs was high — 79% of respondents agreed.

Forrester defines an insights-platform-as-a-service as an integrated set of data management and analytics service offerings provided by a single vendor through a cloud that it operates for multiple clients. Insights-platforms-as-a-service satisfy buyer desires for a single technology stack, address concerns about integration and security, and enable buyers to leverage the vendor's ability to scale. When we inquired further about insights platforms in the cloud, we found:

› **Firms want platforms to operationalize analytics applications and enable data science.** Eighty percent of respondents said they need an environment for operationalizing analytics at scale. Insights-platforms-as-a-service solve organizations' top analytics challenges. An integrated stack frees data scientists from constantly struggling with clunky, disparate tools and data and instead allows them to focus on innovation that can be quickly operationalized at scale.

› **Leaders are finding that insights-platforms-as-a-service cost less and are easier to use.** Of the organizations that have adopted an insights-platform-as-a-service, 75% believe that they are experiencing the lowest possible cost, while 58% are realizing easier integration as a benefit of the technology stack in one cloud (Figure 7).

› **Platforms are sticky because they do the hard integration work.** Our survey found that firms are increasing their footprint in many different types of data management and analytics technologies; therefore, a platform from a single provider promises to ease the integration burden (see Figure 8).

FIGURE 7
Enterprises With The Tech Stack In One Cloud Are Realizing Benefits

"What are the anticipated and/or already realized benefits of having shifted the stack into one cloud?"
(Select all that apply)

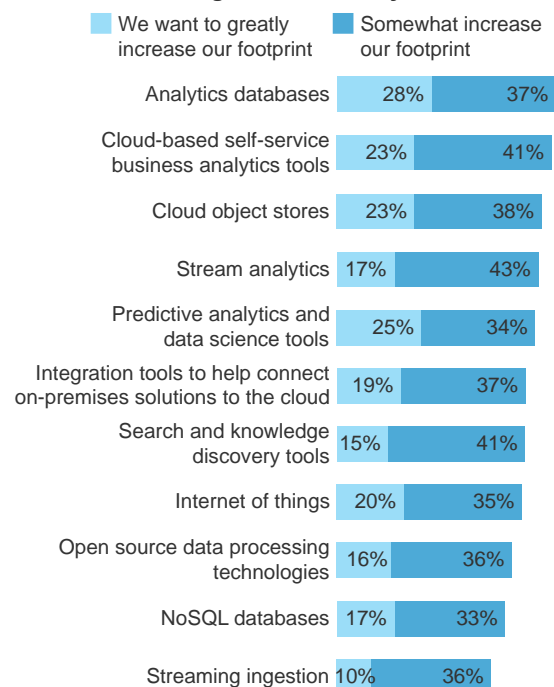|	
Lowest possible cost	75%
Ease of integration	58%
Limiting security risk	50%
Reduced time-to-value	49%

Base: 118 IT professionals responsible for big data who have shifted their stack into one cloud

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016

FIGURE 8
Enterprises Plan To Increase Data Management Capabilities

"Which of the following best describes your organization's priorities with respect to each of the following cloud capabilities for data management and analytics?"

■ We want to greatly increase our footprint ■ Somewhat increase our footprint

	We want to greatly increase our footprint	Somewhat increase our footprint
Analytics databases	28%	37%
Cloud-based self-service business analytics tools	23%	41%
Cloud object stores	23%	38%
Stream analytics	17%	43%
Predictive analytics and data science tools	25%	34%
Integration tools to help connect on-premises solutions to the cloud	19%	37%
Search and knowledge discovery tools	15%	41%
Internet of things	20%	35%
Open source data processing technologies	16%	36%
NoSQL databases	17%	33%
Streaming ingestion	10%	36%

Base: 166 IT professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016
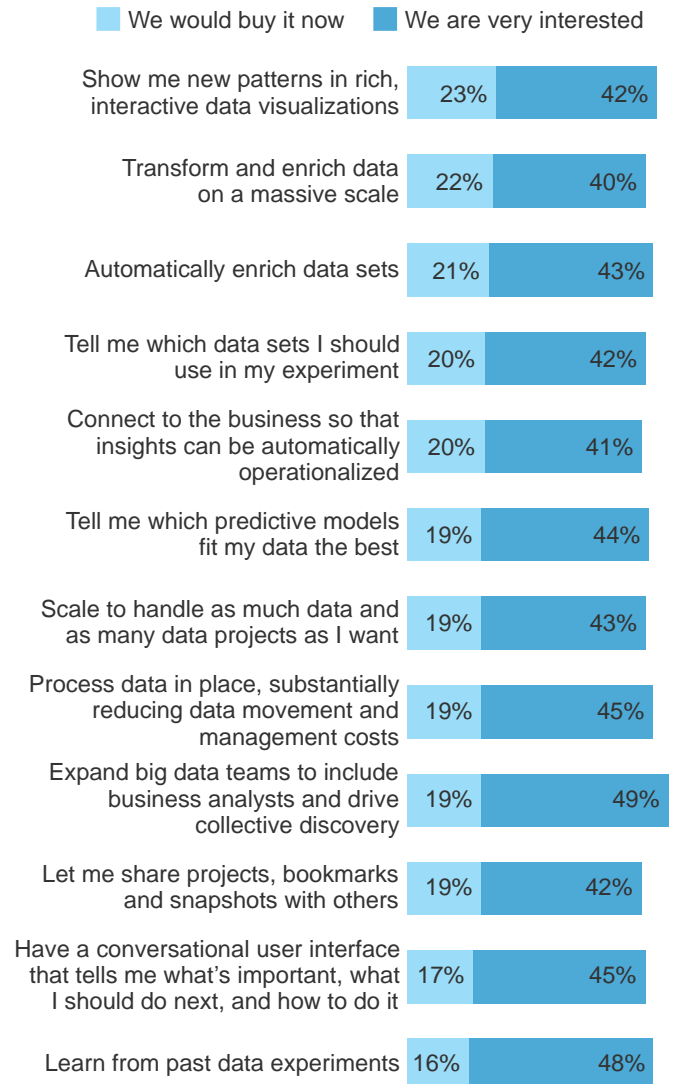
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INSIGHTS-PLATFORMS-AS-A-SERVICE SUPPORT DATA INNOVATION

Data innovation is an up-and-coming area of investment, so it's no surprise that 62% of IT leaders stated that they would buy a data lab immediately, in order to satisfy at least one of the goals or objectives listed in Figure 9. Insights-platforms-as-a-service are an ideal foundation for data labs, because they provide a complete analytics environment where teams can experiment with data to innovate. Furthermore, the on-demand and elastic nature of an insights-platform-as-a-service complements the innovation process.

FIGURE 9
Sixty-Two Percent Of Enterprises Would Buy A Data Lab Now

"To what degree would your organization be interested in a data lab to satisfy any of the following?"

We would buy it now   We are very interested

	We would buy it now	We are very interested
Show me new patterns in rich, interactive data visualizations	23%	42%
Transform and enrich data on a massive scale	22%	40%
Automatically enrich data sets	21%	43%
Tell me which data sets I should use in my experiment	20%	42%
Connect to the business so that insights can be automatically operationalized	20%	41%
Tell me which predictive models fit my data the best	19%	44%
Scale to handle as much data and as many data projects as I want	19%	43%
Process data in place, substantially reducing data movement and management costs	19%	45%
Expand big data teams to include business analysts and drive collective discovery	19%	49%
Let me share projects, bookmarks and snapshots with others	19%	42%
Have a conversational user interface that tells me what's important, what I should do next, and how to do it	17%	45%
Learn from past data experiments	16%	48%

Base: 431 IT, line-of-business, and data professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016

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Key Recommendations

Early promoters of big data identified the natural fit between large, diverse, and rapidly changing data sets and the cloud's scalable, elastic nature. While early technologies were scalable, they were not easy to integrate with other technologies, requiring all the data to be loaded in a single file store, limiting elasticity. Big data management and analytics capabilities, maturing in public cloud providers' portfolios, are finally catching up to the promise. IT executives and architects must:

› **Have a big data analytics strategy that embraces public cloud.** Very few firms have the skills and the business case to keep up with the blazing speed of big data analytics innovation. The cloud providers are leveraging scale and expertise to deliver more capability at a much lower cost. Your internal IT cannot compete, even with a private cloud solution.

› **Select a platform that accelerates data science, data innovation, and closed-loop systems of insight.** Insights-platforms-as-a-service bring a lot to the table. Enterprise data management? Check. Breadth of analytics tools and libraries? Check as well. It's important to focus on features that will ensure your firm gets the top-line, customer-oriented benefits it expects from big data. Select a platform with better and more integrated tools for data science — tools that support building out data lab sandboxes for innovation and exploration. Also understand that while most service providers will focus on data management and analytics, the best will also provide tools that help you capture feedback data, learn, and rapidly iterate in closed-loop systems of insight. Building systems of insight on insights platforms will ensure that you can quickly and iteratively derive benefits from your investment.

› **Differentiate between insights platform suites and insights-platforms-as-a-service.** Technology managers we speak with are often interested in comparing insights platform suites with insights-platforms-as-a-service. Understand the difference — it's not an apples-to-apples comparison. Insights platform suites are partially integrated tools that vendors sell separately and that can be installed either in the cloud or on-premises. Insights-platforms-as-a-service are operated in the vendor's cloud and cannot be installed on-premises. The full potential of big data in the cloud can be more easily achieved through insights-platforms-as-service because they better leverage the scaling capabilities of the service vendor. However, migrating to an insights-platform-as-a-service is rarely just a lift-and-shift operation. It requires firms to rethink and redesign their analytics architecture and many of their analytics applications; make the decision carefully.

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Appendix A: Methodology

In this study, Forrester conducted an online survey of 431 organizations across the Americas (Canada, Brazil, Mexico, and the United States), Europe (France, Germany, Italy, Spain, and the United Kingdom), and Asia Pacific (Australia/New Zealand, China, Singapore, and South Korea) to evaluate current and future big data trends. Survey participants included decision-makers in IT, line-of-business, and data science roles with the responsibility for setting business analytics or data strategy and budgets, evaluating data and analytics technology vendors, approving data and analytics technology, and/or monetizing data or data analytics as products. Questions provided to the participants asked their perspective on data and analytics use cases and challenges. Respondents were offered an incentive as a thank you for time spent on the survey. The study was fielded in October 2016.
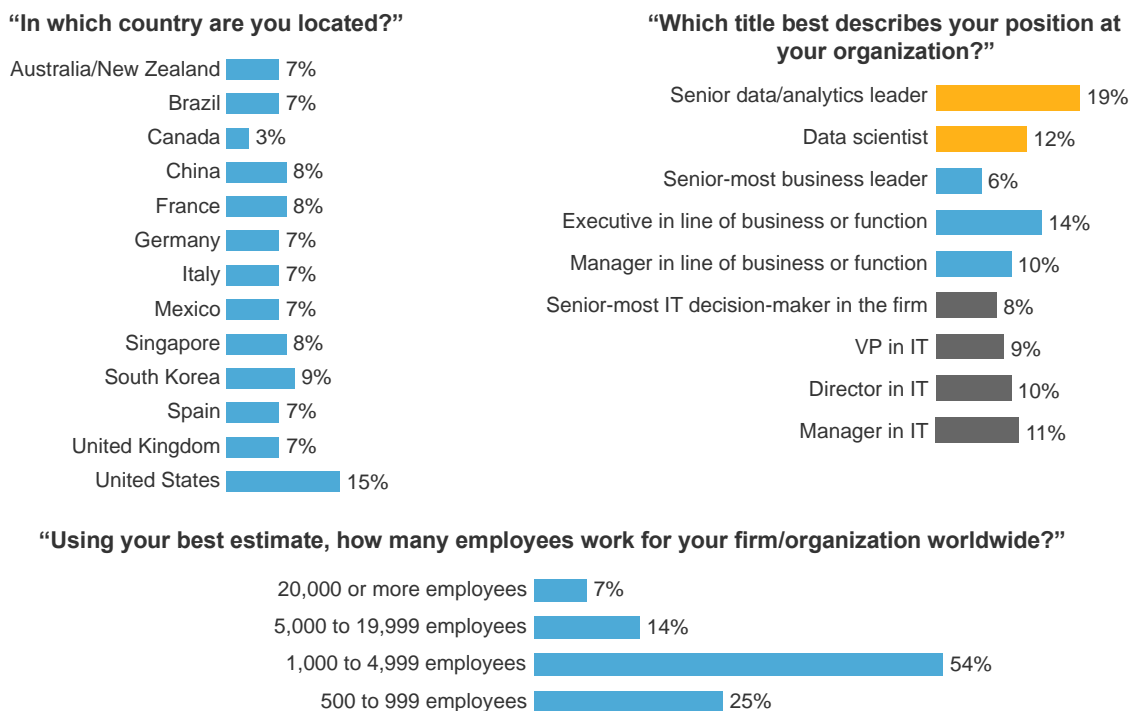
Appendix B: Supplemental Material

RELATED FORRESTER RESEARCH

"Predictions 2017: Enterprise Architecture In 2017 And Beyond," Forrester Research, Inc., November 3, 2016

"The Insights-Driven Business," Forrester Research, Inc., August 1, 2016

Appendix C: Demographics

FIGURE 10
Study Demographics: Location, Company Size, And Role

"In which country are you located?"

Country	%
Australia/New Zealand	7%
Brazil	7%
Canada	3%
China	8%
France	8%
Germany	7%
Italy	7%
Mexico	7%
Singapore	8%
South Korea	9%
Spain	7%
United Kingdom	7%
United States	15%

"Which title best describes your position at your organization?"

Title	%
Senior data/analytics leader	19%
Data scientist	12%
Senior-most business leader	6%
Executive in line of business or function	14%
Manager in line of business or function	10%
Senior-most IT decision-maker in the firm	8%
VP in IT	9%
Director in IT	10%
Manager in IT	11%

"Using your best estimate, how many employees work for your firm/organization worldwide?"

Employees	%
20,000 or more employees	7%
5,000 to 19,999 employees	14%
1,000 to 4,999 employees	54%
500 to 999 employees	25%

Base: 431 IT, line-of-business, and data professionals responsible for big data in global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle and Intel, October 2016

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