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Thought Leadership Paper
Commissioned By SAP

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Powering The Intelligent Enterprise With AI, Machine Learning, And Predictive Analytics

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Executive Summary

The intelligent enterprise is powered by applications — both business process and customer experience applications. These applications make informed decisions, navigate flexible business processes and, most importantly, these applications understand the lifeblood of all enterprises: customers. In the emerging age of artificial intelligence, "intelligence" means applications that are infused with smarter decision and process logic information by predictive analytics and machine learning. At least that's the goal. In reality, too often do enterprises struggle to scale data management, analytics, and data science practices to create and infuse these nuggets of intelligence into applications. New approaches and tools are necessary, and most importantly, non-data scientists must join the AI party by using tools and platforms that democratize data science. The result is a proliferation of smart models that collectively create the intelligent enterprise.

SAP commissioned Forrester Consulting to explore the hypothesis that enterprise data science, technology, and business teams struggle to satisfy the dramatically increased demand for predictive analytics or machine learning (PAML) models to support various elements of the business. In response to these struggles, businesses must become more productive by embracing a new generation of PAML solutions that offer automation and enable non-data scientists to be more engaged with data. To test this hypothesis, Forrester conducted a survey of 353 global decision makers who are both involved with PAML and familiar with enterprise applications. The survey found that companies are indeed struggling to keep up with demand for PAML, but they are making strides to remedy those challenges through greater investment and priority on PAML capabilities.

KEY FINDINGS

- **Seventy-nine percent of companies see a growing demand for machine learning models.** Over 90% of companies said PAML models are integral to the ongoing success of their business; however, this demand has put an untenable burden on data science teams to create such models, and 64% of companies surveyed said it is hard for their internal teams to keep up with the demand for PAML models.
- **Companies flail when it comes to infusing machine learning models in production applications.** Roughly half of companies struggle with the complexity of deploying and managing models used in production applications. This is both caused and compounded by the lack of skilled personnel (e.g., data scientists) to support demand (42%).
- **Data scientists are not scalable; everyone must be enabled with AI technology.** New, automated PAML solutions put analytics into the hands of non-data scientists — business analysts, domain experts, engineers, marketing professionals, etc. To this end, over 80% of companies expect their investments in predictive analytics and machine learning (PAML) to grow over the next 12 months.

The Intelligent Enterprise Is Built Brick By Brick With Predictive Analytics And Machine Learning Models

Enterprise teams can use PAML solutions to ideate, develop, deploy, and manage probabilistic models that make predictions about customers, business processes, and operations.[1] These predictions support better decision making in businesses and enable greater business efficiency through automation of repetitive tasks such as invoice matching. The application of PAML capabilities is important to nearly all companies — 93% said PAML is integral to the ongoing success of their business, and 88% agreed that the next generation of enterprise applications will be infused with machine learning and other AI technologies (see Figure 1).

Not all organizations build and deploy custom PAML capabilities in-house. Considerations include whether a suitable packaged solution exists, if the proper skill sets are available, if the right tooling and platforms are in place, time constraints, and other costs. PAML solutions offering automation help to put analytics into the hands of non-data scientists, reducing the reliance on data-science teams.

Machine learning is fundamental to AI, and enterprises that want to leverage AI must start with PAML solutions — either within applications or through customized solutions.[2] This recognition is driving higher demand; nearly 80% of companies agree that demand is increasing for PAML. However, this demand has put increased burden on data-science teams, and 64% of companies surveyed said it is hard for their internal teams to keep up with the demand for PAML. Acknowledging the value of PAML is important, but without the resources to build and deploy it, or the tools to reduce the burden on internal teams, the benefits of PAML will be limited.

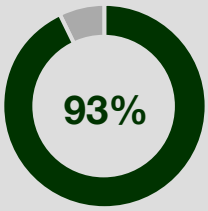
64% of companies find it hard for their internal teams to keep up with the demand for PAML.

Figure 1

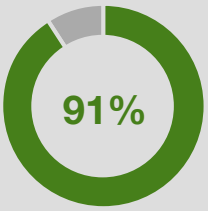
PAML capabilities are critical to all aspects of the business.

PAML models are . . .

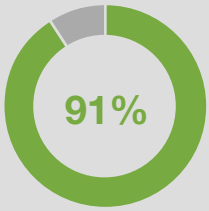
. . . important for building more personalized customer experiences.



. . . needed to drive efficiency with back-end applications.



. . . needed to drive efficiency of customer-facing applications.



88% of companies believe the next generation of enterprise applications will be infused with machine learning and other AI technologies.

Base: 353 global decision makers involved with machine learning and familiar with enterprise applications
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, April 2018

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PAML Demand Comes From All Parts Of The Business

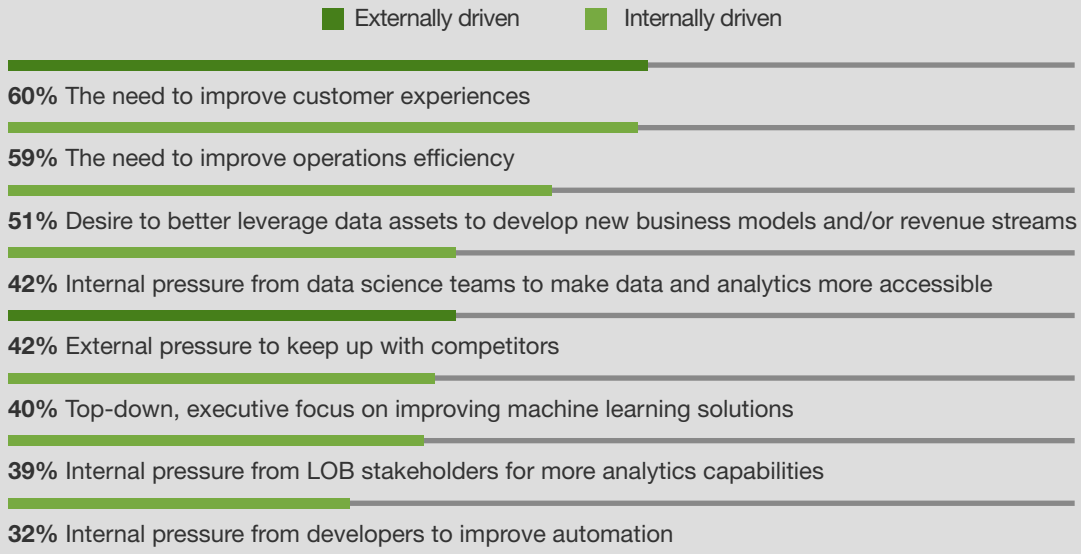
While PAML's utility for improving the customer experience is well-known, companies are beginning to recognize its potential for driving internal efficiencies. Our research found that:

- **PAML demand is driven by the need for external (e.g., customer experience) and internal (e.g., operational) improvements.** There are a number of use cases driving demand for PAML solutions (Figure 2). The top driver is the customer experience imperative (60%) followed closely by the need to improve internal operational efficiency (59%). Businesses recognize the value of their data assets and widely acknowledge their struggle to make use of them. They see an answer in PAML.
- **Businesses are seeing an equalization of PAML usage between customer and operational applications.** Eighty-five percent of respondents use PAML for a mix of customer-facing and employee-facing applications; 43% of which use both types of applications in equal measure. This reinforces the value of PAML for internal and external users.

43% of respondents use PAML in equal measure for front-end and back-end applications.

Figure 2

"What is driving demand for predictive analytics and machine learning technology and solutions?"



Base: 333 global decision makers involved with machine learning and familiar with enterprise applications
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, April 2018

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THE PRIMARY CHALLENGES WITH PAML ARE TACTICAL, NOT STRATEGIC

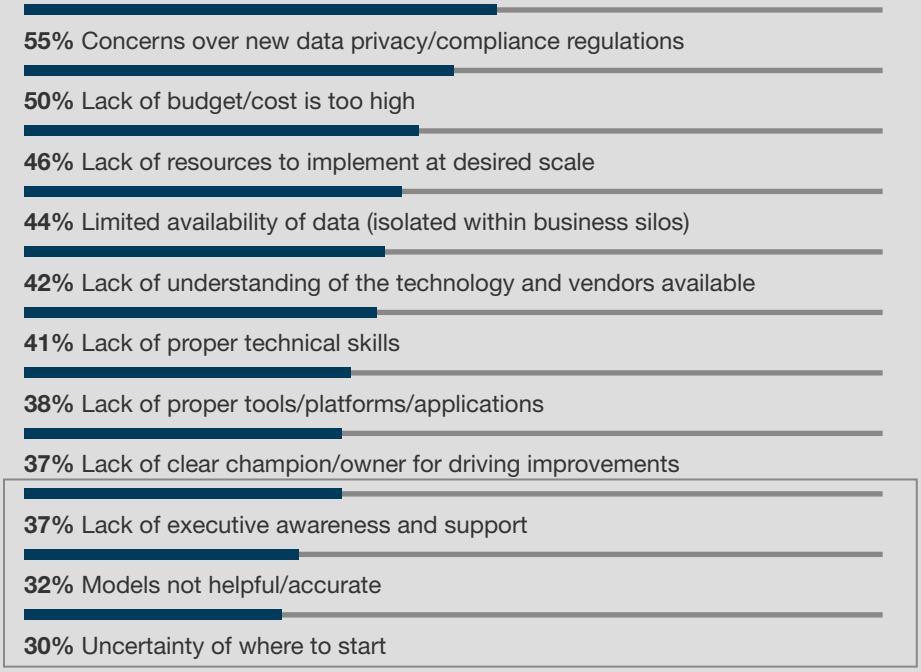
While many business challenges often stem from a lack of executive support, that is not the case with PAML. Decision makers all the way up to the C-suite recognize the usefulness of PAML, and as machine learning becomes increasingly accessible, companies have indicated that they both know where to start and that they have the senior support needed to move forward (Figure 3).

So, if businesses have the executive support they need and understand the different use cases for PAML, what is holding nearly two-thirds back from keeping up with the demand for PAML? Over half of respondents (55%) ranked concerns over new data privacy and compliance as a barrier to adopting PAML solutions. This underscores the need for real-time data anonymization capabilities and tools to enable compliance in light of new regulations such as the General Data Protection Regulation (GDPR). Also, forty-eight percent of companies said they struggle to deploy and manage models used in production applications. This is both caused and compounded by the lack of skilled personnel (e.g., data scientists) to support demand — a challenge for 42% of companies. This challenge highlights a key opportunity for companies to utilize prebuilt solutions from technology partners, enabling them to implement PAML capabilities without traditional data-science expertise.

Decision makers all the way up to the C-suite recognize the usefulness of PAML.

Figure 3

"What are/were the biggest barriers keeping your organization from more readily adopting predictive analytics and machine learning solutions?" (Ranked 1 to 5)



Smallest barriers in adopting PAML solutions

Base: 353 global decision makers involved with machine learning and familiar with enterprise applications
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, April 2018

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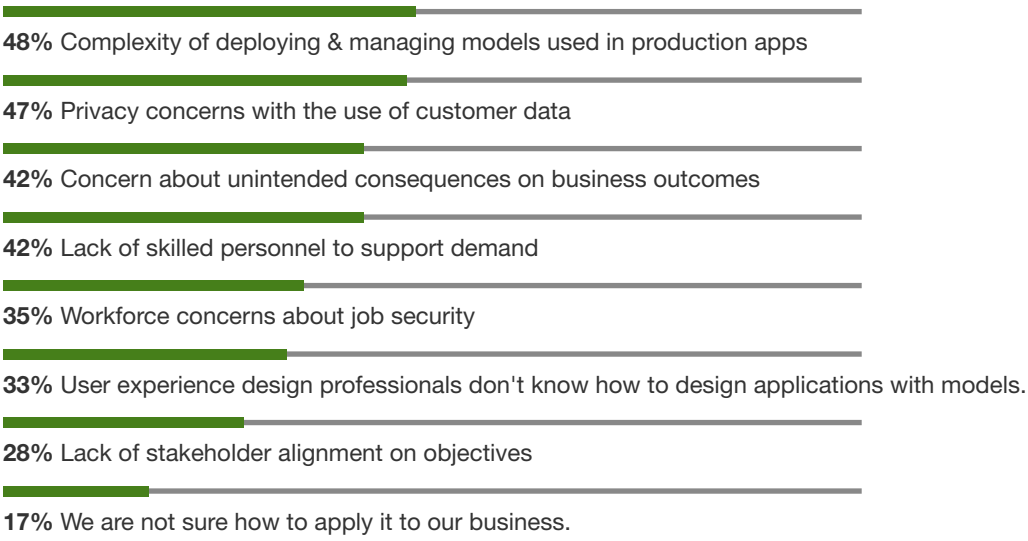
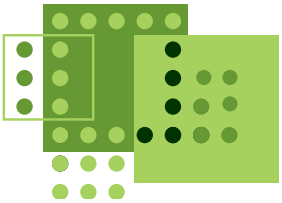
Figure 3 (Cont.)

"What are the organizational challenges your company faces with the ongoing support of its predictive analytics and machine learning solutions?"



Base: 353 global decision makers involved with machine learning and familiar with enterprise applications
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, April 2018

Data Scientists Are Not Scalable: The Entire Enterprise Must Be Enabled With AI Technology



Most companies have barely scratched the surface of what is possible with PAML. Interestingly, data-science professionals more commonly felt like their company had a broad application of PAML across various use cases compared to business end users who indicated the number of PAML use cases was still relatively small. This illustrates that end users are not seeing the volume of PAML applications that they'd like, which validates the need for greater automation-focused solutions to address volume challenges.

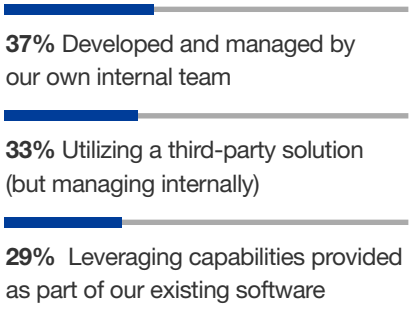
This growing demand further reinforces the importance of companies to make their PAML capabilities more accessible to "citizen data scientists" by embedding those capabilities within applications that employees are using. This also includes the opportunity to discuss areas where a prepackaged PAML solution could be directly deployed by a software vendor to meet that same need. As well, there are a number of prebuilt PAML solutions that address specific needs (such as customer experience). These solutions alleviate the need for an substantial internal development effort to get the intelligent application functionality which companies desire. Regardless of the method of implementation, nearly eight in 10 (79%) respondents anticipate increased executive support for PAML going forward with over 80% anticipating PAML investments to grow over the next 12 months.

With those added investments in PAML, companies are able to take incremental steps toward accomplishing their advanced analytics priorities. The most common steps include:

- **Better applying machine learning automation across the business.** Having enough time and resources to manage and support analytics can be challenging. Automation through machine learning helps to alleviate those challenges and allows companies to expand the reach of their analytics capabilites to support more parts of the business. One way companies can better expand access to data insights is by seeking out intelligent products with embedded PAML capabilites.This also reduces the burden on data-science teams to support all analytics requests.
- **Providing better access to data.** PAML outputs are only as good as the data populating them. As companies explore new uses cases for PAML, they likewise need to ensure that their PAML solutions and applications are connected to relevant data streams to support them. Companies can also explore data management platforms to help manage data and queries across all cloud types (local, private, and public) and to help ensure real-time data protection and privacy for GDPR, given present security concerns.
- **Investing in better technology to support development teams.** With production being a key pain point with PAML currently, companies want to put the right platform and tools in place to support the growing demand. There is no single solution to solve current challenges; evidenced by many oganizations preferring a mix of build and buy solutions for expanding PAML capabilities (see Figure 4).

Figure 4

"What best describes your company's approach to PAML technology?"



Base: 353 global decision makers involved with machine learning and familiar with a applications
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, April 2018

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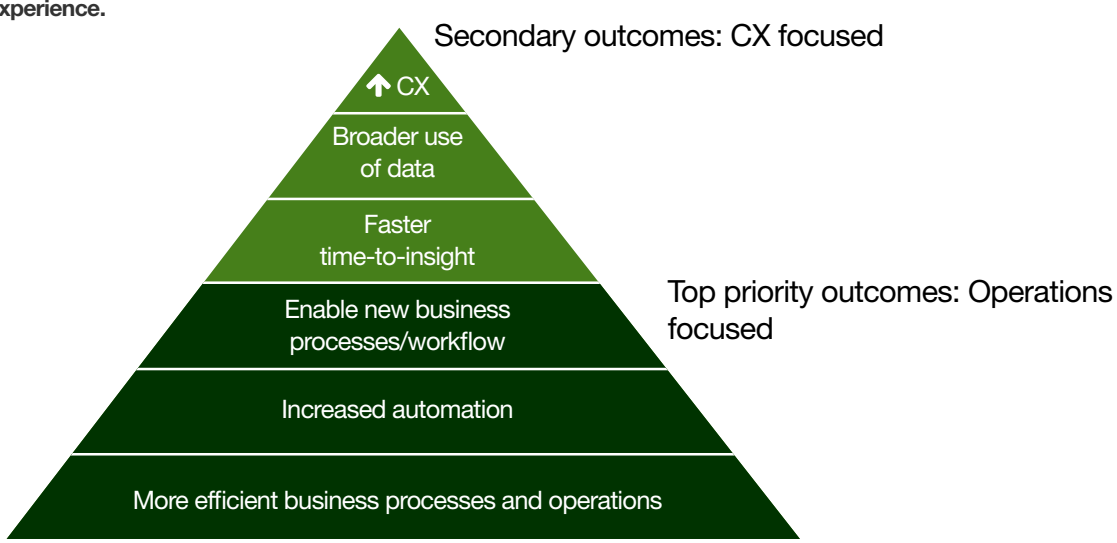
PAML IMPROVEMENTS DRIVE HOLISTIC BUSINESS BENEFITS WHICH ULTIMATELY SUPPORT INCREASED CX

Businesses can expect to see substantial benefits as they take the steps to improve automation through machine learning, to empower data science and IT teams with great data accessiblitiy and visiblity, and to put the right technology in place to support better PAML implementation. The most immediate benefits are seen at the ground level with more efficient processes and operations, followed by more timely data usage, refreshed workflows, and adoption of AI applications. In sum, these benefits enable businesses to make decisions that will improve CX, which, in the long run, is what will drive revenue (see Figure 5).

Figure 5

The desired outcomes of PAML improvements focus first on operational improvement in order to support better customer experience.



Base: 353 global decision makers involved with machine learning and familiar with enterprise applications
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, April 2018

Key Recommendations

Don't wait. Enterprises must deliver machine learning models at a regular cadence, but also with an increased velocity. Data-science teams don't scale. Enterprises must invest in PAML solutions that enable a broader range of business stakeholders. It is a competitive imperative that your firm meet the increasing demand head-on with both short-term and long-term strategies, including:

Harvest both low-hanging and high-hanging fruit. Where there is high demand and few resources, there must be a corresponding prioritization process. Build and publish a method for prioritization to ensure that requests aren't addressed for any reason outside of high-business value. This prevents projects from being tackled because they are the proverbial low-hanging fruit, they were lobbied for by a department head who perceives that team to be underserved by data science, or because one executive sponsor had more organizational influence than another. Note that this recommendation doesn't translate to making the data-science team an internal service bureau, with the governance that typically goes along with that. It simply recognizes that when every initiative can't be addressed, a transparent and business-driven prioritization process is one mechanism to manage demand and limited resources.

Stay flexible in your approach to PAML. Predictive analytics and machine learning solutions run the gamut from meeting the specific needs of data-science teams to extending the capabilities for model building to non-data science pros.[3] With no end in sight to the massive demand on data scientist resources, some firms will need to explore arming analytically-aware generalists with tools that enable self-service or at least collaboration. Distributing PAML projects will still need to follow prioritization guidelines. For instance, custom models will still require data scientists combined with sophisticated tools. Some high-priority needs may be better met with prepackaged solutions or extensions to your existing business applications.

Recognize back-office operations as key to customer experience. This survey reflects that PAML demand is driven equally by the need for customer-centric and operations-centric improvements, which we applaud. This data highlights that back-office investments are required to run the business and serve customers and business partners, and further, challenges the notion that "front-office" (external-facing) and "back-office" (behind the scenes) are distinct. Customers are looking to find efficient, organizationwide processes; in fact, much customer discontent can be attributed to under-investment in back-office operations like finance. As the demand for data scientists continues to increase, keep this balance top of mind in your organization.

Get over your production woes. Forty-eight percent of companies said they struggle to deploy and manage models used in production applications, indicating that moving models to production is a process that needs attention. This is concerning in that it is a late-stage problem, meaning that limited data scientists were allotted to model development and that some problem or flaw was recognized very late in the game; presumably, issues identified earlier could have been addressed more efficiently. Assess your organization's processes that define moving models to production. Look for action steps (signoffs, reviews, testing efforts) that could be conducted earlier in the process to address issues sooner. Further, review any policies that define model transition to production and see if those policies need review by data scientists. Summarily, identify your own production barriers and address them.

Use the wheel that's already been invented. Some needs may be better met with prepackaged solutions or extensions to your existing business applications. If your organization struggles to develop custom applications, consider evaluating prepackaged solutions that have historically solved the business problem you need to solve for. An evaluation can go a long way in determining just how "custom" your custom application needs to be, or whether a vendor has in fact done the heavy lifting for intelligent automation of your targeted business process and can provide a more efficient path.

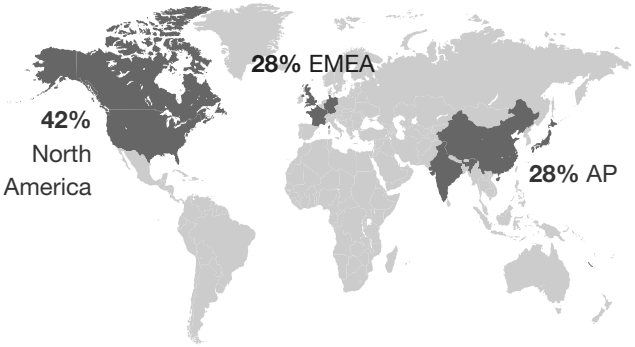
Businesses need increased investment in PAML to keep up with and deliver intelligent enterprise, but they also better processes and more flexible approaches.

Appendix A: Methodology

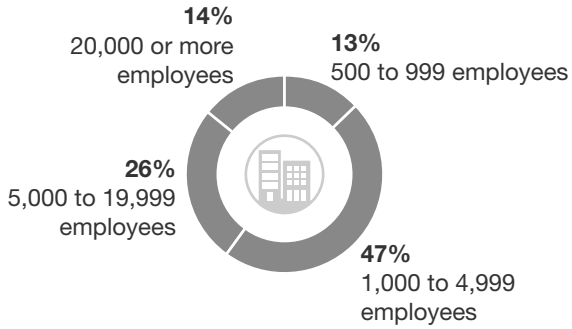
In this study, Forrester interviewed 353 global decision makers involved with machine learning and familiar with enterprise applications. Questions provided to the participants asked about their company's use of predictive analytics and machine learning models, and the challenges associated with that. Companies surveyed were from the US, EMEA, and AP and had employee counts of 500 or more. The study was completed in April 2018.

Appendix B: Demographics/Data

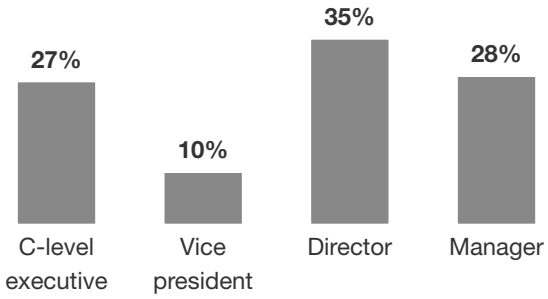
REGION



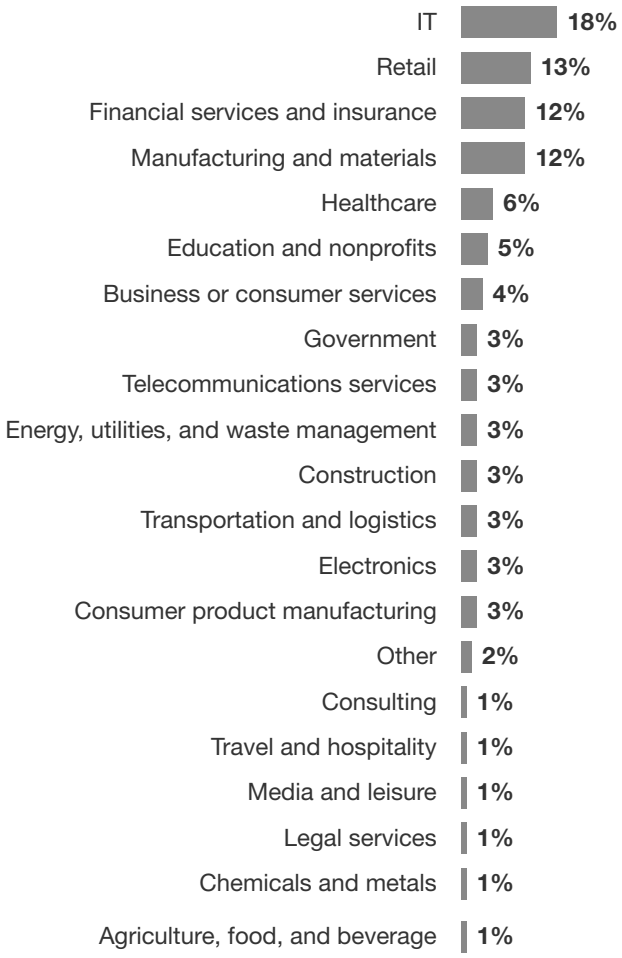
COMPANY SIZE



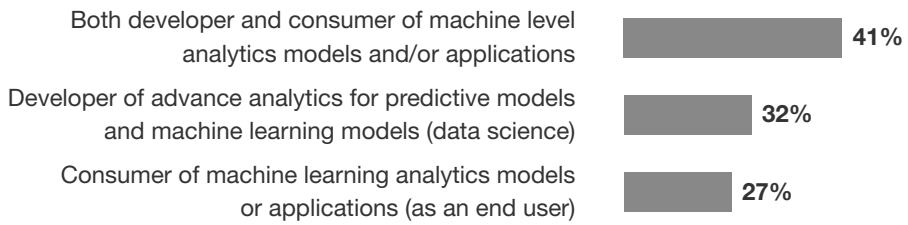
LEVEL



INDUSTRY



PAML CONSUMER OR DEVELOPER



Base: 353 global decision makers involved with machine learning and familiar with enterprise applications
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, April 2018

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Appendix C: Endnotes

[1] Source: “Now Tech: Predictive Analytics And Machine Learning Solutions, Q2 2018,” Forrester Research, Inc., April 26, 2018.

[2] Source: “A Machine Learning Primer For BT Professionals,” Forrester Research, Inc., September 5, 2018.

[3] Source: “Now Tech: Predictive Analytics And Machine Learning Solutions, Q2 2018,” Forrester Research, Inc., April 26, 2018.