Data-driven: Big decisions in the intelligence age

Executives want greater speed and sophistication in their decision-making, but most say their ambition is greater than what their organisations are ready for.

What does a truly data-driven business look like as a new age of artificial intelligence dawns – and how do organisations find the right balance among all the moving parts behind big decisions?

Emerging technologies such as machine learning, natural language processing, and conversational agents can create giant leaps of efficiency, meaning, and insight hidden within businesses and the world at large – an enormous opportunity for leaders to make more informed and effective decisions. Seizing the opportunity will require leaders who can weigh the power and influence of both artificial and human intelligence,

finding a balanced path that makes the most of each unique capability.

In our latest survey we've captured a ground-level view across 2,100 C-suite leaders, business unit heads, and SVPs as they grapple with the biggest choices facing their companies. These leaders say they are sold on the power of data and analytics to deliver insight into key questions they need to answer. They want to be more data-driven, but acknowledge there is more to do – two-thirds (61%) say their own companies' decision-making is only somewhat or rarely data-driven.

Most companies are still on the cusp of change – aware of the

machine power at hand, yet clinging to a status quo that relies on decision cultures based on intuition and past experiences. Machines simply haven't been put to work at what they do best. For example, machines are far better at calculating nonlinear influences and handling many factors, such as complex pricing variables. "The best person, even if he has a lot of experience, cannot handle more than three or four influencing factors, but a machine can calculate a probability distribution and make the optimal decision mathematically," says Michael Feindt, a physicist and an expert on algorithms.

There's more we can know

"Humans by nature are comfortable with the status quo in how they make decisions," says Floyd Yager, chief data officer at Allstate. Most executives simply don't process the world in a deeply analytical way. Now that business is facing this giant algorithmic leap, leaders need to disrupt their cultures to benefit from the opportunity machines offer. "There is more we can know, and fewer assumptions we have to make," Yager says. "That doesn't eliminate the need for judgment, it just changes the process."

Dan DiFilippo, partner and global and US data & analytics leader at PwC, says top executives often discount the data presented to them by their teams. In PwC's initial report on decision-making, half of top executives (52%) said they have discounted data presented to them.[1] To DiFilippo, it's more likely that executives will discount analysis when it isn't explained clearly or the approach is unfamiliar.
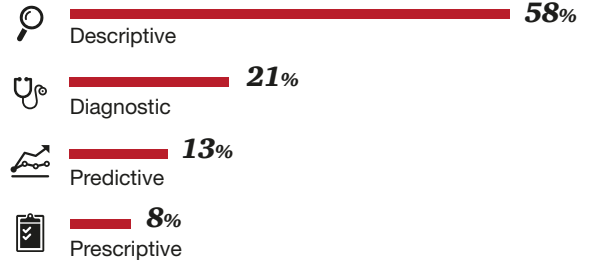
"If you're making decisions, trusting data shouldn't be holding you back," DiFilippo says. What you should be thinking about is how to frame the problem, how you can take advantage of the available data that's out there, and what the strengths and weaknesses are of the approaches to use the data."

"The lifeblood of any seasoned, successful business leader is experience and intuition," adds Paul Blase, a principal and global and US data & analytics consulting leader at PwC. These leaders are confident of themselves and their instincts, for very good reasons. But sometimes the data can tell them their intuition is off. To become a data-driven organisation, leadership needs to set the tone. "You have to accept experimentation and failure," Blase says. "But in a lot of decision cultures, instead of using data and analytics to explore and discover, they start using it to support the conclusions they want."
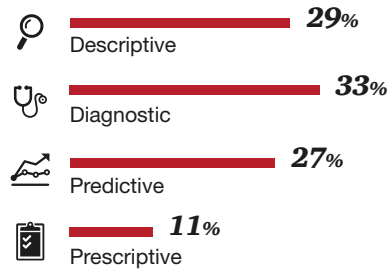
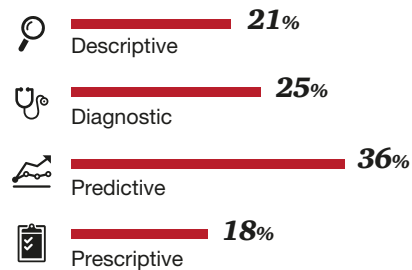## Two-thirds say decision-making is only somewhat or rarely data-driven

Rarely data-driven

8%

Descriptive	58%
Diagnostic	21%
Predictive	13%
Prescriptive	8%

Somewhat data-driven

53%

Descriptive	29%
Diagnostic	33%
Predictive	27%
Prescriptive	11%

Highly data-driven

39%

Descriptive	21%
Diagnostic	25%
Predictive	36%
Prescriptive	18%

Source: PwC's Global Data and Analytics Survey, July 2016. Q: Which of the following describes decision-making at your organisation? How would you describe your organisation's use of analytics? Bases: Rarely data-driven: 165; Somewhat data-driven: 1,077; Highly data-driven: 797.

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1 PwC's Global Data and Analytics Survey: Big Decisions™, September 2014.

PwC's Global Data and Analytics Survey 2016: Big Decisions™

To get a clear understanding of how business leaders approach decision-making in their organisations, PwC used a narrative-led methodology to see experiences that otherwise wouldn't be captured in standard survey instruments.

As of May 15, 2016, PwC and Forbes Insights have collected micro stories and other signifying data from more than 2,100 C-suite leaders, business unit heads, and SVPs across more than 10 countries and 15 industries. We asked these leaders about decision-making in their organisations: The degree to which they see themselves as data-driven; their reliance on machine learning versus human judgment; their needs around decision-making speed and sophistication; and the limitations they face.

Speed and sophistication

In the swirl of clickstreams and sensorstreams, the speed at which businesses make decisions and the sophistication of the techniques they use to find the right insights matter a lot.

Feindt knows a thing or two about the speed and sophistication of data. A former researcher at CERN, the European Organisation for Nuclear Research, he is known for the discovery of an elusive and invisible particle in fast-flowing masses of data – the Higgs boson. He wrote algorithms that sifted through petabytes of data released by sub-atomic collisions in the group's giant particle accelerator.

Now Feindt is the founder and chief scientific advisor of Blue Yonder, a firm that offers his predictive analytics technology to firms, especially retailers. "We were not interested in raw data because most of it was completely unimportant for the questions we were asking," he says, speaking of tens of millions of particle collisions in a fraction of a second. "We were interested in the statistical analysis, finding patterns, making predictions. When something happens very fast you need to have extremely accurate measurement to extract knowledge and quantify the uncertainty."

Business leaders are chasing their own Higgs bosons. Results from this year's survey show that executives have big ambitions around both speed and sophistication. "They all say they need to improve," DiFilippo says, "and that

they need to do it quickly speaks to the environment they feel themselves operating in. Most don't think they will get to where they think they should be by 2020."

Improving decision-making capabilities is a challenge. "When we looked at this question in 2014, we saw organisations mostly reacting." DiFilippo says. "There's an opportunity to do something and you react. You can't take months to find and analyse an opportunity. You can't even take days. It could be a moment, if we're talking about something like pricing. Can you make good decisions quickly? That's what a focus on decision speed and sophistication means to me."

Start with human judgment

How can organisations get better at making decisions? The use of data analytics and emerging technologies can help you uncover patterns that lead to new predictions – what Feindt calls the "prediction of all possible futures" – enabling executives and their teams on the ground to move past uncertainty. Even businesses that are not yet focused or efficient with data can see results by freeing their records from silos and beginning to create a culture around information. "There are models that are robust against missing data," he says. "Most of big data – most of Internet data – is completely unimportant for most of the questions in the world. Only a few things are relevant for answering specific questions. The art is to reduce the amount of noise to find really interesting patterns."

"What I want is your judgment on the front-end to help me understand the problem and ask the right questions. That way I can use data and analytics along with that judgment to build the best model."

Floyd Yager, Chief Data Officer, Allstate

In our survey, just over half of decision-makers say the analysis they require relies primarily on human judgment rather than machine algorithms (59%), meaning they rely on judgment to frame the problem and help them ask the right questions.

Allstate's Yager agrees, framing a thought around what a team might ask of the C-suite. "What I want is your judgment on the front-end to help me understand the problem and ask the right questions," he says. "That way I can use data and analytics along with that judgment to build the best model, understand what's likely to happen, what's the optimal outcome you're trying to achieve, and give you a better path to get there – perhaps not even a better path, perhaps the same path you wanted. We just know now that it's the best one we can be on."

Being data-driven is about people – having the talent and leadership strength to get the right information to the right places at the right time and take action. "It's about using judgment to frame the right questions and using data to get a fine-grain awareness of every aspect of your value chain and every aspect of your employee base, and turning that into a powerful capability," says Blase. "When you align your people with insights from data, from the C-suite to the front lines or the shop floor, you are no longer concerned about outside disruption," Blase says. "Instead, you are in a position to shape your own sector because you are able to see and do more."

Executives want to increase decision speed and sophistication
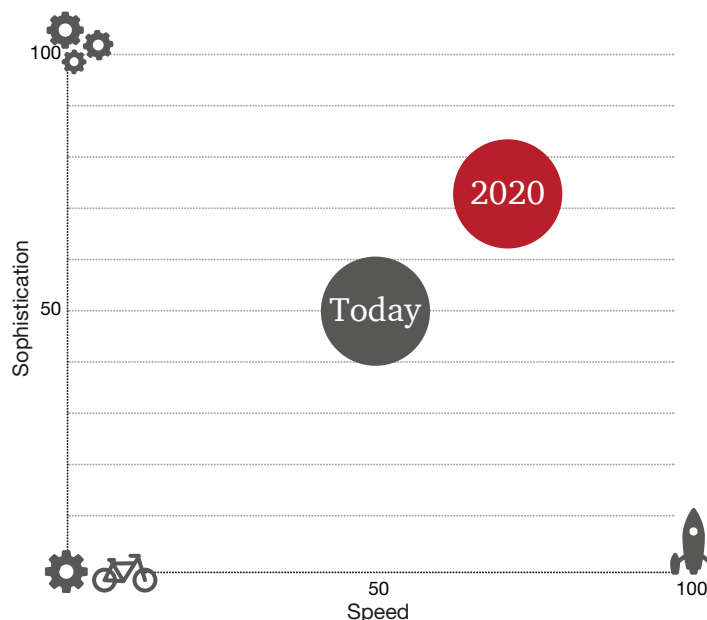
Source: PwC's Global Data and Analytics Survey, July 2016. Q: What best describes decision-making capabilities in your organisation today? Global base: 2,106 senior executives.

www.pwc.com/bigdecisions

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