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Bullish on the business value of cognitive

Leaders in cognitive and AI weigh in on what's working and what's next

The 2017 Deloitte State of Cognitive Survey



Executive summary

With all the talk about cognitive and artificial intelligence (AI) technologies in business circles today, it's natural to wonder whether these capabilities are having any measurable impact.

So we asked some of the most aggressive adopters of cognitive technologies how they have fared to date, focusing on 250 "cognitive-aware" leaders within "cognitive-active" companies. Why this group in particular? Not only can early-phase signals from such early adopters provide a view from the front lines of these important developments, but many other executives are simply not yet sufficiently knowledgeable about cognitive technologies.

What did these leaders tell us? Our survey results indicate that early adopters are bullish on cognitive and AI technologies, with expectations that they will transform both companies and entire industries. When these technologies are effectively integrated into workflows, they can directly influence how organizations accomplish tasks, make decisions, create engaging interactions, and generate stronger business outcomes.

However, cognitive technologies are still maturing. The vendor landscape is fragmented; there is still a shortage of talent; and many initiatives are only focused on internal functions within companies, rather than on developing new products or improving customer interactions. Integration with existing systems remains a principal challenge.

We also asked respondents about the impact of cognitive technologies on the workforce. The picture is, for the most part, highly positive. A significant majority of respondents say

they've either added jobs related to cognitive technologies or have experienced little or no job loss arising from their cognitive projects so far. They tend to expect this pattern to hold over the next three years as well, though with an uptick in the number who expect a moderate loss of jobs during that period.

Survey respondents were split on the level of transformation that cognitive technologies will drive. A portfolio approach may be best for many companies—exploiting early opportunities to build capabilities and develop institutional support, while at the same time focusing on more transformational innovation in support of individual products, processes, or business models.

Although all the respondents profiled were experienced with cognitive technologies, some were more experienced than others. The most aggressive segment of respondents had implemented more projects, invested more money, employed more sophisticated technologies, and was the most positive about their outcomes. Two other groups were still positive overall about their more conservative approaches, but somewhat less so.

On our usage of the terms "cognitive" and "AI"

In this paper, we will use the terms "cognitive technologies" and "artificial intelligence (AI)" interchangeably. Both refer to technologies that can perform and/or augment tasks, help better inform decisions, and create interactions that have traditionally required human intelligence, such as planning, reasoning from partial or uncertain information, and learning.¹

Survey focus and respondent profile

In this survey, we asked respondents what objectives they had for cognitive and AI technologies, how much they were spending on them, what benefits they have already achieved, and what challenges they have already encountered. We inquired about their attitudes toward the technologies, and their feelings about the prospects of job loss from automation.

To ensure that the respondents had well-informed views on the technologies, we surveyed “cognitive-aware” executives in the U.S. The survey began with 1,500 senior executives, but most were still gaining an understanding of the technology and were not familiar with its application in their companies. Roughly 17 percent (250 respondents) were familiar with both the concepts and their applications in their companies. This group constituted our sample. We also segmented the respondents by their level of experience and knowledge about cognitive technologies in order to know how early adoption affects attitudes and behaviors.

A substantial majority (72 percent) of these executives were “C-level,” in charge of functions, business units, or the entire company. Thirty percent were either CEO, president, a board member or an owner/partner. Among the non-C-level executives, most were either senior vice presidents or vice presidents, or senior directors or directors. Almost three quarters (74 percent) said they were either experts on cognitive technology or had an excellent understanding of them. The remaining 26 percent had “some broad understanding.”

All of the companies represented had at least 500 employees, and about half had more than 5,000 employees. The companies represented a variety of industries, with technology, media, and telecom companies comprising the largest percentage (29 percent), and consumer and industrial products the second largest (24 percent). Financial services companies represented 20 percent of the sample.

These executives, representing companies that are prone to early adoption of cognitive technologies, serve as a bellwether group from which others can learn and observe.

What technologies are “cognitive”?

“Cognitive technologies” include machine learning, deep learning neural networks, natural language processing, rule engines, robotic process automation², and combinations of these capabilities for higher-level applications. The cognitive technologies discussed in this report include:



Robotic process automation (RPA) is software that automates repetitive, rules-based processes usually performed by people sitting in front of computers. By interacting with applications just as humans would, software robots can open email attachments, complete e-forms, record and re-key data, and perform other tasks that mimic human action.



Computer vision is the ability to extract meaning and intent out of visual elements, whether characters (in the case of document digitization), or the categorization of content in images such as faces, objects, scenes, and activities.



Machine learning is the ability of statistical models to develop capabilities and improve their performance overtime without the need to follow explicitly programmed instructions.



Natural language processing/generation (NLP/G) is the ability to extract or generate meaning and intent from text in a readable, stylistically natural, and grammatically correct form.



Speech recognition is the ability to automatically and accurately recognize and transcribe human speech.



Rules-based systems is the ability to use databases of knowledge and rules to automate the process of making inferences about information.



Deep learning is a relatively complex form of machine learning involving neural networks, with many layers of abstract variables. Deep learning models are excellent for image and speech recognition, but are difficult or impossible for humans to interpret.



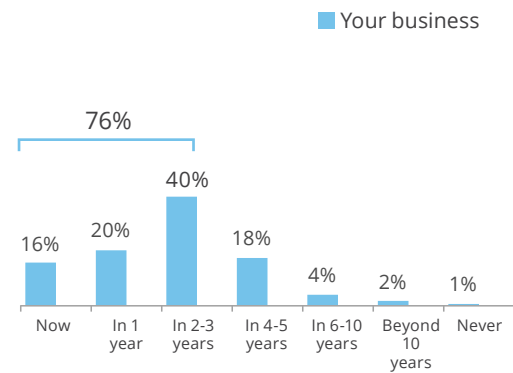
Physical robots can perform many different tasks in unpredictable environments, often in collaboration with human workers. The broader field of robotics is embracing cognitive technologies to create robots that can work alongside, interact with, assist, or entertain people.

Will cognitive really change anything?

If there is one key takeaway from these survey results, it is that respondents—those who have already begun adopting and using cognitive and AI technologies—are highly enthusiastic about the role of these technologies in their companies, both today and in the future. Among respondents, 87 percent said that cognitive technologies are either “important” or “very important” to product and service offerings. Even more—92 percent—stated that they are “important” or “very important” to internal business processes. Seventy-six percent also believe that cognitive technologies will “substantially transform” their companies within the next three years (*Figure 1*). Clearly, these companies feel that using AI is central to their ability to change their businesses and get ahead of their competition (*Figure 2*). None of our respondents believe that AI will fail to drive substantive change, either for themselves or their industry.

Figure 1

Cognitive advantage: Executives expect cognitive technologies to transform their companies...

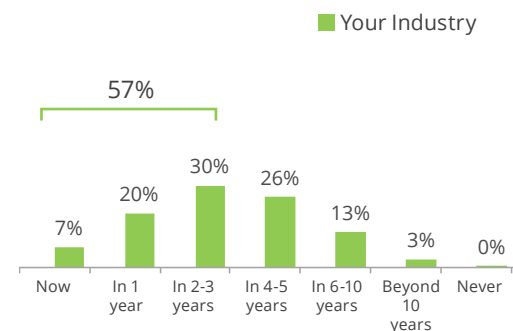


May not add to 100% due to rounding

Source: Deloitte State of Cognitive Survey, August 2017

Figure 2

... and their companies will transform faster than their industries



May not add to 100% due to rounding

Source: Deloitte State of Cognitive Survey, August 2017

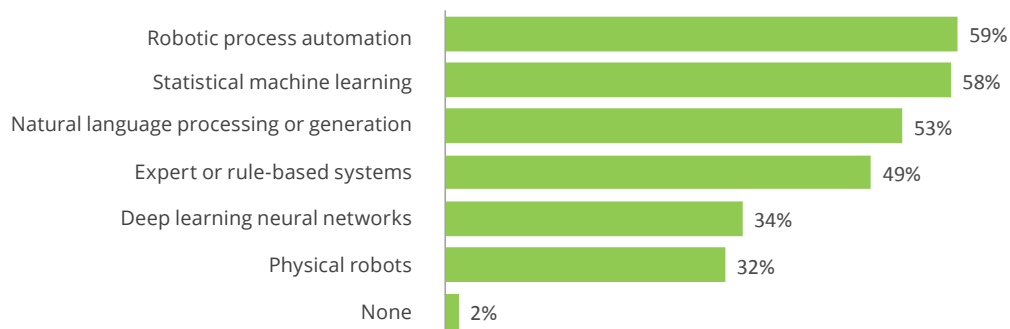
A diverse set of technologies, objectives, and benefits

Those responding to our survey were deploying a wide variety of applications and projects, using multiple technologies (*Figure 3*). For example:

- Most are exploring mature cognitive technologies such as **RPA** (59 percent), which is often used to automate the repetitive, rule-based functions typically handled by back-office employees. Increasingly, RPA is being combined with other AI technologies such as speech recognition, natural language processing, and machine learning to automate perceptual and judgment-based tasks once reserved for humans, which is extending automation to new areas and help companies become more efficient and agile.³
- Nearly as many companies (58 percent) are using **statistical machine learning** to increase the speed, scale, and granularity of their analytical models.
- More than half are using **natural language processing or generation**.
- **Rule-based and expert systems**, popularized in the last wave of commercial adoption of artificial intelligence in the '90s, are still in wide use: 49 percent of respondents report having deployed those technologies.
- Thirty-four percent are employing **deep learning neural networks**, often for image and speech recognition. Interest in the method has surged over the last five years, accounting for the strong adoption of this emergent technology, and graphic processing units (GPUs) have made it feasible to compute.⁴
- Thirty-two percent use **physical robots**. More than a quarter of a million industrial robots are currently in use in the United States.⁵ By integrating AI capabilities like computer vision into robots, companies are able to automate tasks that currently call for human dexterity and judgment.

Figure 3

What types of AI are companies deploying today?



Source: Deloitte State of Cognitive Survey, August 2017

Goals for cognitive: Smarter insights, stronger outcomes

What are companies hoping to achieve with cognitive technologies? According to survey respondents, they are pursuing a wide range of goals (Figure 4).

Making products and services “smarter”

The most common benefit cited by survey respondents was to “enhance the features, functions, and/or performance of our products and services.” Fifty-one percent ranked it either first, second, or third. In short, companies are seeking to increase the value of their products or services by making them “smarter.” The majority of the world’s largest software companies, for instance, have already incorporated one or more cognitive technologies into a product in their portfolio.⁶ This is increasingly common in tech-enabled companies in other industries as well. Spotify, for example, is using cognitive technologies such as deep learning to improve its search and recommendations capabilities, as well as in the creation of personalized playlists.⁷

Developing cognitive products and services

The leaders who responded to our survey are looking to cognitive technologies for more than incremental improvements on existing products and services. A third of them employ cognitive technologies to develop new products, and 25 percent report using these technologies to pursue entirely new markets.

Amazon’s Echo, Google Home, and Microsoft Cortana are three examples of consumer goods with cognitive capabilities. Some companies are also finding enterprise-level applications for these products. For example, instead of drilling into spreadsheets or dashboards, executives can ask questions about their company’s financial performance using a cognitive tool that combines Echo’s voice recognition capabilities with flash reporting. Many companies are also pursuing “predictive asset maintenance” with cognitive technologies in manufacturing.

Figure 4

AI: Primary benefits to companies



Source: Deloitte State of Cognitive Survey, August 2017

Aiding and supporting humans

Companies are also using cognitive technology to augment human judgment. A third of the respondents to our survey are using cognitive technologies to support better decision making. AI can improve decision-making by accurately predicting outcomes and sifting through unstructured data to find answers to questions.⁸ This is leading to better outcomes in applications as varied as loan underwriting, fraud detection, medical diagnosis, policing, and investing. In most cases, early adopters are using cognitive technologies to complement human intelligence, rather than replacing it outright. Analytics capabilities have been enhancing human capabilities for years now, but cognitive capabilities can improve on those efforts by making them smarter and faster—and by learning along the way.

Improving business operations

Improving performance by “optimizing internal business operations” (36 percent in top three objectives) is another top goal. This might involve optimizing supply chains by choosing the most economical shipping options, shrinking power consumption in data centers, tilting windmill blades at just the right angle for the wind, or maximizing investment returns. For example, JPMorgan Chase is using machine learning in its equities business to determine how best to execute block trades based on market conditions.⁹ To gain real benefits from technologies as comprehensive and powerful as AI requires companies to adapt their operations.

Of all the benefits listed, the least frequently chosen was “reduce headcount through automation.” This could be because companies are not pursuing cost-cutting as a major objective of AI, or because they have yet to experience significant headcount reductions.

Survey respondents are relatively optimistic about adding new jobs based on cognitive technology. And the majority of respondents (56 percent) foresee the need for “substantial” or “moderate” changes in job roles and skills to take advantage of cognitive technologies.

The most sophisticated companies using cognitive technology, both in the survey and in interviews, were found to be pursuing a portfolio of objectives simultaneously. At Pfizer, for example, such projects address internal processes (often with RPA), customer-facing processes (such as those for marketing to physicians and patients with greater effectiveness), and product-oriented objectives (the company is using IBM's Watson to help accelerate drug development in the immune-oncology area).¹⁰

Many companies are finding that their cognitive initiatives are generating not only improved process efficiency (faster cycle times, fewer manual interventions, etc.), but also improved effectiveness (greater customer satisfaction, more successful products, etc.). Whenever possible, both efficiency and effectiveness improvements should be converted into increased financial value.



Cognitive investments: Focusing on functions

On which business functions are leaders focusing their cognitive investments? With 64 percent pointing to IT, this was the most commonly cited function. Many companies are using technologies like autonomics to monitor and reboot servers, or intelligent agents to answer IT questions. Product development/R&D was in second place, with 44 percent indicating that function was the focus of cognitive investments.

Other functions, in order, included:

- Customer service – 40%
- Supply chain/procurement – 38%
- Service operations – 37%
- Manufacturing – 32%

Perhaps as a result of this wide range of objectives, technologies, and project types, investment levels varied widely across respondents. Twelve percent are investing \$10 million or more on cognitive technologies. Roughly equal percentages—about 25 percent each—have spent \$5 million to \$10 million, \$1 million to \$5 million, or \$500,000 to \$1 million. Only 7 percent have spent less than \$500,000. Enterprise use of cognitive technologies is still in its early stages, and most companies do not have well-defined budgets for these technologies yet.



Getting underway: Pilot programs and deployments

Companies represented in the survey have both pilots/proofs of concept and production implementations or deployments underway. For example, several health care and banking companies are undertaking pilots/proofs of concept in RPA, cognitive automation, and conversational AI to facilitate the processing of financial transactions such as claims. The modal number of pilots was “3 to 5,” with 34 percent of respondents indicating that range.

How extensively are respondents using pilots, proofs of concept, and production implementations?

- 28% had 1 or 2 pilots underway
- 34% had 3 to 5 pilots underway
- 20% had between six and ten pilots underway
- 2% had no pilots underway
- In production applications, 31% said they had 1 or 2 underway, and 31% said they had 3 to 5 underway
- 4% had no production implementations in place

In a follow-up interview to the survey, one consumer products company mentioned that it was running several smaller pilots using machine learning, but these pilots related to larger goals of understanding consumers in more detail and determining the effectiveness of trade promotion and marketing spending. At Pfizer, executives managing the company's cognitive technology initiatives said in an interview that it has more than 60 cognitive projects underway. Some are proofs of concept and some are already in production.

Are respondents building or buying these solutions?

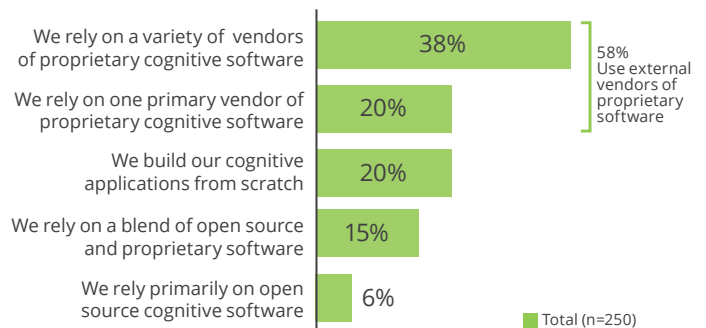
The majority of companies (58 percent) use cognitive software from vendors, with only 20 percent developing their own cognitive applications from scratch (Figure 5). Fifteen percent said they use a blend of open source and proprietary software, and only 6 percent rely primarily on open source offerings, even though they are multiplying in the marketplace.

Companies employing open source tended to be the most sophisticated users of cognitive technology, with dedicated groups of data scientists and several years of experience. In light of the rapid pace of change in this field, enterprises would do well to continually scan the technology and vendor

landscape and seek input from trusted advisors on the merits of different software tools, frameworks, and platforms.

Figure 5

The majority of companies rely on AI vendors



May not add to 100% due to rounding

Source: Deloitte State of Cognitive Survey, August 2017

Internal or external talent?

Approximately one quarter of companies rely primarily on their own technical talent for implementing cognitive projects—but most companies do not go it alone. Fifty-eight percent said they use a mixture of internal resources and consultants/vendors. Only 8 percent primarily use consultants or vendors, and the same percentage works with companies they have acquired, invested in, or partnered with.

Who's in charge?

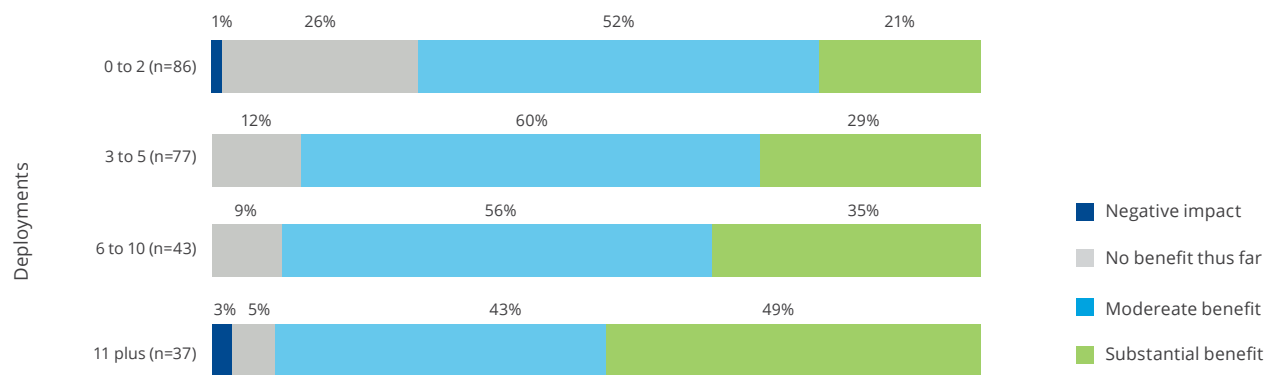
When asked who within their companies is in charge of developing and implementing cognitive technologies, 55 percent of respondents named the IT function. Anthem, for example, has created a Cognitive Capability Office within IT, and is viewing it as a strategic resource worthy of substantial governance and support.¹¹ Twenty-three percent stated that an R&D or Innovation function is in charge. Only 20 percent said “a variety of business units or functional executives” fill this role. IT is most likely to be in control when the primary cognitive activity is in IT itself or in marketing, and is least likely to be developing and implementing cognitive tech in HR and service operations—although this is still the case for just over half of the companies surveyed.

Happy (early) returns

Although cognitive technology is in its early stages of adoption, 83 percent of respondents said their companies have already achieved either moderate (53 percent) or substantial (30 percent) benefits from their work with these technologies (Figure 6). These benefits increase with more frequent deployments of AI technology.

Figure 6

The economic benefits of AI increase with experience



May not add to 100% due to rounding

Source: Deloitte State of Cognitive Survey, August 2017

While companies most experienced with AI report the most benefits, only 16 percent said they have received no benefit, with a mere 1 percent “in the red” due to AI investments.

There is a widespread sense that AI is paying off—and it is creating believers. No doubt, there is plenty of hype from vendors and the media about cognitive technologies—but only 9 percent of respondents believe that the technology is overhyped. Ninety percent agree or strongly agree that cognitive technologies are a strategic priority for their company today. And the respondents are just as bullish about the future: 90 percent feel that cognitive technologies will be somewhat or much more important to their companies’ strategies than they are today. In short, these knowledgeable executives had almost uniformly positive and favorable comments about the role of cognitive in their businesses.

Knowledgeable executives had almost uniformly positive and favorable comments about the role of cognitive in their businesses.

Key challenges: Integration and expertise

Although the vast majority of respondents were positive about cognitive technologies, they did report challenges in working with them. Forty-seven percent, for example, find it “difficult to integrate cognitive projects with existing processes and systems.” (Figure 7)

However, those who do effectively integrate cognitive technologies into workflows, business processes, and customer experiences can reap significant benefits. As Amazon Founder and CEO Jeff Bezos recently noted, his company derives much of the benefit from cognitive technologies by augmenting existing operational capabilities. “It is things like improved search results, improved product recommendations for customers, improved forecasting for inventory management, and literally hundreds of other things beneath the surface,” he said recently.¹²

Our experience indicates that companies that successfully integrate cognitive technologies into work flows are likely to use other disciplines—such as behavioral sciences, business process redesign, and technology integration—to design more effective human and machine interactions.

Integration with existing systems is also critical. At Anthem, cognitive technologies are being integrated within a new set of core systems during a large-scale modernization initiative. This will require cognitive capabilities that function as modular components. As the systems are being restructured, business processes are being redesigned to take advantage of cognitive technologies.

“We’re creating a single, modernized platform to do claims processing and related services. In addition to modularizing and componentizing these services, this is the time to look at not only standardizing and then automating manual work, but also using intelligent machines to take it to the next level.”

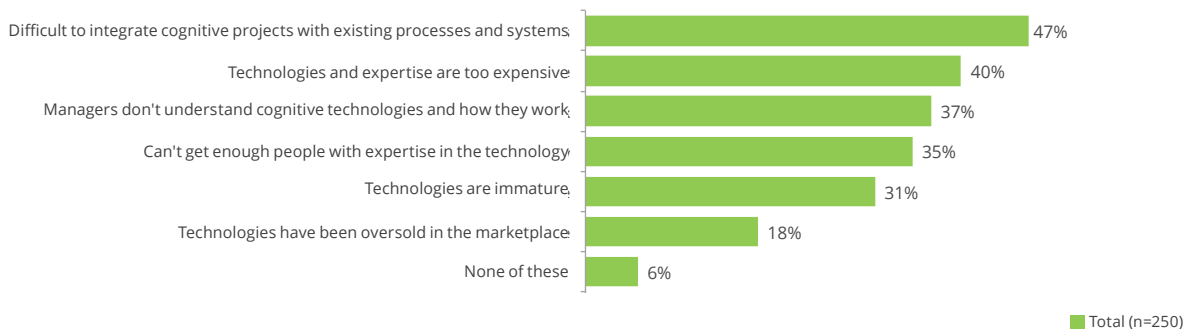
—Tom Miller, Anthem CIO

In terms of other challenges, 40 percent feel that “technologies and expertise are too expensive,” and 37 percent noted that “managers don’t understand cognitive technologies and how they work.” Thirty-five percent of respondents report being challenged because they “can’t get enough people with expertise in the technology”—a talent problem that has been widely reported in the press.

Smaller percentages feel that “technologies are immature” (31 percent) or that “technologies have been oversold in the marketplace” (18 percent). Companies typically react to these feelings by postponing their implementations of the technologies.

Figure 7

What are the top challenges with cognitive technology?



Source: Deloitte State of Cognitive Survey, August 2017

Different technologies, different challenges

Companies tend to encounter different challenges based on the type of technology they are employing. For example, integration challenges are most commonly encountered by respondents using statistical machine learning and expert/rule-based systems. The “technologies are too expensive” complaint was cited most often by respondents employing physical robots (49 percent). This group also reports frequent challenges in “finding enough people with expertise.” Meanwhile, 40 percent of those using natural language processing technologies report that the “technologies are immature.”

Are cognitive technologies really ready?

A slight majority of the cognitive-aware executives we surveyed express some reservations about the readiness of cognitive technologies to enable large-scale, transformational change. Forty-seven percent said that companies should strive for such ambitious objectives—but a somewhat larger group is either more comfortable with “picking the ‘low-hanging fruit’” (40 percent) or feel that they can “wait a few years until the technology matures before we start using it” (12 percent).

The companies surveyed that claimed the greatest economic benefits feel that cognitive technologies should be used for transformational change rather than pursuing incremental improvements. Our experience indicates that this outcome is due to organizations using cognitive technologies to disrupt how work is done. Rather than “bolting on” cognitive technologies to existing processes, they are redesigning entire workflows.

Overhyped?

Only 9 percent of respondents feel that cognitive technologies are “over-hyped,” and a slightly larger percentage (10 percent) believe they are “under-hyped.” Forty-three percent think that cognitive technologies are “just another new technology that will eventually become mainstream,” while 37 percent believe that they are “fundamentally different from conventional IT”—presumably needing new approaches to development, implementation, and management.



Impact on the workforce: New jobs and reskilling offsetting losses

We asked respondents several questions about the impact of cognitive technologies on the workforce in the next three years. While some observers anticipate an apocalyptic impact and others merely yawn at these developments, our respondents landed somewhere between these two reactions. Most companies do not predict substantial job losses. Within the next three years, 69 percent of enterprises anticipate minimal to no job loss and even some job gains (Figure 8). At the same time, respondents are also relatively optimistic about adding new jobs based on cognitive technology.

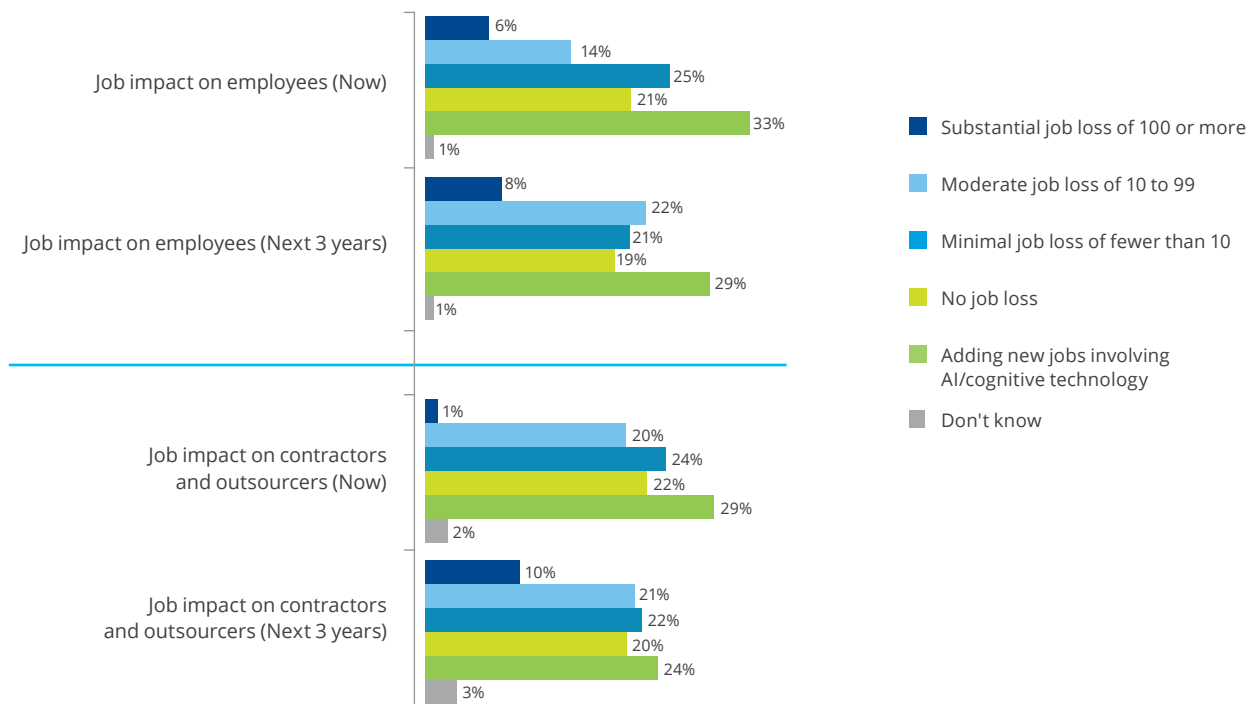
Substantially higher percentages of respondents foresee the need for changes in job roles and skills to take advantage of cognitive technologies:

- 20% believe that “substantial changes in jobs and skills” are required now
- 36% see the need for moderate change now
- Only about 10% said there is no need for change

The percentages are similar for changes anticipated within three years, and for contractors and outsourcers.

Figure 8

Apocalypse later? Minimal job losses for the near future



May not add to 100% due to rounding

Source: Deloitte State of Cognitive Survey, August 2017

Future impact

Looking further into the future, the picture is generally positive within 10 years. More than half of respondents see potential opportunity: 28 percent see new ways of working arising in which cognitive technologies augment people's capabilities, while another 28 percent anticipate many new jobs created as a result of the adoption of cognitive technologies (Figure 9). Twenty-two percent of respondents believe workers are likely to be displaced by cognitive technology-driven automation and 15 percent expect little change one way or the other.

Many believe that machines and humans will augment each other in the workplace within three years (51 percent agreeing), although the percentages drop for the five- and 10-year time frames (36 percent and 28 percent, respectively).

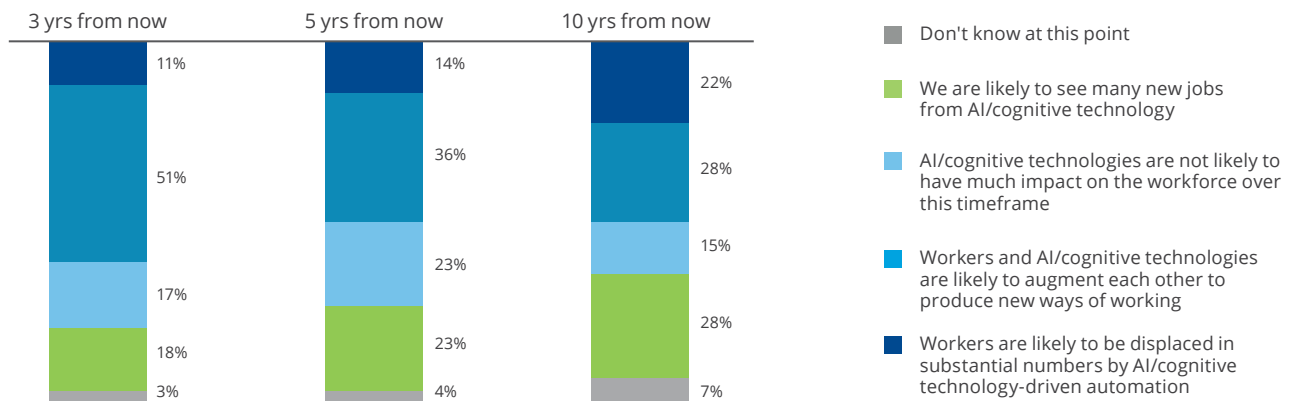
It is likely that cognitive technologies will eliminate some tasks and jobs, create new ones, and create demands for new skills—probably at an accelerating pace. These changes suggest that demand for HR and Talent processes and programs to help recruit, transition, and retool the workforce will likely increase over the coming years. This perspective is one of augmenting human work with smart machines, rather than eliminating it through automation. In interviews, most companies say that augmentation has so far been much more common than job elimination through automation.¹³

That said, companies should assume that reducing, reallocating, or retraining staff are going to be important parts of the story in the coming years. For example, the Vanguard Group developed a cognitive offering that combines automated investment advice with advice from human advisors—and at a lower cost than purely human-advised investing. For the human advisors, the new offering created a new work process, which required them to take on some new roles. The primary description of the new role: To be an “investing coach,” able to answer investor questions, encourage healthy financial behaviors, and be “an emotional circuit breaker” to keep investors on their plan. These advisors were encouraged to learn about behavioral finance and behavioral coaching to perform these roles effectively.¹⁴

As demonstrated through this example, companies should consider engaging in strategic workforce planning, upgrading skills, and rethinking the design of processes and jobs holistically.¹⁵ General Electric, for example, has created a series of job “personas” that include both jobs that will largely be automated, jobs that will be substantially changed, and entirely new jobs that will be created—all specifically in reference to cognitive technology-driven change. These personas are beginning to be used to help current employees think about how their skills need to evolve in the future.¹⁶

Figure 9

A workforce in flux over the longer term: AI predicted to cause both gains and losses



May not add to 100% due to rounding

Source: Deloitte State of Cognitive Survey, August 2017


To maximize the cognitive advantage, companies embrace training

When asked about the steps necessary to prepare employees for cognitive technologies, substantial majorities agree with most of the interventions listed, including:

- Training employees to develop cognitive technologies (70%)
- Training employees to work alongside cognitive technologies (64%)
- Conducting awareness education on cognitive technologies and their implications (63%)
- Creating new departments and roles to lead the use of these technologies (61%)

Sixty-three percent of respondents (and 76 percent of those from companies with over 5,000 and less than 10,000 employees) say they already have training programs underway to prepare employees to deal with changes in their jobs from cognitive technologies. Thirty-two percent said they don't have them yet but plan to create some.





Taking a closer look at respondent segments

In many ways, our survey results show that early, cognitive-aware adopters may be saying “just jump in, the water’s fine!” to their peers. But among cognitive/AI adopters, there are different levels of skill and ability, just as there are different levels of swimmers. For example, not everyone who jumps in the pool swims at the same speed, or with great technique. Some are just getting used to the water.

Keep in mind that the majority of U.S. business executives—the 83 percent of managers initially contacted who were not cognitive-aware and therefore did not qualify to serve as survey respondents—haven’t even tested the waters. In this section as in the rest of this report, we focus on those who have.

We have segmented the cognitive-aware respondents based on two main criteria:

- Their reported level of sophistication in selecting, applying, and implementing cognitive technologies
- The strategic importance of these technologies to the company and its leaders

Based on this analysis, three main segments emerged. Continuing the pool metaphor, we will refer to them as “Fast Lane,” “Slow Lane,” and “Waders.”

Life in the fast lane

In general, the more experienced and expert the respondent segment, the more strongly they believe in the importance of cognitive technologies to their company. The Fast Lane, the

most advanced segment, is also the largest, with 42 percent of respondents. This segment is the most bullish on almost every survey question. For example, nearly half of Fast Lane respondents say their companies have gained substantial benefits from AI, while less than a quarter of Slow Lane respondents and only 12 percent of Waders make the same claim. This enthusiasm appears to be the result of experience.

Those in the Fast Lane tend to jump in and start working on technique—understanding what cognitive technologies can do, where best to apply them, and taking at least a partial do-it-yourself approach to developing and integrating them. Fast Lane companies still use vendors, but they don’t rely on them to the same extent as Slow Laners and Waders. They believe in the transformative potential of cognitive technologies. But they are using a hands-on approach to transform their companies project by project, rather than relying solely on others to deliver it.

Slow but steady

Slow Lane respondents have less experience than Fast Lane companies with cognitive technologies, invest fewer dollars in it, and are taking a measured approach to pilots and deployments. In general, Slow Lane companies are building AI capabilities deliberately and have pragmatic aspirations. Nearly half of Slow Lane respondents believe that cognitive technologies should be used to pluck “low-hanging fruit,” while 30 percent of Fast Lane and Waders felt the same way.

Those in the Slow Lane are getting results from AI: While less than a quarter claim “substantial” economic benefits from their

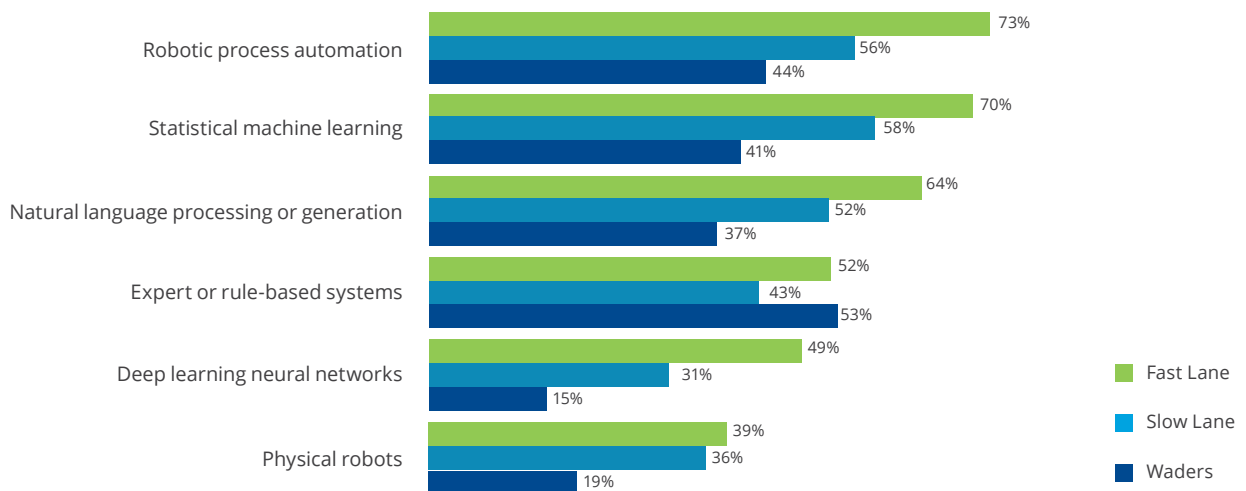
investments, 64 percent say they have seen “moderate” benefits. So AI is paying off for the Slow Lane, perhaps not as handsomely as it is for the more experienced Fast Lane, but possibly enough to keep them building their expertise.

Waders testing the waters

Waders are the smallest segment, at just under a quarter of total respondents. They are the least experienced with cognitive technologies, and acknowledge their lack of sophistication. They rely heavily on external vendors: nearly 80 percent use a single

or multiple AI vendors, and only 5 percent build their own, well below those in the Fast Lane (28 percent) and Slow Lane (23 percent). Significant percentages of Waders are using AI today, especially basic applications such as rule-based systems and RPA (Figure 10). These can be “gateways” to more sophisticated AI applications. Waders remain far behind the other segments in terms of adopting more complex AI, however.

Figure 10
Current AI usage by segment



Source: Deloitte State of Cognitive Survey, August 2017

Many Waders appear to be working their way into the Slow Lane, however. Nearly a quarter of them have completed at least six pilots, and 17 percent have at least six deployments under their belts—not far behind their peers in the Slow Lane (22 percent). To date, they have not yet converted their investments into economic benefits. Only 12 percent of Waders say they have seen substantial benefits, while nearly 40 percent have seen no economic benefits at all. This finding reinforces the view that cognitive technologies require direct experience and hands-on experimentation in order to have a positive impact.

Despite results that have been less successful than other segments to date, Waders want to stay in the pool. They believe in its potential to improve their companies, mostly though

incremental change. Only 22 percent feel their companies should wait until AI is more mature before using it.

As the fast lane innovates, waders automate

What benefits do our segments hope to gain from cognitive technologies? We asked respondents to rank their top three benefits. When we examined the #1 benefit by segment, we found that nearly twice as many companies in the Fast Lane segment believe the main benefit of AI is to help them create new products or pursue new markets (26 percent) compared to Waders (12 percent). While the Fast Lane wants to innovate, companies in the Wader segment want to automate.

For 34 percent of Waders, the main benefit of AI is to automate tasks to cut headcount or free employees for other work, compared to only 10 percent in the Fast Lane.

Using AI to cut costs and re-allocate headcount can be a useful strategy. But it is telling that so many Fast Lane respondents, who have gained stronger returns from cognitive technologies than Waders, see new revenue opportunities as their main benefit. Perhaps this is because their senior leaders understand the potential of cognitive technologies to improve their products and services. In fact, more than half of Fast Lane companies (55 percent) develop their own cognitive solutions for the market.

Slow Lane respondents share the Fast Lane's zeal for innovation, with 22 percent stating that creating new products or pursuing new markets are the main benefit of cognitive technologies. Only a third of them, however, are bringing cognitive solutions to customers. Perhaps when the companies become more sophisticated with cognitive technologies, a higher percentage will bring their own offerings to market.

Consistent with their innovation focus, Fast Lane respondents see AI as adding jobs more than eliminating them. Over half say the net impact of AI today is the addition of jobs at their companies, while 38 percent say they are cutting jobs.

The other two segments, which see cognitive technologies as less critical to their company's current strategies, are investing less in AI jobs and anticipate more cuts in the future. This is especially true of Waders, a third of which are pursuing the automation of jobs as an explicit goal of AI.

The Fast Lane: Bellwethers among bellwethers

Overall, we view the Fast Lane companies as the bellwethers among bellwethers. They are pushing forward fastest with cognitive technologies—and they like what they see. They are developing AI-enriched product offerings, planning to hire new people, and expecting great benefits. It seems likely that as their enthusiasm spreads to the Slow Lane and Wader companies—perhaps they will inspire all companies to jump into the world of cognitive and AI technologies.



What it all means

According to the senior executives we surveyed, AI is expected to have a major impact on business and the workforce—and in many cases, it already is. If leading companies continue on this trajectory, it is possible that cognitive technologies could live up to even the most breathless hype from vendors and the media. Looking at these results, many companies stand to benefit greatly from adopting these technologies, especially when it comes to three practical areas:

- **Tasks:** Changing how tasks are performed by organization, and who performs them.
- **Decisions:** Generating smarter insights that lead to stronger outcomes.
- **Interactions:** Enhancing, accelerating, and improving interactions and experiences with employees, customers, and others.

How rapidly and aggressively should companies adopt cognitive technologies? Those that typically employ an aggressive adoption strategy toward emerging technologies should consider taking the same approach with cognitive. These early adopters should expect to encounter a familiar list of problems and risks: people with the requisite skills are scarce and expensive.¹⁷ Some cognitive technologies are still emerging and are not as tested and stable as they will be later. Not all investments will pay off, and not all projects will be successfully implemented. Organizational transformation driven by technology is inevitably difficult, no matter what technology is involved.

Of course, companies with a track record of adopting and profiting from new technologies may have an opportunity to repeat history with this new generation of technologies. These companies intend to restructure their IT landscape and resources profile to create a cognitive—ready IT ecosystem. By leveraging cognitive technologies to augment human intelligence and transform their core operations, they could unlock significant value. Managing their cognitive initiatives in the form of a portfolio will allow them to spread risk across their cognitive bets. They will need to educate and

convert business sponsors to be cognitive-ready. And these moves will allow them to create cognitive-intensive products and services that will radically transform their industries.

Most companies with a more conservative bent will not necessarily be left behind as long as they nurture a level of education and readiness for cognitive technologies. For these companies, it may make more sense to explore cognitive technologies on non-mission critical business processes, co-developed with vendors with dual business—IT sponsorship. They can eventually fold them into a broader strategic vision over time. They should consider hiring those with cognitive skills and educating managers about the role these technologies can play in their businesses—at a measured pace. They can also rely more heavily on external ecosystems to help advance their goals rather than taking on most of the R&D responsibility. The risk with such an approach, of course, is that they could be surpassed by faster, more aggressive companies, whether traditional competitors or disruptive upstarts.

Given the challenges of implementing and integrating large-scale, ambitious projects, most companies should consider adopting a “portfolio” approach to the technology, taking on a variety of projects with different levels of ambition, different objectives, and different cognitive technologies—all focused on achieving measureable outcomes that add business value.

This portfolio of cognitive projects should be interwoven under a coherent enterprise cognitive agenda. Most projects should be piloted before full implementation. If a company can develop multiple smaller projects in the same area of the business, the aggregate effect of these completed projects could be transformational.

From our experience, and supported by this survey, virtually all large companies should consider having cognitive initiatives underway at some level today. Although these technologies are still in their infancy, they hold great promise. Many activities that require human intelligence and action can be augmented with cognitive technologies— and some can be replaced altogether. Don't expect this development to wait for the business world to catch up. Transitioning and retooling the workforce in the wake of cognitive advances can become business as usual.

Cognitive technologies are becoming ubiquitous in the consumer world. Often without realizing it, many of us use machine learning, RPA, machine intelligence, analytics, AI, natural language processing, image recognition, and similar capabilities in our personal lives. Innovative companies will apply their personal experiences to reimagine work within their enterprise.

Understanding where to apply these technologies, and how to evolve them, requires investment and persistence. Many early adopters report that they already are sharpening their skills and developing talented managers and practitioners who understand their current value—and vast potential. Shouldn't you?



Key lessons from the front lines of cognitive and AI

We are still in the early phases of the cognitive computing era—what works well five years from now may look very different than the approaches being adopted today. That said, those respondents on the front lines are reporting that they are already realizing value from cognitive and AI technologies. What's working for them today may be instructive for those on the verge of embarking on their own journeys with these technologies. Following are some of the lessons respondents learned on the way to generating real business value:

- **Jump in:** Realizing the benefits of cognitive technologies requires developing a good understanding of how they work, exactly what they're good at doing, and how to supply them with the data they need to thrive. That takes a hands-on approach and a lot of practice.
- **Manage a portfolio of projects:** Creating a small yet dedicated internal function that will support a group (portfolio) of cognitive initiatives focused on creating measurable business outcomes will help allow companies to take bets on cognitive technologies, identify the relative maturity of these technologies, and pinpoint operational, resources and technology changes required to embark on a full on cognitive journey.
- **Do some of it yourself:** Companies that report economic benefits from cognitive technologies are developing and implementing at least some of their own solutions. This helps them acquire skills and makes it easier to integrate cognitive technologies into business processes and new products, where the return on investment may be highest.
- **Focus on change—not just cost cutting:** By focusing too much on automation-driven cost-cutting, companies can miss out on the potential to drive top-line growth through cognitive-driven innovation, or to realize near-term benefits in product and process improvements.



Endnotes

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