McKinsey Digital

McKinsey Analytics

Global survey: The state of AI in 2020

Since our 2019 survey, artificial intelligence has become more of a revenue driver. Companies earning the most from AI plan to invest even more in response to COVID-19—and perhaps widen the gap with others.

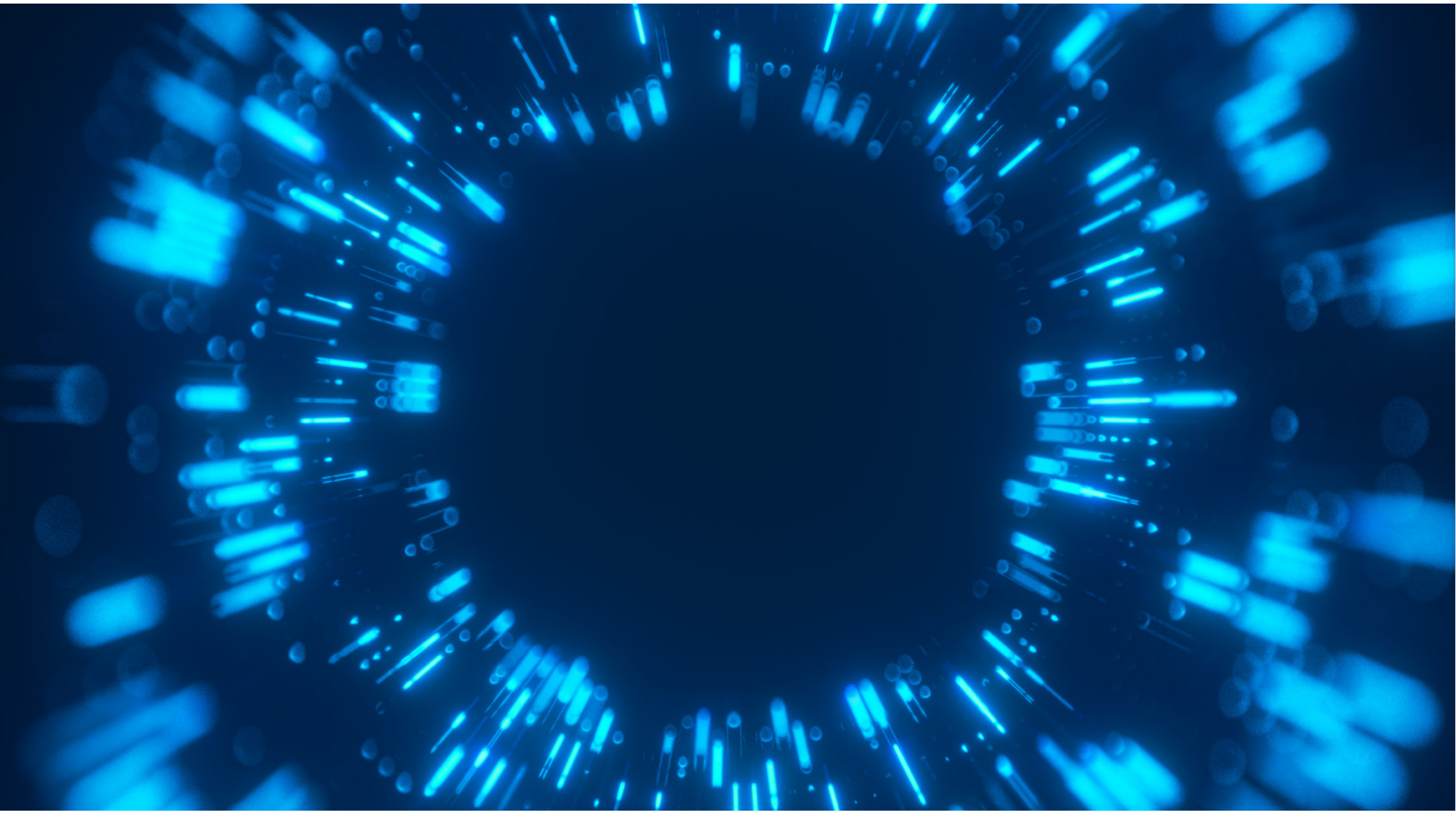


Image by Darby Films

November 2020

The results of this year's McKinsey Global Survey on artificial intelligence (AI) suggest that organizations are using AI as a tool for generating value. Increasingly, that value is coming in the form of revenues. A small contingent of respondents coming from a variety of industries attribute 20 percent or more of their organizations' earnings before interest and taxes (EBIT) to AI. These companies plan to invest even more in AI in response to the COVID-19 pandemic and its acceleration of all things digital. This could create a wider divide between AI leaders and the majority of companies still struggling to capitalize on the technology; however, these leaders engage in a number of practices that could offer helpful hints for success. And while companies overall are making some progress in mitigating the risks of AI, most still have a long way to go.

AI adoption and impact

While the latest findings show no increase in AI adoption, some companies are capturing value from AI at the enterprise level, and many are generating revenue and cost reductions at least at the function level.

Overall, half of respondents say their organizations have adopted AI in at least one function.[1] And while AI adoption was about equal across regions last year, this year's respondents working for companies with headquarters in Latin American countries and in other developing countries are much less likely than those elsewhere to report that their companies have embedded AI into a process or product in at least one function or business unit. By industry, respondents in the high-tech and telecom sectors[2] are again the most likely to report AI adoption, with the automotive and assembly sector falling just behind them (down from sharing the lead last year).

The business functions in which organizations adopt AI remain largely unchanged from the 2019 survey, with service operations, product or service development, and marketing and sales again taking the top spots (Exhibit 1).

Within these functions, the largest shares of respondents report revenue increases for inventory and parts optimization, pricing and promotion, customer-service analytics, and sales and demand forecasting. More than two-thirds of respondents who report adopting each of those use cases say its adoption increased revenue. The use cases that most commonly led to cost decreases are optimization of talent management, contact-center automation, and warehouse automation. Over half of respondents who report adopting each of those say the use of AI in those areas reduced costs.

50%

of respondents report that their companies have adopted AI in at least one business function.

[1] In the 2019 survey, we asked about companies' AI adoption differently, and 58 percent of respondents said that their companies had embedded AI in at least one function or business unit.

[2] The high-tech and telecom sectors include respondents who say they work in broadband communication, call centers, hardware, internet and online services, IT services, sales, software, telecom equipment, telecom regulation, wired telecommunications, and wireless communications.

Exhibit 1

AI adoption is highest within the product- or service-development and service-operations functions.

AI use cases most commonly adopted within each business function, % of respondents

[1]Ie, adding entirely new features to existing products.
[2]Eg, recruiting, retention.

The survey findings show that some companies using AI are seeing that value accrue to the enterprise level. Twenty-two percent of respondents say that more than 5 percent of their organizations' enterprise-wide EBIT in 2019 was attributable to their use of AI, with 48 percent reporting less than 5 percent.

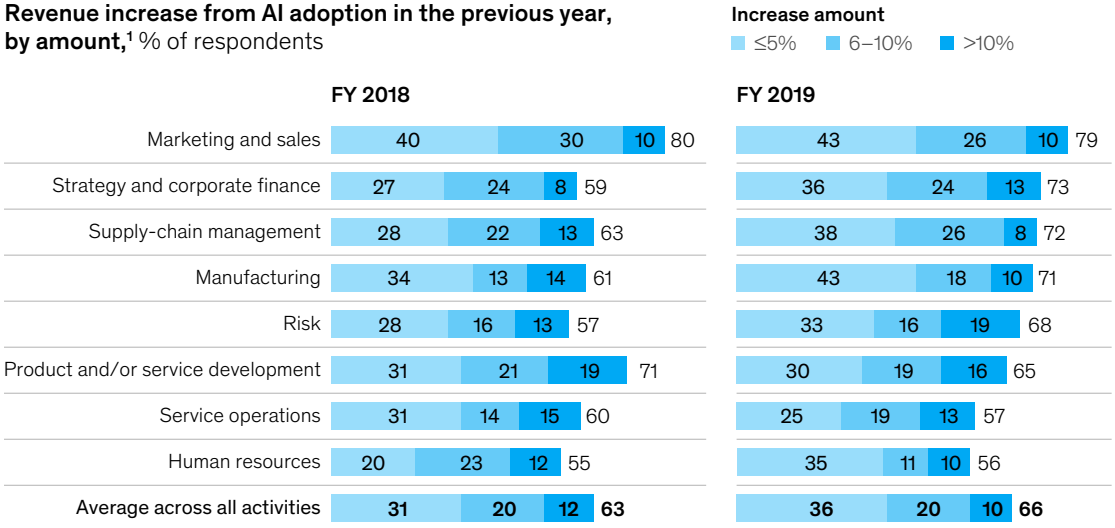
Additionally, in half of business functions, a larger share of respondents report revenue increases from AI use than in the previous survey, while revenue in most other functions remained stable (Exhibit 2). At the same time, cost decreases have become less common in most functions.[3]

[3] Respondents were asked about revenues and costs for the previous year.

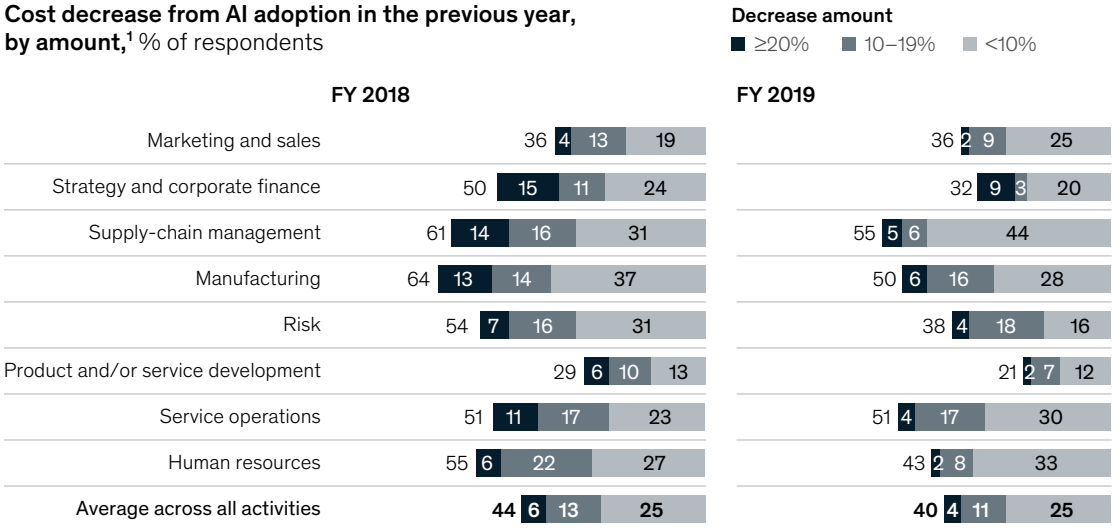
Exhibit 2

Revenue increases from AI adoption have become more common over time, while cost decreases have become less common.

Revenue increase from AI adoption in the previous year, by amount,[1] % of respondents



Cost decrease from AI adoption in the previous year, by amount,[1] % of respondents



[1]Question was asked only of respondents who said their companies adopted AI in a given function. Respondents who said "no change" are not shown.

This year we asked about adoption of deep learning—a type of machine learning that uses neural networks and can sometimes deliver superior results—for the first time. Just 16 percent of respondents say their companies have taken deep learning beyond the piloting stage. Once again, high-tech and telecom companies are leading the charge, with 30 percent of respondents from those sectors saying their companies have embedded deep-learning capabilities.

McKinsey Commentary

Michael Chui, partner, McKinsey Global Institute, San Francisco

What we've said in the past about "following the money" to find where AI adds value in organizations still holds true. At the industry level, companies continue to use AI in areas that are most fundamental to where value is generated in each sector. And, overall, many companies focused on growth in 2019 (we asked about last year's revenue and cost effects from AI); for that reason, it's likely that we saw more companies driving revenues with AI rather than decreasing their costs—not because AI *can't* effectively reduce costs.

It's also clear that we're still in the early days of AI use in business, with less than a quarter of respondents seeing significant bottom-line impact. This isn't surprising—achieving impact at scale is still elusive for many companies not only because of the technical challenges but also because of the organizational changes required. However, those seeing AI contribute more than 20 percent to earnings before interest and taxes are not just from the tech sector. So it is possible for any company to get a good amount of value from AI if it's applied effectively in a repeatable way.

Most companies seem to agree, with the results showing an appetite to continue investing in the technology. However, there was a bit of a decrease in bullishness this year, perhaps reflecting the passing of AI's hype phase. We do think AI is worth the investment, but it requires effective execution to generate significant value, particularly at enterprise scale.

What separates the best from the rest

Companies seeing the highest bottom-line impact from AI exhibit overall organizational strength and engage in a clear set of core best practices.

The companies seeing the most value from their use of AI—that is, respondents who say 20 percent or more of enterprise-wide EBIT in 2019 was attributable to their AI use—report several strengths that set them apart from other respondents[4]:

- *Better overall performance.* The findings suggest that companies seeing more EBIT contribution from AI experience better year-over-year growth overall than do other companies. Respondents at high-performing companies are nearly twice as likely as others to report EBIT growth in 2019 of 10 percent or more.
- *Better overall leadership.* Respondents at AI high performers rate their C-suite as very effective more often than other respondents do. They also are much more likely than others to say that their AI initiatives have an engaged and knowledgeable champion in the C-suite.
- *Resource commitment to AI.* Responses show that AI high performers invest more of their digital budgets in AI than their counterparts and are more likely to increase their AI investments in the next three years. High performers also tend to have the ability to develop AI solutions in-house—as opposed to purchasing solutions—and they typically employ more AI-related talent, such as data engineers, data architects, and translators, than do their counterparts. They also are much more likely than others to say their companies have built a standardized end-to-end platform for AI-related data science, data engineering, and application development.

[4] All questions about AI-related strengths and practices were asked only of respondents who said their organizations had adopted AI in at least one function, n = 1,151.

This year we again looked at a broad set of companies' AI-related practices, this time examining about twice as many, to see which might correspond with capturing more value from AI. The organizations with the highest EBIT attributable to AI were more likely to engage in *nearly every practice* than those seeing less value from AI. These practices generally align to six categories: strategy; talent and leadership; ways of working; models, tools, and technology; data; and adoption (Exhibit 3).

But a few practices are adopted at about the same level by all companies: for example, using test-and-learn methodologies to run rapid iterations in AI initiatives, putting processes in place to capture business feedback, and defining clusters of AI use cases in priority business units, functions, or other areas of business activity.

Exhibit 3

Six sets of practices differentiate high-performing companies from others, with a subset adopted much more often by these leaders.

Share of respondents reporting their organizations engage in each practice, % of respondents[1]

	AI high performers	All other respondents
Strategy		
Have a road map clearly **prioritizing AI initiatives linked to business value** across organization	55%	29%
Have a clearly **defined AI vision and strategy**	43%	17%
Senior management is fully aligned and **committed to organization's AI strategy**	60%	34%
Have an active program to develop and manage an **extensive range of AI ecosystem partnerships** (eg, with companies, academia)	43%	28%
AI strategy that **aligns with the broader corporate strategy**	53%	42%
Talent and leadership		
Tech professionals develop AI skills through tailored curriculums by role and progress along defined career trajectories	40%	15%
An appointed, credible leader is **empowered to move AI initiatives forward** in collaboration with peers across business units and functions	52%	32%
Strong, **centralized coordination of AI initiatives** is balanced with close **connectivity to end users** in the business	42%	25%
AI talent is effectively recruited and onboarded	36%	21%
Type of **AI talent needed** (eg, by role and skill level) to support AI initiatives is understood	45%	33%
Ways of working		
Feel comfortable taking **risks with AI-related investment decisions**	65%	31%
Use advanced processes (eg, data operations, microservices) to deploy AI	57%	23%
Have a **clear framework for AI governance** that covers all steps of the model-development process and manages AI-related risks	42%	14%
Use design thinking, involving the end user in development of AI tools	56%	38%
AI-development teams across the organization **follow a standard protocol** to build and deliver AI tools	33%	16%

Exhibit 3 (continued)

Six sets of practices differentiate high-performing companies from others, with a subset adopted much more often by these leaders.

Share of respondents reporting their organizations engage in each practice, % of respondents[1]

Models, tools, and technology	AI high performers	All other respondents
Have **standard tool frameworks** and development processes in place for developing AI models	51%	19%
Understand how frequently AI models need to be updated, and refresh them based on clearly defined criteria	45%	15%
Use **automated tools to produce and test** AI models	48%	20%
Track AI-model performance and explanations to ensure that **outcomes and/or models improve over time**	53%	29%
Use a standardized tool set to create production-ready data pipelines	44%	23%
Own a **high-performance computing cluster** for AI workloads	37%	16%
Use a standardized end-to-end platform for AI-related data science, data engineering, and application development	40%	20%
Data		
Generate **synthetic data to train AI models** when there are insufficient natural data sets	49%	16%
Rapidly integrate internal structured data to use in AI initiatives	56%	28%
Have **well-defined governance processes** in place for key data-related decisions	43%	21%
Have scalable internal **processes for labeling AI training data**	39%	18%
Protocols are in place to ensure appropriate levels of data quality	48%	29%
A data dictionary (ie, a metadata repository) describes the features of data that are accessible across the enterprise	40%	23%
A clear data strategy supports and enables AI	44%	31%
Adoption		
Entire organization consistently adheres to the **execution processes identified as essential to capturing value** from AI	57%	17%
Systematically **track a comprehensive set of key performance indicators** to measure the impact of AI initiatives	52%	27%
Capabilities are **designed for scalability,** and AI initiatives are fully scaled within business units and/or company-wide	52%	32%
Have a comprehensive process for **moving AI solutions from pilot to production**	52%	34%
Enact effective change management to ensure AI adoption (eg, by having leaders model behaviors)	44%	28%

[1]Practices shown here are representative of those with the highest deltas between AI high performers and other respondents. Not all practices asked about are shown.

McKinsey Commentary

Bryce Hall, associate partner, Washington, DC

One of the most remarkable patterns we see in these findings is the adoption of core practices among companies capturing value from AI. There really is a "playbook" for success. It's encouraging to see a larger proportion of organizations this year doing more in foundational areas, but many still are not. We see companies, for example, still spending disproportionate time cleaning and integrating data, not following standard protocols to build AI tools, or running "shiny object" analyses not tied to business value.

It's also striking that some of the biggest gaps between AI high performers and others aren't only in technical areas, such as using complex AI-modeling techniques, but also in the *human* aspects of AI, such as the alignment of senior executives around AI strategy and adoption of standard execution processes to scale AI across an organization.

Finally, we see a theme in these results that we see in much of our work with companies: higher performers develop or heavily customize their AI capabilities in-house. Many executives now realize that AI solutions typically need to be developed or adapted in close collaboration with business users to address real business needs and enable adoption, scale, and real value creation. As a result, we see companies increasingly developing a bench of AI talent and launching training programs to raise the overall analytics acumen across their organizations.

On the ground

Putting best practices to work

Senior executives at companies making progress in AI adoption tell McKinsey in interviews that they are finding many of the leading practices essential.

On strategy

"This program was originated bottom-up by the business, and the CEO has become a supporter, seeing this very much as a strategic opportunity."
– Head of AI, data, and analytics at a global oil and gas company

"Investment decisions are made by the management board. So whenever we have implemented a use case, we make sure that the business team is reporting it into the board to provide transparency on results and why we should expand our efforts."
– Analytics leader at a global bank

On talent and leadership

"We are investing quite heavily in talent upskilling. If you have a workforce of tens of thousands of people, you have to think about how to move this entire workforce forward. That's why we are doing this at two levels: one, partnering with a leading technology company on improving the data and AI skills of practitioners and, two, improving the skills and understanding of AI among senior management with dedicated courses."
– Analytics leader at a global bank

On adoption

"Building the technology took us much less time than alignment and getting people to adopt it. While leadership generally believes in this work, you need to provide them with details on what the work will actually entail, how it will change their part of the business, and how it will make life for their associates easier. The same needs to be done with employees. Our experience is that it isn't enough to 'train and explain.' We've found it very useful to bring the associates who are experts in the application domain into the build of the solution."
– Head of analytics and insights at a global pharmaceutical company

Managing AI risks

While many companies still aren't acknowledging most AI risks, they modestly increased mitigating a handful of them.

The survey findings suggest that a minority of companies recognize many of the risks of AI use, and fewer are working to reduce the risks—as was true in 2019. Cybersecurity remains the only risk that a majority of respondents say their organizations consider relevant. Overall, the share of respondents citing each risk as relevant has remained flat[5] or has decreased, with the exception of national security.

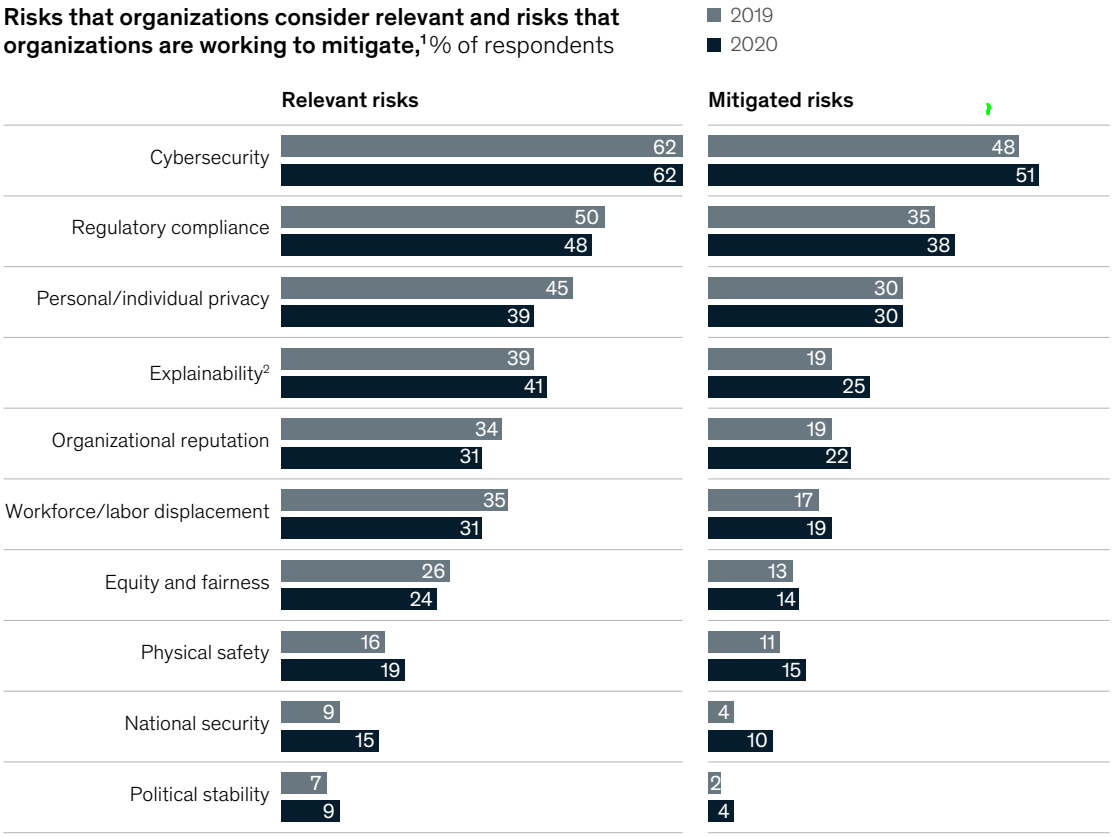
Yet some of the less commonly considered risks are the ones in which we see increasing mitigation. National security and physical safety are more commonly addressed now than in 2019. Responses also indicate that companies increasingly manage risks related to AI explainability.

High performers remain more likely than others to recognize and mitigate most risks (Exhibit 4). For example, respondents at high performers are 2.6 times more likely than others to say their organizations are managing equity and fairness risks such as unwanted bias in AI-driven decisions.

Exhibit 4

A larger share of respondents than last year say their organizations are actively working to mitigate risks that are not commonly considered relevant.

Risks that organizations consider relevant and risks that organizations are working to mitigate,[1] % of respondents



[1]Question was asked only of respondents who said their organizations had adopted AI in at least one business function; n = 1,151. Respondents who said "don't know/not applicable" are not shown.
[2]Ie, the ability to explain how AI models come to their decisions.

[5] That is, the change from the prior year was not statistically significant.

McKinsey Commentary

Roger Burkhardt, partner, New York

It's encouraging to see the increase in recognition of risks arising from a lack of explainability, meaning the inability to understand the drivers of a complex AI model's predictions. The industry-level data show that not only are healthcare and financial services leading here, which is expected because those industries are more regulated, but also high tech and business, legal, and professional services. Some of the jump in mitigation of this risk could be driven by regulations in Europe and the United States (for example, the General Data Protection Regulation [GDPR] and the California Consumer Privacy Act [CCPA]) that affect a number of industries as well as an increased awareness of advances in explainability techniques.

Overall, however, the results are concerning. While some risks, such as physical safety, apply to only particular industries, it's difficult to understand why universal risks aren't recognized by a much higher proportion of respondents. Cybersecurity is relevant for any organization using any type of device connected to the internet, and attacks have risen significantly during the pandemic, which has driven even more business and commerce online. And while equity and fairness can be tricky to solve for, it should be on the list of relevant concerns for organizations in any industry. It's particularly surprising to see little improvement in the recognition and mitigation of this risk given the attention to racial bias and other examples of discriminatory treatment such as age-based targeting in job advertisements on social media.

On the ground

A global commodities producer increases AI adoption with explainability

A lack of model explainability presents a level of risk in nearly every industry. In some areas, like healthcare, the stakes are particularly high when AI could be presenting a recommendation for patient care. In financial services, regulators may need to know why an organization is making particular decisions—on lending, for example. But explainability can present another risk: lack of AI adoption, leading to wasted investment and the risk of falling behind the competition. In an interview with McKinsey, the head of AI transformation at a global materials manufacturer notes that without an explainable model, adoption by frontline workers is nearly impossible. Workers need to be able to trust AI's judgment not only for the sake of taking the most efficient action but also for their physical safety. When a tool recommends running a piece of potentially dangerous heavy equipment in a certain way, workers need to feel confident that the reasoning behind the decision is sound and safe. The materials manufacturer uses the simplest and most transparent models possible to enable explainability, which has gone a long way in making workers confident and excited to use new AI applications. It also has improved operations, contributing to a 15 percent uplift in earnings before interest, taxes, depreciation, and amortization through AI and analytics initiatives.

The COVID-19 effect

Despite the economic challenges that pandemic-mitigation measures have caused for many companies, those seeing the most value from AI are doubling down on the technology.

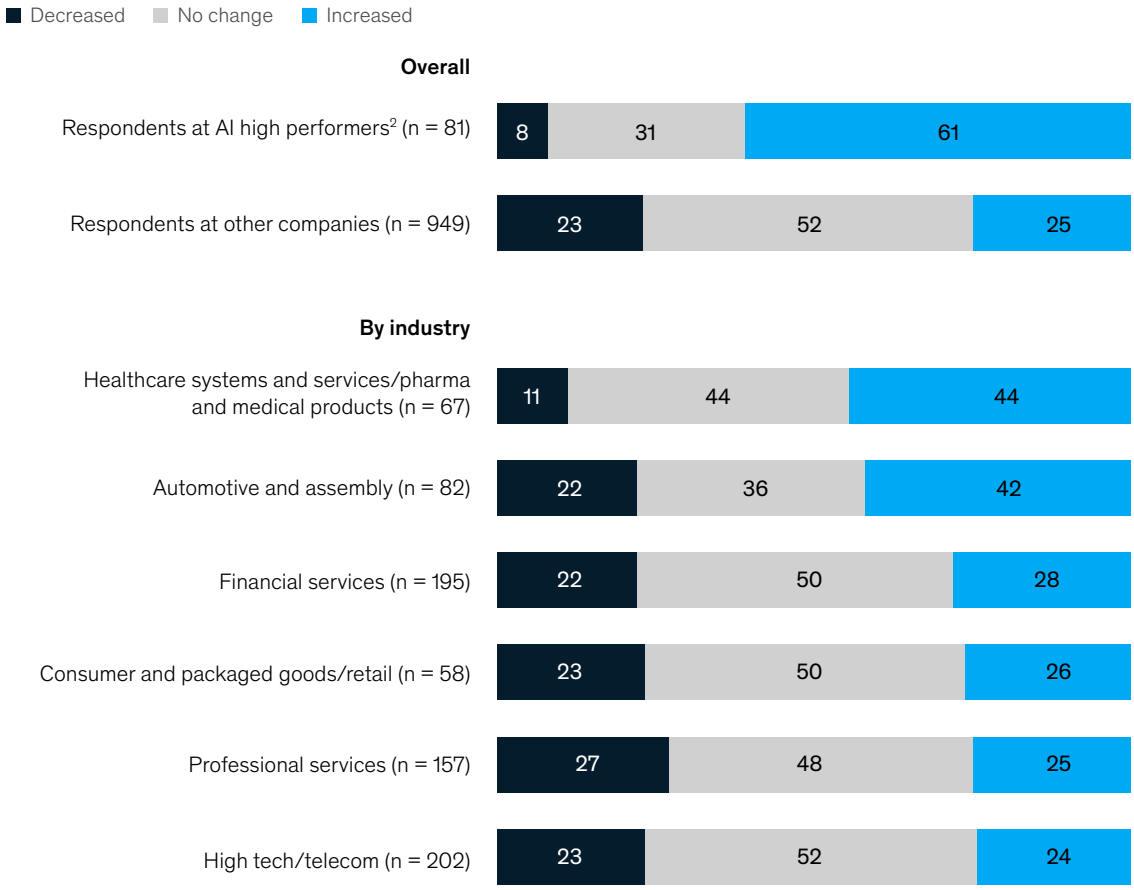
The companies seeing significant value from AI are continuing to invest in it during the pandemic. Most respondents at high performers say their organizations have increased investment in AI in each major business function in response to the pandemic, while less than 30 percent of other respondents say the same (Exhibit 5). By industry, respondents in automotive and assembly as well as in healthcare and pharma are the most likely to say their companies have increased investment.

Generally, respondents from companies that have adopted more AI capabilities are more likely to report seeing AI models misperform amid the COVID-19 pandemic than others are. Responses indicate that high-performing organizations, which tend to have adopted more AI capabilities than others, are witnessing more misperformance than companies seeing less value from AI. These high-performing organizations' models were particularly vulnerable within marketing and sales, product development, and service operations (Exhibit 6)—the areas where AI adoption is most commonly reported.

Exhibit 5

Most high-performing companies have increased their investment in AI amid the COVID-19 crisis, though the changes vary by industry.

Average change in AI investment across business functions because of COVID-19 pandemic, % of respondents reporting adoption of AI[1]



[1]Figures may not sum to 100%, because of rounding.
[2]Respondents who said that 20% or more of their organizations' enterprise-wide earnings before interest and taxes in 2019 was attributable to their use of AI.

Exhibit 6

Respondents from AI high performers most often say their models have misperformed within the business functions where AI is used the most.

Functions in which AI models misperformed since the COVID-19 crisis began,[1] % of respondents

[1]Out of 8 major business functions. Question was asked only of respondents who said their companies adopted AI in a given function.

McKinsey Commentary

Nicolaus Henke, senior partner, London

As we all know, COVID-19 has rapidly moved consumers and businesses to digital channels. Throughout the pandemic, we've seen organizations across sectors adopting and scaling AI and analytics much more rapidly than they previously thought possible. Many organizations have worked with their analytics teams to update demand patterns, reconsider supply chains, build scenario plans around resource needs, and enable automation in factories and other industry settings where workers may need to distance and have fewer people on-site. For example, a global pharmaceutical company linked multiple COVID-19 scenarios to develop a view of supply-and-demand issues for each of their products by country and integrated that view into their regular finance- and operations-planning processes. In some cases, organizations' short-term analytics solutions weren't incredibly precise, but executives realized that they were "good enough" to give them more direction than they otherwise would have had.

Many companies are now turning to longer-term opportunities. With more data from digital channels available, improved recommender systems, for example, can enable better customer experience, more personalized content, and automated digital customer service.

So it's not surprising that the pandemic has spurred more investment in AI capabilities. The companies currently underperforming in AI clearly aren't investing as much and risk falling further behind AI leaders.

On the ground

A pharmaceutical company boosts its use of AI to maintain operations during the COVID-19 pandemic

One analytics leader at a large pharmaceutical company tells McKinsey in an interview that, in general, the COVID-19 pandemic has acted as an accelerator for AI and digital initiatives, particularly to maintain and manage operations remotely during lockdown conditions or with a reduced on-site workforce. Importantly, the company had already begun employing more AI prepandemic, "so when COVID-19 hit, it served as a test bench for applications already put in place." And because these applications were already available, the company could boost and accelerate them. The situation served as a catalyst in many areas to get AI initiatives already underway completed faster, more accurately, and more reliably, in large part because the organization now depended even more on the capabilities AI would enable.

A global bank launches chatbots to respond to customer needs arising from the COVID-19 pandemic

For one large bank, the COVID-19 pandemic accelerated efforts to bring together customer-service data from both online and offline interactions (for example, at physical branches) to provide more prompt and targeted service to corporate customers during the pandemic, particularly with regard to government grants provided to address the strains companies were experiencing. The organization created one source of truth from the data sets and launched an AI-powered chatbot to respond to customer queries. The effort not only helped customers but also proved to employees what AI could do, accelerating efforts on data preparation and other AI initiatives. "The impact was such a strong driver for our management and IT department to see what is possible with AI that we immediately got the story flowing that more of this needs to be done," the bank's analytics leader told us in an interview.

About the research

The online survey was in the field from June 9 to June 19, 2020, and garnered responses from 2,395 participants representing the full range of regions, industries, company sizes, functional specialties, and tenures. Of those respondents, 1,151 said their organizations had adopted AI in at least one function and were asked questions about their organizations' AI use. To adjust for differences in response rates, the data are weighted by the contribution of each respondent's nation to global GDP. McKinsey also conducted interviews with executives between May and August 2020 about their companies' use of AI. All quotations from executives were gathered during those interviews.

The survey content and analysis were developed by **Tara Balakrishnan**, a consultant in McKinsey's Silicon Valley office; **Michael Chui**, a partner of the McKinsey Global Institute and a partner in the San Francisco office; **Bryce Hall**, an associate partner in the Washington, DC, office; and **Nicolaus Henke**, a senior partner in the London office.

Designed by McKinsey Global Publishing