KPMG

Thriving in an AI World

Unlocking the value of AI across seven key industries

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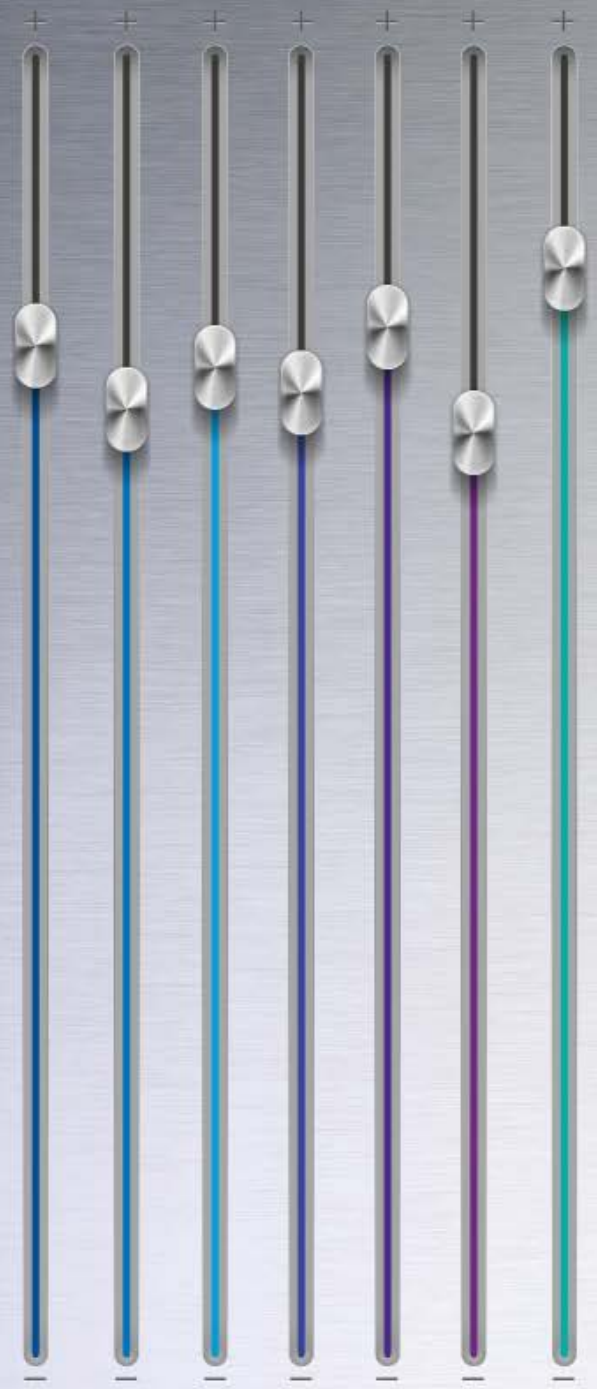

Working through AI whiplash

It has been a whirlwind.

When COVID-19 upended the world, businesses doubled down on digital transformation and raced ahead using artificial intelligence (AI) to meet new challenges. Now, according to our research, many organizations appear to be experiencing COVID-induced AI whiplash.

While nearly half of the executives surveyed by KPMG LLP (KPMG) at the start of 2021 say that they are concerned that their overall industry may be moving too fast with AI adoption, nearly all wish their own organization would move even *faster*. Executives also harbor a nagging feeling that everyone else is doing better than they are. Nearly eight in 10 say AI is functional in their organization, and a majority using it say it is delivering value beyond what was promised. Yet three-quarters believe the use of AI to help businesses is still more hype than reality, and nearly two-thirds believe the U.S. is trailing other countries in taking advantage of the technology.

Impossible contradictions? We see a coherent narrative behind these findings. Faced with a stark reminder of what is possible with AI—COVID-19 vaccines developed in record time, for example—it is natural for many executives to worry that their own organization may not be keeping pace. And trite as it may seem, it is worth remembering that the grass usually looks greener on the other side.

Executives also may be forgiven for viewing AI as overhyped if, as is too often the case, their organization has taken a piecemeal approach to the technology, proving use cases here and there only to find that scaling them across the enterprise can be an order of magnitude more challenging. The hurdles can be especially high at organizations that have yet to lay the necessary groundwork for AI, from data mastery to cultural transformation.

The good news is that AI's promise is nonetheless becoming more real every day. Forty-three percent of executives say AI is fully functional at scale within their organization, and nearly all are confident AI could help their own industry address its biggest problems. Most are educating their workforces about AI, and the vast majority believe their employees have the skillsets needed for its adoption.

This year's second annual survey was created to help AI leaders across industries and functions see how their counterparts are using AI to solve major industry problems; identify AI-related pain points, risks and challenges by industry; and show where businesses are focusing their AI agendas in 2021 and beyond. Along with these survey insights, we sought to provide pragmatic guidance on the path towards realizing AI's promise.

We believe that promise starts with a comprehensive data strategy; a robust AI platform, infrastructure and data pipeline; and a talented workforce with full-stack AI, digital and related skillsets —or an external partner who can provide those capabilities at scale. It includes employee upskilling. Cultural change. Deep involvement by the business, not just IT. Ethical use of AI, and, as our survey respondents indicate, guidance from the government on how AI will be regulated going forward. Finally, it requires a commitment to a new reality in which speed and innovation are imperatives. Having seen what is possible with AI, we can never return to the pre-COVID-19 pace of AI adoption.

Sreekar Krishna, Ph.D.
National Leader of Artificial Intelligence and Head of Data Engineering, KPMG
sreekarkrishna@kpmg.com

Ellen Campana, Ph.D.
Head of Enterprise Artificial Intelligence, KPMG
ellencampana@kpmg.com

Swami Chandrasekaran
Head of Digital Solutions Architecture, KPMG
swamchan@kpmg.com

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Methodology

Thriving in an AI World: Unlocking the value of AI across seven industries **is based on a KPMG survey conducted by Ketchum Analytics. The survey looks at how business leaders across these industries perceive AI's use; identifies AI-related pain points, risks and challenges; and shows where businesses are focusing their AI agendas.**

The findings are based on feedback from 950 full-time business decision makers and/or IT decision makers with at least a moderate amount of AI knowledge.

The respondents represent these seven industries

- **Technology**
- **Financial Services**
- **Industrial Manufacturing**
- **Healthcare**
- **Life Sciences**
- **Retail**
- **Government**

Each organization represented was required to have annual revenue of at least $1 billion, except in healthcare and life sciences, where the threshold was $100 million. There were 100 respondents each in the healthcare and life sciences industries, and 150 in each of the other industries. The online survey was fielded between January 3, 2021, and January 16, 2021. The margin of error for the total sample at the 95 percent confidence level is +/- 3.2 percentage points.

This 2021 KPMG study, *Thriving in an AI World*, is an evolution of a study KPMG originally released in January 2020 that surveyed 751 business leaders across five industries: healthcare, financial services, retail, technology, and transportation. Results from that survey were published in our 2020 report, *Living in an AI World*. The online survey for the 2020 report was fielded between September 3, 2019, and September 16, 2019.

Key findings

AI is becoming ubiquitous.

Seventy-nine percent of executives say AI is at least moderately functional within their organization, including 43 percent who say it is fully functional at scale. Leading the way is the industrial manufacturing industry, where 93 percent of executives say AI is at least moderately functional, followed by the financial services industry (84 percent) and the technology industry (83 percent).

Percentage of executives who say AI is at least moderately functional within their organization:

Industrial Manufacturing 93%

Financial Services 84%

Technology 83%

Executives widely believe in AI's ability to deliver value. Ninety-two percent agree AI would make their organization run more efficiently, and individual industries report confidence in AI's potential to solve some of their biggest challenges. Indeed, at organizations where AI has been adopted, the majority of executives say it is adding even more value than was promised. The retail industry is a leader on this front, with 69 percent of retail executives saying their organization's AI initiatives are yielding more value. But even among the industries that are not as far ahead in this area—life sciences and government—at least half report similarly favorable results (50 percent and 54 percent, respectively).

Despite these positive views, concerns that AI is overhyped are widespread and rising. Seventy-four percent of executives say the use of AI to help businesses is more hype than reality right now, and the percentage who feel that way has grown substantially since our previous AI survey was fielded in September 2019.

Most executives want their organization to implement AI faster—even as they worry their own industry may be embracing it too swiftly. Eighty-five percent of executives want their own organization to move faster with AI, even though 44 percent say their industry may be adopting AI faster than it should—a signal that many executives fear their organization is being left behind.

Nearly two-thirds of executives (65 percent) believe the U.S. is trailing other countries in adopting AI. This is another indication that executives are worried about keeping pace.

Cyber-security and data privacy continue to be viewed as the top risks associated with AI, but potential bias is a growing concern. Forty-two percent of executives say potential bias in AI technology is an issue that needs to be addressed, with healthcare executives most likely (50 percent) to echo this sentiment. Ninety-three percent of all executives surveyed also agree that companies should implement an AI ethics policy to help govern their use of the technology.

A growing number of business leaders want government to regulate AI. Leading the pack are executives in the industrial manufacturing sector, where 94 percent of respondents endorse regulation. Among retailers the figure is 87 percent, up from 63 percent in September 2019, and in the financial services sector it is 86 percent, up from 59 percent. Clear guidance from the government on rules around AI would allow organizations to invest in the technology with confidence they are moving in the right direction.

The majority of executives believe the Biden administration will do more to help advance the adoption of AI. Executives in the industrial manufacturing industry (90 percent) are more optimistic than executives overall (83 percent) that the Biden administration will help advance the adoption of AI by enterprises.

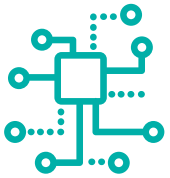
Building momentum amid the pandemic

AI is no longer tomorrow's technology.

When COVID-19 began to devastate lives and shut down vast swaths of the economy last year, businesses reached for every tool at their disposal—including AI—to solve new challenges and serve customers safely and effectively. Half of the survey respondents say their organization sped up the adoption of AI in response to the pandemic, including 72 percent of industrial manufacturers, 57 percent of technology companies and 53 percent of retailers.

Half the respondents say their organization sped up the adoption of AI in response to the pandemic including:

72%
Industrial Manufacturing



57%
Technology

53%
Retail

Organizations are using AI in a multitude of ways: to respond faster and more accurately to customer inquiries; to automate back-office processes; and to identify and address potential flaws in products, services and systems before they become material problems. In healthcare, organizations are leveraging AI to reduce errors and improve medical outcomes. Life sciences is leveraging AI for record keeping in the drug development process. Financial services firms are deploying AI to detect fraud and manage risk. The list of use cases is growing exponentially.

Seventy-nine percent of executives say AI is now at least moderately functional within their organizations, including 43 percent who say it is fully functional at scale. Industrial manufacturers are most likely to report at least moderate functionality (93 percent), followed by financial services firms (84 percent), technology companies (83 percent), and retailers (81 percent). These percentages are up dramatically from our 2020 report, *Living in an AI World*. Executives in the government and healthcare sectors are least likely to say AI is functional at some level in their organization, but even in those sectors a majority are putting it to work (61 percent and 67 percent, respectively).

While large businesses often lead in embracing new technologies, smaller organizations are more likely to report having at least moderately functional AI compared to larger enterprises (88 percent versus 75 percent).

Importantly, most executives believe their investments in AI are paying off. Eighty-two percent say AI has been helpful to their organization during the COVID-19 outbreak, including 93 percent of industrial manufacturers, 87 percent of tech companies, and 84 percent of retailers and financial services organizations. This aligns with other findings that suggest a growing faith in AI's capabilities. Ninety-two percent of executives agree it would make their company run more efficiently, for example, and most report confidence in AI's potential to solve some of their industry's biggest challenges. At financial services firms, 93 percent are confident in AI's ability to detect fraud, and, in the government sector, 79 percent are confident in its ability to improve bureaucratic inefficiency.

At organizations where AI has been adopted, the majority of executives say it is adding even more value than promised. The retail industry leads in this perception, with 69 percent of retail executives reporting better-than-expected outcomes. But even among the industries not as far ahead in this area—life sciences and government—at least half say AI has exceeded expectations (50 percent and 54 percent, respectively).

Despite all these positives, many executives now appear to be suffering from COVID-induced AI whiplash. Even as 85 percent surveyed say they want their own organization to pick up the pace of AI adoption, 44 percent contend their industry is moving faster on AI than it should. Meanwhile, the notion that AI's value has been exaggerated is

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Building momentum amid the pandemic

widespread and growing. Seventy-four percent of executives say AI's ability to help businesses is more hype than reality right now, and their ranks are up sharply in key industries from our 2019 survey. In both the financial services and retail sectors, for example, 75 percent of executives now see the use of AI in businesses as more hype than reality, up from 42 percent and 64 percent, respectively.

Concerns that AI is moving faster than it should are especially prevalent in the industrial manufacturing sector, where 55 percent of executives surveyed say the pace is too fast, as well as in the technology and retail industries, where 49 percent concur—up from 33 percent and 23 percent, respectively, when asked that same question in September 2019. It is also a more common view at smaller companies (63 percent, versus 44 percent of all respondents), among executives with high levels of AI knowledge (51 percent), and among younger business leaders (51 percent of Millennials and members of Generation Z).

Fears about how fast AI is being adopted likely reflect both the newness of the technology and the absence of an established legal and regulatory framework to guide its use.

"There's a lot of debate around the ethics, governance and regulation of AI," observes Swami Chandrasekaran, Head of Digital Solutions Architecture, KPMG. "Many business leaders don't have a clear view into what their organization is doing to control and govern AI in a scalable and continuous manner, or what new government regulations might lie ahead. Controlling, monitoring and governing AI, including data, have to be continuous exercises. It has to be embedded into new ways of working and operating."

Although the majority of executives express concern about the pace of AI adoption across their industries, the fact that they simultaneously want their own organizations to move faster suggests that at least some of their worries are more attributable to concerns about their own organizations being left behind than to fears that the technology isn't ready for prime time.

Concerns about the speed of AI adoption extend beyond organizational footprints. Sixty-five percent of survey respondents say they believe the U.S. is trailing other countries in adopting AI, another possible sign they're worried about keeping up with the crowd.

As for views about AI hype, they likely can be explained, at least in part, by early missteps with the technology. Some organizations ventured into the AI world under the mistaken impression it is something you buy, like a new piece of factory-floor machinery, to reap immediate results. In contrast, meaningful results were sometimes hard to come by if their organizations hadn't first built the necessary foundation—quality data to train AI models, a robust data infrastructure, sophisticated skillsets, a "build culture" in which the organization works to integrate AI tools with existing apps and processes, and deep buy-in by the business.

Similarly, modest initiatives that might have shown promise in isolated corners of the business sometimes became challenging to implement at scale, which may have left some early adopters discouraged. And, of course, it is no stretch to believe that proponents of AI sometimes exaggerated its potential or discounted the level of work required to realize its full value.

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> "To frame it another way, we suspect a lot of people worry that *AI is moving too fast* in their industry only if their own organization *isn't transforming quickly enough* to match that speed."
>
> **–Swami Chandrasekaran**
> Head of Digital Solutions Architecture, KPMG

Building momentum amid the pandemic

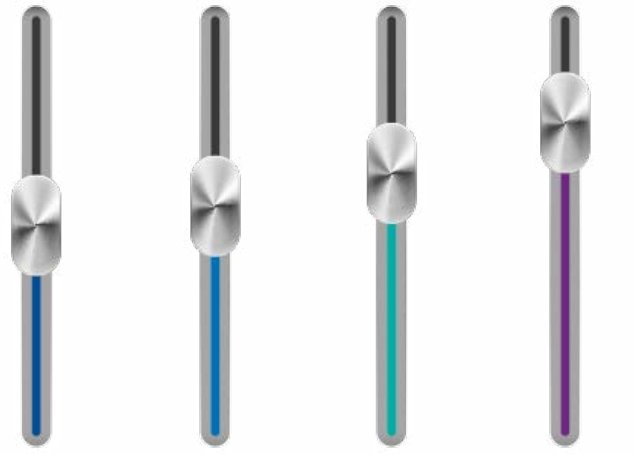
Perceptions of AI's value vary by company size. Sixty-seven percent of business leaders at small and medium-sized companies say AI initiatives have delivered more value than was promised at their organizations, versus 57 percent of those at large companies. Simply put, the explanation may be attributable to the fact that large companies tend to be less nimble and more risk-averse than smaller organizations. In addition, many large organizations are tethered to legacy information systems that can impede agility.

As one moves up the corporate ladder, our data shows that perceptions about AI's value improve. While 50 percent of manager-level and 54 percent of director-level business leaders believe AI is delivering more than promised, that figure rises to 68 percent at the vice president/senior vice president level, and 78 percent in the C-suite. Perceptions also may be a matter of focus. The C-suite is dialed into how AI impacts financial statements—the quantitative benefits of the technology. Business leaders further downstream are more likely to be focused on the practical day-to-day impacts of AI, such as whether it speeds up production or helps eliminate errors.

"Part of this is related to the AI paradigm differing from traditional software development and delivery, along with the degree of difficulty involved and the extra pressure to coordinate people, process and technology—all in concert," says Ellen Campana, Head of Enterprise Artificial Intelligence at KPMG. "Things like implementing tools and procedures to collect and protect data so that it can be used to train systems takes time and effort but does not deliver value until later. The people closest to the implementation tend to feel a bit out of their comfort zone, but those at higher levels see the value and long-term promise across the organization."

The fact that the majority of executives want their own organizations to adopt AI faster suggests they are, in the end, more concerned about missing the AI wave than they are about overestimating the technology's potential.

The percentage of leaders who believe that AI is delivering more than promised rises as they move up the corporate ladder.



Unlocking the value of Digital, Data, and AI:

How Levi Strauss & Co. transformed itself

Levi Strauss & Co.

Dr. Katia Walsh is the Chief Strategy and Artificial Intelligence Officer at Levi Strauss & Co. She joined the company in Q2 2019, months before the pandemic began. Here she explains how to approach AI in ways that bring deeper customer engagement—and deliver real financial value.

How should an organization approach AI-driven transformation?

The combination of Digital, Data, and AI is not just the future—it is the present of every business. It doesn't matter whether the business has been around for 168 years, like Levi Strauss & Co., or just a few years. The combination of Digital, Data and AI is at the foundation of how a modern business operates. It will inform how we live as a society and how we continue to evolve. While these areas are rightly perceived as highly technical, we need to humanize them for businesses to realize their full benefit.

How does an organization humanize AI?

Communication is critical to making Digital, Data, and AI come to life. We humanize Digital, Data, and AI, for example, by crystallizing the value of this capability into our key messages and giving examples of how they can help society and the organization, with customers at the forefront. Because Digital, Data, and AI are still new to established companies, it is critical to get stakeholders across the business onboard. We do that by showing them how to realize the value inherent in these technologies. The focus must be on business objectives - commercial goals and priorities.

What business goals are you connecting to AI?

We always want to start with improving the customer experience. A company can only succeed when it does right by its customers. So, it is imperative to start this kind of transformation with a deep, genuine and intense focus on the customer experience. As we fully transform our business operations, we are still running the same business—we are just doing it in a very different way. In retail and apparel, merchandise planning and inventory management are the original data science functions. They go straight to the heart of the customer experience. That is why we started by embedding Digital, Data, and AI into merchandise planning and inventory management.

The pandemic was a challenge unlike any other. You're a retailer, the world was in lockdown, and all your stores were closed. How did you pivot?

Like most retailers, particularly in the apparel sector, we could have been faced with piles of inventory gathering in our stores. The logical reaction among our competitors was to discount deeply to move that inventory. We did not do that. We quickly pivoted from using only distribution centers to source and fulfill our e-commerce orders to also shipping orders from our stores. With the consumer always in mind, we wanted to move inventory and get it to our fans as quickly as possible, while also decreasing the number of shipments, which helps sustainability, reduces shipment costs, and maintains high margins. ●

The road to value: Challenges to AI success

Regardless of how much value executives believe AI is adding to their organizations, their widespread concern that it may be overhyped suggests most don't believe they are getting everything they could from the technology. Many factors play into this finding, clustered in four key areas: talent, technology, strategy, and risk management.

Talent

The large majority of business leaders—about 90 percent in most industries surveyed—say their organizations make an effort to keep employees current on AI trends, and that they are dedicated to upskilling employees in AI technology. That figure falls to about 80 percent for healthcare executives and slightly more than 70 percent for government executives. Perhaps as a result of all this training, most executives, ranging from 71 percent in government to 97 percent in industrial manufacturing, say their employees are at least somewhat prepared for AI adoption in terms of their skillsets. Forty-seven percent of retail executives believe their employees are very prepared, the highest of any industry, while those in the industrial manufacturing sector are least likely to say employees are very prepared (just 23 percent). As with assessing AI's value, executives in the C-suite are more optimistic about the skillsets of their talent than those at the manager level.

Despite the confidence executives report, we see many organizations struggling to attract and retain people with the right skillsets to drive their AI strategies, or indeed to develop those strategies. In part, difficulties with attracting talent can be attributed to how quickly AI adoption has ramped up. Universities have not had time to train enough graduates in the field, especially when competing with technology companies for instructors, according to Campana.

She also adds, "It will take some time to build up a workforce with this type of knowledge and experience. In the meantime, it will be critical to bring together people with diverse perspectives and build in time for dialogue. Junior team members may be uniquely positioned to offer perspectives unhampered by constraints that could stifle innovation. On the other hand, experienced team members may be in a better position to impart the rigor necessary to deliver hardened software at scale. Respecting each person's perspective, and taking time for that back-and-forth, will lead to better decisions."

Technology

Challenges around technology tend to be concentrated in two areas: choosing the right tools, platforms, and technologies in line with an organization's needs; and building the underlying infrastructure needed to support enterprise-scale AI applications.

"Some of it is technology paralysis," Chandrasekaran says. "The market is moving so fast that a lot of organizations are hesitant to dive into something really deep and broad because they're afraid a tool or platform or API will come out tomorrow that does it quicker, better, faster."

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Challenges to AI success

Sixty-nine percent of survey respondents agree that it is hard to keep up with the evolving AI landscape, ranging from 78 percent in the retail industry to 64 percent in the tech and healthcare industries. Sixty-seven percent of all survey respondents say their organization struggles to select the best AI technologies. Even 60 percent of tech executives, who work in the very industry leading the charge in AI development, agree.

Meanwhile, many organizations have yet to invest the necessary time and money to build a robust data infrastructure. And quite a few have yet to migrate their information systems to the cloud, where it is easier to scale AI initiatives and move them into production than it is in a legacy computing environment. The need to adapt governance models to support protecting data, while at the same time curating that data and using it to train and maintain AI, are at the heart of this reluctance.

"Many organizations don't appreciate the amount of quality data needed to train AI systems," Chandrasekaran says. "If data is the new oil, then effort is required to turn the crude into oil. The time it takes to acquire, clean and prepare data, and to have data experts label, annotate and catalog it, are all often underestimated."

Chandrasekaran adds that many organizations fail to appreciate the gap between experimenting with a small-scale proof-of-concept and then scaling it up across the enterprise, including the differences in the teams required, the AI infrastructures needed, and the challenges associated with model management.

Strategy

Most business leaders today appreciate the importance of agility—the ability to move quickly, fail fast (if failure is in the cards), and then iterate and move forward with something better. However, being able to move quickly in the short term doesn't mean it makes sense to build a long-term strategy around small, quick wins. To be sure, those wins are great. They can build confidence in, and momentum for, AI. But in many cases, real value is realized only over the long term, and this should be reflected in an organization's AI strategy if it wants to avoid setting itself up for failure.

> "AI is not self-driving. It doesn't live and perform without a human in the loop. Man must collaborate with machine—overseeing inputs, assessing outputs, training data, and keeping AI models current."
>
> **–Sreekar Krishna**
> National Leader of Artificial Intelligence and Head of Data Engineering, KPMG

"AI doesn't typically create value overnight," says Krishna. "In many cases, short-term results may not be all that exciting. But if you keep your eye on the long game—on the strategic game—the value is profound." Too often, he adds, many organizations abandon projects before moving them to production because they aren't confident those projects will generate value.

Another common hurdle to AI success is putting the solution before the problem; becoming, in other words, the proverbial hammer in search of a nail. The objective isn't to buy a platform or tool and find ways to use it, but the other way around—to identify business problems and then apply AI solutions where they offer the best potential outcomes.

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Challenges to AI success

Risk management

The digital revolution has created risks that simply didn't exist in the 20th century. AI is adding to this list, creating new challenges for organizations seeking to embed the technology deeply into their operations.

In six of the seven industries examined in this report, executives identify cyber-security breaches as the most common risk associated with AI adoption and privacy violations as the second most frequently cited risk. (Healthcare is a bit different: the industry doesn't rank cyber-security breaches as the highest risk associated with AI; however, the industry is the most concerned of all the industries KPMG surveyed when it comes to concern about privacy violations.) The ranking of other risks by all industries surveyed, in descending order, are potential biases in AI technology, surveillance issues, AI intelligence overtaking human intelligence, and job loss via automation.

While concerns about security and privacy remain top of mind, concerns have abated a bit since our 2020 report. At that time, they were cited by 72 percent of executives as an ethical concern in the financial services sector (versus 49 percent this year), by 61 percent in retail (versus 49 percent this year), and by 59 percent in the tech sector (versus 55 percent this year). These declines are likely not attributable to any real decrease in the importance of security and privacy, but rather to a growing awareness of other risks, such as bias in AI algorithms.

Bias refers to the potential for developers to embed their own prejudices, consciously or not, into computer algorithms. For example, developers could train facial recognition software by using data sets skewed toward people of a certain gender or skin color. Such partiality could lead to the software learning only a subset of the population and putting other members of the community at a significant long-term disadvantage. AI developers must also guard against drift—changes over time in the relationship between data used by an algorithm and the outcomes it generates—and imbalances in datasets that could color or obscure results.

"Tools, techniques and methods have to be put in place to uncover imbalances and quantify developer biases early in the development lifecycle," says Chandrasekaran. "Once AI models are deployed, there is also a need for continuous monitoring of the models, and data, for bias and drift. At any point in time, a model's decisions need to be explainable for the person receiving the output."

Executives are nearly unanimous in saying companies should implement ethics policies to help govern their AI work—more than 90 percent agree in every industry except life sciences, where the total is 86 percent of those surveyed. However, many have yet to act on that belief. Industrial manufacturers have been quickest to adopt ethics policies for AI (89 percent have one) followed by retailers (78 percent, up 34 percentage points from the 2020 report) and tech companies (71 percent, up 17 points). Government and life sciences organizations are less likely to have an ethics policy (53 percent and 59 percent, respectively).

Percentage of companies that have implemented ethics policies for AI:

The role for government

Business leaders seldom advocate for more government regulations. However, in the case of artificial intelligence, many are pushing for clearer regulatory guidance—and their numbers are growing. Eighty-seven percent of business executives surveyed say government should play a role in regulating AI technology, with the number of advocates ranging from a high of 94 percent in the industrial manufacturing sector to 84 percent in healthcare. The call for government oversight among those surveyed is up sharply since the September 2019 survey—from 63 percent to 87 percent in the retail sector, from 59 percent to 86 percent in financial services, and from 69 percent to 86 percent in the technology sector.

Some of this growing interest in regulation may be attributable to concerns such as those voiced by prominent high-tech entrepreneur Elon Musk, who has warned that AI could overtake humans by 2025 and has pledged to support strict guidelines for the development of advanced AI.[1] At a more practical level, it is likely that many business leaders, especially in risk-averse industries like healthcare and financial services, simply don't want to be surprised by future regulations. They want to know what's going to be required of them before they invest in AI initiatives lest they run afoul of future rules.

We believe that for AI to be transformative it must be trusted, and that trust will rest on four main anchors: integrity (of algorithms and data), explainability (of the algorithmic decision-making process in simple terms), fairness (or freedom from bias), and resilience (or technical robustness and compliance with regulations, agility across platforms, and protection against bad actors).

Governments outside the U.S. are already moving toward regulation of AI. In 2018, for example, the European Commission created a steering group, the High-Level Expert Group on Artificial Intelligence, to produce the European Union's Ethics Guidelines for Trustworthy AI. In Asia, Singapore's central bank has worked with industrial partners to create Veritas, an R&D framework to promote responsible adoption of AI and associated data analytics. Elsewhere, the Organisation for Economic Co-Operation and Development has launched its Principals on AI, and Canada is developing its Pan-Canadian Artificial Intelligence Strategy.[2]

Eighty-three percent of survey respondents say they believe the new administration in the U.S. will do more to help advance the adoption of AI in the enterprise, a sentiment that is most prevalent in the industrial manufacturing industry (90 percent).

Among survey respondents from the government sector, there are specific opinions about where the Biden administration should push for an increased role for AI role over the next four years: healthcare is cited by 41 percent of government respondents and defense/national security is cited by 36 percent. But the administration will likely need the assistance of the private sector to navigate the evolving AI landscape.

Although trust in government as an authority on AI has been growing, executives most often identify business as the most trusted authority (cited by 33 percent of respondents), followed in descending order by academia (28 percent), government (21 percent), media (9 percent), and trade groups (8 percent). ●

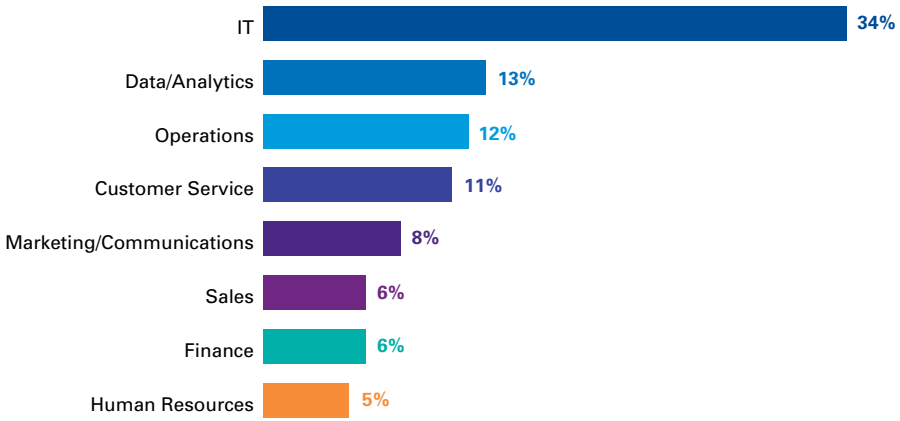
1 The Independent, "Elon Musk Claims AI Will Overtake Humans 'In Less Than Five Years,'" by Anthony Cuthbertson, July 2020.

2 KPMG Global, "The Shape of AI Governance to Come," January 2021.

The road to value: Making it happen

While every organization will need its own playbook to achieve at-scale implementation and accelerate time to realize value, our research across 950 business decision-makers in seven industries, along with our deep experience helping clients develop and implement their own AI strategies, confirms that a comprehensive plan should consider the following:

Which functional area within your organization is the biggest beneficiary of AI?



Strategic investment in data and a robust data infrastructure. Data is the raw material of AI—the fuel that feeds the engine. To realize maximum value from AI, organizations need to have the right data, of high quality, typically from both internal and external sources. That data must be clean, validated by domain experts, checked for bias so that it can be trusted, and organized in a format that facilitates processing. Organizations also need a data catalog or storage infrastructure that transcends functional silos within the business and can deliver data quickly and reliably to those who need it. Businesses making fast inroads with AI are already far along this path. "Leading organizations have begun to think of data not just as an asset but as the connective tissue of a digital organization," says Justin Hoss, a principal in the KPMG Healthcare and Life Sciences practice. Businesses may also want to consider augmenting their data with innovative approaches and techniques, including crowdsourcing using high-veracity methods and sources.

The right talent. Computer scientists with expertise in AI and data engineering are in high demand and tough to find but are crucial to understanding the AI landscape and formulating and guiding AI strategy and initiatives. Organizations unable to build a full team of data scientists internally must be diligent in finding external partners that can fill the gaps and help them sort through the ever-expanding array of AI vendors and their offerings. But these technologists cannot be expected to drive AI strategy on their own. Organizations also need business leaders educated in AI's potential who can help inform its application to the business.

An AI strategy based on business needs and guided by the business itself. Organizations that get the most from AI think about finding solutions to problems, not buying technology and then searching for ways to use it. "The worst AI is developed within an IT department when there is no business involvement," says Krishna. "Unless your use case itself is an IT use case, that's a recipe for disaster." When AI investments are tied to an AI strategy led by the business, Krishna adds, AI initiatives that go wrong become opportunities to fail fast and learn, not fail fast and burn.

Survey results (see chart above) suggest some organizations may have allowed their AI strategies to become overly reliant on IT. Forty-seven percent of survey respondents identify IT as the functional area leading the adoption of AI at their organizations, more than any other single functional area selected. In addition, more respondents identify IT as the biggest beneficiary of AI within their organization (34 percent) than any other functional area. However, the latter number also indicates that a majority of executives see the biggest benefits accruing to some other part of the business, whether that is data/analytics (cited by 13 percent of respondents), operations (12 percent), customer service (11 percent), marketing/communications (8 percent), sales (6 percent), finance (6 percent), human resources (5 percent), or supply chain (5 percent). Add them all up, and 66 percent of survey respondents say AI is primarily benefitting a function outside of the IT department.

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Making it happen

One way to ensure the business plays its role is by making sure AI is part of the conversation as organizations accelerate their digital transformation agendas. While many AI initiatives to date have been focused on front-office operations that directly interface with customers, organizations must also look for opportunities to leverage AI to improve middle- and back-office operations, such as the supply chain, where the technology has the potential to deliver massive efficiencies and smarter decision-making. Organizations should also have a robust approach to prioritizing use cases. (See "AI's potential to balance productivity and growth" on the next page)

Culture and employee upskilling. It is the C-suite's role to make sure AI is part of an organization's digital agenda, but that agenda won't gain much traction without buy-in from the rest of the workforce. Employees, in turn, can't be expected to commit to an AI strategy if they don't have at least a basic understanding of the technology and an even deeper understanding of how it will benefit them and the enterprise. Creating a workplace culture invested in AI's success begins with educating and upskilling employees, especially where AI will take over or supplement some of their existing responsibilities.

> "The pandemic has presented an opportunity for organizations to prioritize these actions and help employees develop new skills. The year 2021 will be about education—ensuring employees have what it takes to successfully operate in a new normal and catch up to expedited digital initiatives."
>
> –**Ellen Campana, Ph.D.**
> Head of Enterprise Artificial Intelligence, KPMG

Some organizations have room for improvement in this area. While the vast majority are making the effort to keep employees current on AI trends and are dedicated to upskilling employees in AI technology, those efforts narrow dramatically among rank-and-file workers. About half of organizations surveyed offer training on AI literacy for mid-level and senior employees, for example, but only 34 percent offer it to intermediate or "experienced" employees, and only 15 percent to entry-level employees.

"There is a lot of education that needs to be done," Campana says. "At a basic level, employees need to be digitally literate, which includes some understanding of data types, how AI operates, and how it gets built and trained. Organizations should also be sure that education efforts are aligned with product lifecycles, because AI is best developed under a product-lifecycle mindset using agile methodologies." To avoid alienating customers, she adds, employees should be taught where customers will be open to AI's influence and where they will not. Finally, organizations should make education and training available for IT staff too, as they must become versed in modern tools, platforms, and methodologies for taking AI into production.

Given the growing business case for AI, Campana predicts companies will soon be offering more upskilling opportunities and incentives moving forward, and working harder to build data and AI literacy across all levels of the organization.

A commitment to ethical and unbiased use of AI. AI holds great promise for allowing organizations to provide customers with faster and more personalized service, more targeted products, and greater convenience. However, it also carries the potential to harm customers if certain personal boundaries are crossed or if it is used in service of customer interactions that could be seen as discriminatory. When designing AI applications, organizations should consider the type of problem or opportunity being addressed and the type of customer that will be impacted. Organizations should also develop AI ethics policies with clear guidelines on how the technology will be deployed and continuously monitored. These policies should mandate measures that guard against unintended bias in machine-learning algorithms, continuously detect drift in data and algorithms, and track the provenance of data and the identity of those who train algorithms.

AI has potential to balance both productivity and growth

Perspectives from the Office of the Chief Economist

Nobel Prize-winning economist Robert Solow once quipped that one could see the computer age everywhere but in the productivity statistics. He said this in 1987, and, while there has been tremendous technological advancement since then, productivity, as measured by output per worker hour, has averaged a growth rate of slightly less than 2 percent year over year during this 34-year period. [3]

Productivity is central to economic growth, allowing higher standards of living and faster growth with less inflation. Economists often look to the 25 years following World War II as the golden age of productivity, as growth averaged 2.8 percent per year during the period. **Similarly, today's economists are eagerly studying developments in AI for its potential to bring about a period of rapid productivity growth in the years to come.**

Economists posit that if AI can reduce the costs of the factors of production, as appears to have been the case in the COVID-19 vaccine-development process, AI has the potential to greatly improve productivity as it becomes adopted widely.

Due to the iterative nature of general-purpose technologies becoming adopted, one possibility of AI adoption is that it could have a logarithmic impact on future productivity. While automation has been improving on a 200-year continuum it has been limited to routine tasks since the spinning jenny advanced the industrialization of textile manufacturing. AI opens the door to automating non-routine tasks, such as self-driving cars, radiology, vaccine development, certain types of laboratory research, and even some legal services.

Even if these examples are fertile ground for more advances and widespread adoption, it is not guaranteed that AI will produce significantly higher growth. Economists consider the paradox outlined in Baumol's cost disease.[4] Sectors that experience high levels of productivity growth often become a smaller share of gross domestic product. This is because increased productivity reduces input costs and often results in lower absolute and relative prices.

The two prime examples of this paradox can be seen in agriculture and manufacturing. In the United States, the productivity of these sectors between 1950 and 2000 exceeded that of the economy as a whole. At the same time, these sectors' GDP share fell: from 26.8 percent to 15.1 percent in manufacturing, and from 6.6 percent to 0.9 percent in agriculture.

Getting back to AI, a 2019 study produced by the National Bureau of Economic Research modeled the growth of AI specifically when it comes to automating the production of ideas.[5] In this model, Baumol's cost disease is mitigated and the model suggests explosive growth is possible if there are sufficient safeguards for protecting intellectual property. The authors suggest that AI could change the process by which new ideas and technologies are created, providing a significant boost to economies of scale. However, in order to realize this bright new future, consideration must be given to the problems of business stealing and creative destruction that is so rapid it discourages R&D, as well as business concentration and firm structure.

Ultimately, as Baumol's insight shows, growth is determined not by what economies are good at, but by what is essential and yet hard to improve. If AI can tackle essential but hard-to-improve-upon problems, it could be the holy grail that delivers higher productivity for decades to come. ●

Constance Hunter
Principal and Chief Economist for KPMG

3 U.S. Bureau of Economic Analysis

4 National Bureau of Economic Research, May 2006.

5 The Economics of Artificial Intelligence, Philippe Aghion, Benjamin F. Jones & Charles I. Jones, May 2019.

What's next

Near-term objectives for AI investments vary by industry. In the healthcare sector, executives say their focus over the next two years will be on telemedicine, robotic tasks and delivery of patient care. In life sciences, AI will be deployed in the search for new revenue opportunities, reduction of administrative costs and patient data analyses. And at government organizations, AI can be used to improve process automation and analytics capabilities, and to manage contracting and other obligations.

When asked to identify the top three AI technologies that will have the greatest impact on their industry, executives point most often to machine learning (cited by 41 percent of survey respondents), followed by robotic process automation (35 percent) and artificial or virtual reality (35 percent). It is of note that machine learning is cited significantly more often by executives in the technology and industrial manufacturing industries (53 percent and 51 percent, respectively) than in other industries surveyed.

The survey also sheds light on how certain technologies loom larger in some industries than others:

- **Fifty-two percent of industrial manufacturing executives** predict robotic process automation will have a big impact on productivity in their businesses and see AI having the most impact on product design, development and engineering; maintenance operations; and production/assembly activities.
- **Forty-five percent of tech executives** are planning to use artificial/virtual reality to improve output, and 33 percent think deep learning will be transformative, compared to only 24 percent of all respondents.
- **Financial services firms** have high expectations for AI around fraud detection and prevention, risk management, and process automation.
- **Thirty-one percent of retail executives** are planning to use chatbots and intelligent agents in their call centers for customer service and intelligence gathering, versus 22 percent of all respondents.

Longer-term, we see AI playing a vital role in reducing fraud, waste and abuse, especially in the government sector, and in helping businesses sharpen their sales, marketing and customer service operations. Ultimately, we believe AI will contribute to the resolution of fundamental human challenges. For example, the technology has the potential to dramatically improve disease identification and treatment using sophisticated machine learning algorithms; to boost the farming sector's profitability and reduce global hunger by more accurately predicting weather patterns and analyzing soil for best crop usage; and to combat climate change by helping develop better and more resilient ways to use sustainable sources of energy.

The foundation for that future is being laid now. We can't imagine anybody would want to be left behind.

How can KPMG help?

We help our clients realize the promise of AI by providing insight on the best tools for innovation and by offering outcome-driven pragmatic approaches to implementing sustainable processes built on AI insights. Our wide-ranging domain and industry expertise means we are able to execute on your agenda from strategy to full-scale production.

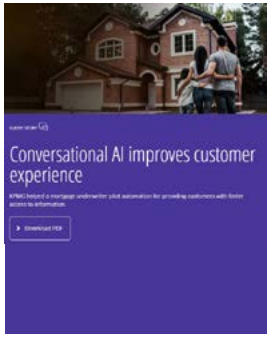
With our patented KPMG Ignite AI platform, we're able to bring together machine learning, deep learning, natural language processing, document ingestion and OCR capabilities and apply them to structured and unstructured data, voice and images. KPMG Ignite enables rapid AI solution development and delivery by enhancing, accelerating and automating decisions and processes that drive growth, manage risk and optimize cost. Organizations are able to achieve real value from their data and AI investments in a flexible, easy-to-use and secure environment. Specifically built to work with a range of leading platforms including Microsoft Azure, Google Cloud, IBM Watson, Appian and a host of other leading open source AI tools, KPMG Ignite can help advance our clients' digital transformation initiatives.

Related Materials

Enterprise reboot: This research report explores the current and future state of emerging technologies and demonstrates a dramatic shift in how businesses are approaching emerging technology now versus before the onset of COVID-19. Our research reflects the perspectives of hundreds of enterprise technology leaders around the world, as well as KPMG and HFS Research thought leaders, and global luminaries.

The shape of a governance to come: The business and compliance imperative to understand and be confident in AI technologies has reached critical mass. This report explains the urgency and describes methods and tools that can help leaders govern their AI programs. As the regulatory environment continues to evolve at traditional pace, leading organizations are addressing AI ethics and governance proactively rather than waiting for requirements to be enforced upon them.

Controlling AI: This report is for leaders involved in the world of Artificial Intelligence and Machine Learning algorithms. The business and compliance imperative to understand and be confident in AI technologies has reached critical mass. This paper explains the urgency and describes methods and tools that can help leaders govern their AI programs.



Client stories: Explore how KPMG has helped clients integrate people and machines, leveraging AI for competitive advantage.

Authors

Sreekar Krishna, Ph.D
National Leader of Artificial Intelligence and Head of Data Engineering, KPMG
sreekarkrishna@kpmg.com

Sreekar specializes in innovation and creative business solution delivery using AI-enabled digital transformation, specifically big data machine learning and knowledge from unstructured data. Working with KPMG's customers, he has helped evangelize the transition of various industry partners from the traditional data warehousing model to a more sophisticated big data analytics driven culture. He specializes in big data AI solutions that improve business process and customer engagement. Specifically, he focuses on the core areas of machine learning and its associated technologies like natural language processing, billion-scale data processing, ranking, information retrieval and simulation.

Ellen Campana, Ph.D
Head of Enterprise Artificial Intelligence, KPMG
ellencampana@kpmg.com

Ellen is a technology leader with over 20 years of experience designing, developing and delivering transformative AI-based technology. At KPMG she has advised top 5 healthcare payor organizations and top 5 financial institutions in their transitions to enterprise AI. She has also supported companies in other verticals including major international food distribution, education, chemicals, entertainment, and telecommunications. Ellen has a deep grounding in AI, with dual Ph.D.s in Brain and Cognitive Science and Computer Science and a career path that has always focused on where humans and technology come together to achieve great things. She has built AI-based systems to help astronauts and chemists do their research and others to help triathletes up their game. She has invented systems for immersive technology-based classroom learning and for lowering the costs of medical care. Most importantly, she has invested in mentoring a generation of AI practitioners who will drive the innovations of the future.

Swami Chandrasekaran
Head of Digital Solutions Architecture, KPMG
swamchan@kpmg.com

Swami drives technology and architecture for complex digital solutions. He has over 20 years of technology and engineering experience in delivering outcomes using "Process, AI, Data and Automation" in a broad range of industries. In his current role, he works with clients to architect solutions across several industries that combine AI including advanced analytics, IoT, AR/VR, and automation technologies deployed on multi-clouds. He has built middleware products and cloud-first AI platforms and has worked with clients in 20+ countries to deploy them successfully. Some of his recent work includes: Intelligent Conversational Agents, Risk Prediction & Monitoring, Restarting America (safe return to work), Trusted AI framework (for data provenance, bias detection & mitigation, model resiliency, model explainability, etc.), Ambient Data Management, Smart Inventory Management using Drones & Things, Multi-Cloud Architectures, Modern Data Catalog, Patient Front Door, Contact Center Modernization etc.

Additional contributors

Dr. Katia Walsh, Chief Strategy and Artificial Intelligence Officer
Levi Strauss & Co

Kelly Combs, Director, Advisory
KPMG Digital Lighthouse

Rob Dwyer, Principal
Federal Consulting Industry Leader

Melissa Edwards, Advisory Managing Director
KPMG Digital Lighthouse

Justin Hoss, Principal
Life Sciences Industry Leader

Agnel Kagoo, Principal
Capital Markets Consulting Industry Leader

Todd Lohr, Principal, Advisory
KPMG Digital Lighthouse

Roy Mathews, Managing Director, Data & Analytics
KPMG Digital Lighthouse

David Neely, Advisory Managing Director
KPMG Digital Lighthouse

Bill Nowacki, Managing Director, Data & Analytics
KPMG Digital Lighthouse

Duleep Rodrigo, Principal
Consumer & Retail Consulting Industry Leader

Anand Sekhar, Advisory Managing Director
KPMG Digital Lighthouse

Martin Sokalski, Principal, Advisory
KPMG Digital Lighthouse

Vince Vickers, Principal
Healthcare Consulting Industry Leader

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