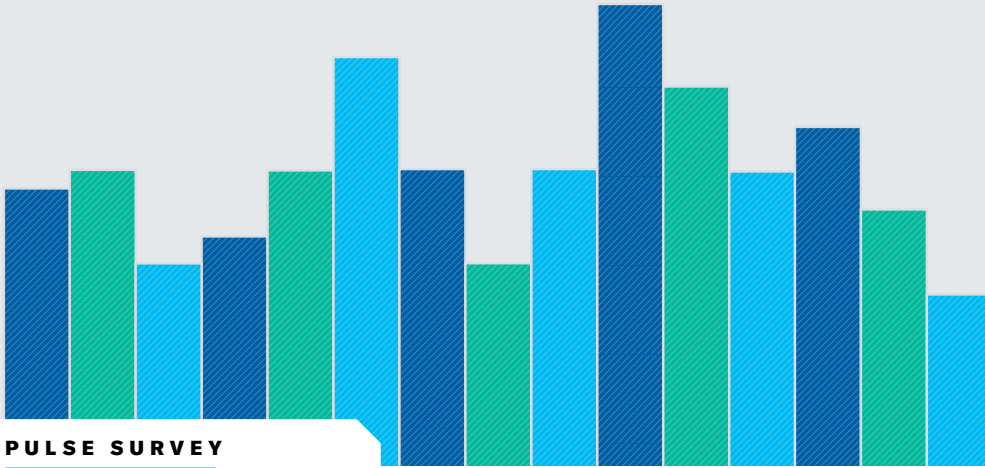




**Harvard
Business
Review**

ANALYTIC SERVICES



PULSE SURVEY

Data Strategy:

The Missing Link in
Artificial Intelligence-Enabled
Transformation



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Data Strategy: The Missing Link in Artificial Intelligence-Enabled Transformation

Thanks to an explosion of data, exponential increases in computing power and storage capacity, and better algorithms, artificial intelligence (AI) and machine learning (ML) capabilities are poised to revolutionize business processes. These intelligent capabilities will not only underpin increased automation and process optimization but also improve business results with better and faster planning, decision making, and risk forecasting.

Indeed, AI/ML models will be very or extremely important to the business performance of most organizations over the next two years, according to a Harvard Business Review Analytic Services survey of 247 business executives familiar with their organizations' AI use. "There is a lot of long-term momentum in the AI market," says Nitish Mittal, vice president in the digital transformation practice at global research firm Everest Group, noting that AI/ML adoption is expected to accelerate through 2024.

Nine out of 10 respondents (92%) indicate that their organizations are working with AI/ML models in some capacity now, whether it's piloting or experimenting with them, deploying them in certain areas, or running them at scale across the enterprise. But, as Wayne Butterfield, director and leader of the European AI automation practice at business consultancy and research firm ISG, tells it, a limited number of organizations are seeing significant business impact from their AI/ML investments so far.

"If we break down AI into its various components, nearly every enterprise is using one of them," Butterfield says. "But none of it is transformative. It's very much happening around the edges. Very few organizations are AI-first. Most organizations are not set up to achieve that."

HIGHLIGHTS



92% of survey respondents' organizations **are working with artificial intelligence or machine learning (AI/ML) models today** in either a piloting/experimenting phase or in production.



71% of all survey respondents say **AI/ML models will be very or extremely important to business performance** within the next 18 to 24 months.



61% **do not yet have a data strategy in place** to support machine learning and data science.

The mere existence of more data, greater computing power, and better algorithms isn't enough to drive AI/ML-enabled business change. Optimization and transformation will hinge on an organization's ability to access, process, and analyze the data that fuels AI and ML. Although most respondents' organizations are at least developing a cohesive plan and processes for collecting, processing, governing, and eliciting value from data specifically optimized for ML and data science, not many have a data strategy in place that enables very effective application of AI/ML models today.

Most organizations recognize the criticality of their AI/ML models to their future success as well as the importance of an AI-focused data strategy, but there is significant near-term work ahead. Those that hope to advance their AI/ML ambitions for the future will have to amplify their focus on creating and deploying cohesive plans and processes for collecting, processing, governing, and eliciting value from data specifically optimized for machine learning and data science.

The AI Imperative

There is a broad spectrum of AI/ML maturity in the marketplace—from early adoption by high-tech leaders and data-rich enterprises to one-off experimentation and pilot projects by late movers. However, more organizations have experience with implementing internal AI/ML models than do not. For example, four in 10 respondents say their organizations have AI/ML models in production in one or more

business areas, nearly a third are piloting or experimenting with these capabilities, and 18% are using AI/ML models at scale, according to the survey. **FIGURE 1**

"There is an understanding of the power of AI that has evolved over the last five years," says Beena Ammanath, executive director of Deloitte AI Institute. "In the past, it was more of a question of what AI could do. Today, the majority of organizations are stuck in the implementation phase when you go from idea to production and start thinking about scaling AI systems and user adoption. That's the last leap."

AI/ML models will only grow in importance to business performance in the near term. More than two-thirds of respondents (71%) say that AI/ML models will be very or extremely important to their organizations' business performance within the next two years—an increase of more than 50% over the number that say AI/ML models are critical to performance today. **FIGURE 2**

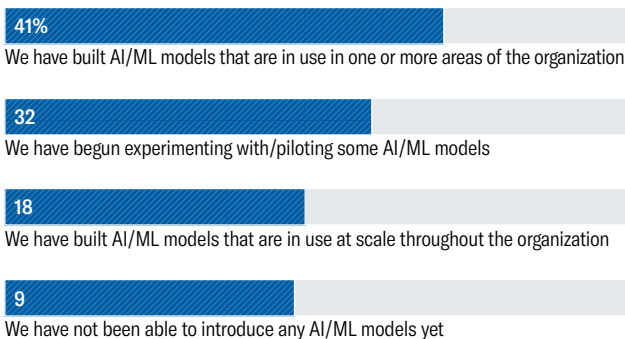
This new AI imperative is, in part, attributable to the growing volumes of data that organizations have and can collect or access, in addition to the data-enabled demands of their customers, partners, and employees. "AI is a way for organizations to make sense of vast amounts of data they are now sitting on—employee data, customer data, partner data, operational data," says Mittal of Everest Group. "Much of that data is unusable unless they apply a broad spectrum of AI technologies. Because data is so crucial to how companies best serve their stakeholders, AI is a very important tool [to have] in the arsenal."

FIGURE 1

Artificial Intelligence Invades the Enterprise

The vast majority of surveyed respondents say their organizations are working with AI/ML models today

How would you describe the extent of your organization's internal development and adoption of AI/ML models?



Source: Harvard Business Review Analytic Services survey, June 2021

FIGURE 2

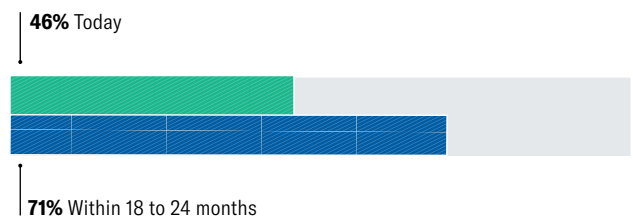
AI Becoming Key Business Enabler

AI/ML models will soon underpin effective business performance

How important are AI/ML models to business performance today?

How important will AI/ML models be to business performance within the next 18 to 24 months?

[PERCENTAGE OF RESPONDENTS INDICATING 8, 9, OR 10 ON A SCALE OF 0 TO 10, WITH 10 BEING EXTREMELY IMPORTANT]



Source: Harvard Business Review Analytic Services survey, June 2021



“I can’t stress this enough: data or the lack of the right data strategy is the number one bottleneck to scaling or doing anything with AI,” says Nitish Mittal of Everest Group.

The State of Enterprise AI

AI/ML models can certainly have a profound impact on businesses—even entire industries, as seen in the disruption of the banking and financial industry by AI-enabled financial technology firms or the ML-driven development of new tests and vaccines for Covid-19. Business leaders have seen this play out over the past several years of digital disruption. For many organizations today, however, the immediate impact of AI/ML may be more incremental.

Automation and optimization are the most popular use cases for AI/ML models according to the survey, with 42% of respondents indicating that their organizations are most aiming to achieve automation of repetitive tasks from their internal development and adoption of AI/ML models, and 38% saying they are looking to optimize business processes the most. More than a third, however, state that their organizations are seeking more profound business outcomes: 37% hope to enable new or improved customer experiences and 34% are seeking better or faster decision making.

“If you break it down in the simplest way, AI is really good at finding patterns and making predictions,” says Butterfield of ISG.

Thus, many early use cases have focused on areas where those capabilities have the greatest impact, such as fraud detection or marketing optimization. Mittal categorizes AI/ML use cases into four buckets: efficiency, effectiveness, experience, and evolution.

“Not surprisingly, much of the early focus has been on improving efficiency and effectiveness, increasing the efficacy of a process or function or improving the way people work,” Mittal says. Investments in intelligent chatbots or digital assistance have also begun to impact customer or employee experiences, spurred on by the Covid-19 pandemic. “Use cases around evolution—using AI to deliver new solutions, business models, or revenue streams—are the most nascent,” says Mittal. “To get to that stage, companies will need to solve their data issues and develop AI models that are explainable, bias-free, and robust.”

The Data Strategy Dilemma

In fact, the data challenges that organizations face in developing, deploying, and scaling their AI/ML models can be significant. “I can’t stress this enough: data or the lack of

the right data strategy is the number one bottleneck to scaling or doing anything with AI,” Mittal says. “When clients come to us with what they think is an AI problem, it is almost always a data problem.”

The issue isn’t that leaders lack an understanding of the importance of having a cohesive plan and processes for collecting, processing, governing, and eliciting value from data specifically optimized for machine learning and data science. The majority of respondents either have such a data strategy in place today (37%), are developing one (38%), or have plans to do so (16%). **FIGURE 3** However, just 35% say their data strategy enables the effective application of AI/ML models very or extremely well (an eight to 10 on a scale from zero to 10, with 10 being “extremely well”).

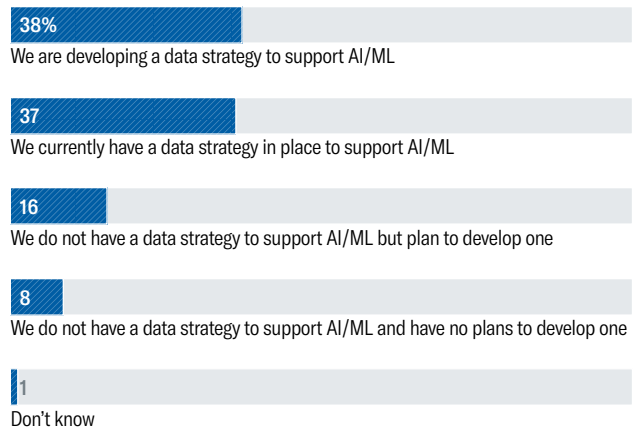
“There are a lot of misconceptions that AI is going to tell you something you don’t know, but it can only do that if you’re asking the right questions,” says Butterfield. “When you’re

FIGURE 3

Data Strategies: On the Agenda

Most organizations recognize the need for a cohesive plan

For the purposes of this survey, data strategy is defined as a cohesive plan and processes for collecting, processing, governing, and eliciting value from data specifically optimized for machine learning and data science. To what extent does your organization have a data strategy in place to support AI/ML use cases today?



Source: Harvard Business Review Analytic Services survey, June 2021



“The level of understanding surrounding data requirements for AI is greater than it was a few years ago, but there is still more work to do. It’s not enough to say you have 20 years of data. You have to have the right data,” says Beena Ammanath of Deloitte AI Institute.

thinking about being AI-first, it all comes down to data and data strategy. You need to know what you’re trying to achieve and, at the most basic level, be directionally accurate in what you’re asking AI to do.”

Without that accuracy, organizations risk becoming data hoarders, collecting as much data as possible with no real plan. Companies that are most successful in their application of AI/ML “have a strategy, and that strategy starts with data,” Butterfield says. “They think about what they want to achieve and why, and then determine what data they need to get there.”

Taming the Data Lifecycle

AI/ML-enabled business optimization and transformation depends on an organization’s ability to access, process, and analyze data effectively throughout the data lifecycle—from collection and storage to data engineering and integration to data analysis and workflow development. “AI depends on viable data to prosper,” says Mittal. “That’s why it’s important to think about the data first—before AI. When you don’t, it creates unnecessary stress and slows everything down.”

Organizations can encounter challenges at multiple points along the data journey. The good news: companies seem to understand, in large part, where to focus their efforts to address their data-specific difficulties. Most of the processes within the data lifecycle that are most challenging to organizations’ internal AI/ML efforts today—data integration, data enrichment and engineering, and model development—will also be key areas of investment over the next two years. **FIGURE 4**

“The level of understanding surrounding data requirements for AI is greater than it was a few years ago, but there is still more work to do,” says Deloitte AI’s Ammanath. “It’s not enough to say you have 20 years of data. You have to have the right data. You may have high quantities of data, but you may not have the quality you need.”

What’s more, organizations tend to focus on the big data that might fuel an AI/ML model, but they may also need to integrate other data locked away in desktop Excel files, paper maintenance logs, or call center recordings. A good AI/ML model may need to integrate and analyze this so-called small data, which may include important information from focus

groups or customer interviews, to solve business problems most effectively. “Most people are surprised by how much small data you need,” Ammanath says. “Organizations are beginning to digitize some of that, but you have to translate that data to make it usable for the AI environment.”

Overcoming Hurdles to AI Expansion

The lack of effectiveness throughout the data lifecycle is, in part, hindering the scaling of AI/ML model applications in the enterprise, along with a variety of other factors—some closely related to the lack of a cohesive data strategy. Too many organizations still think of AI as a silver bullet, according to Mittal, when instead they should be thinking

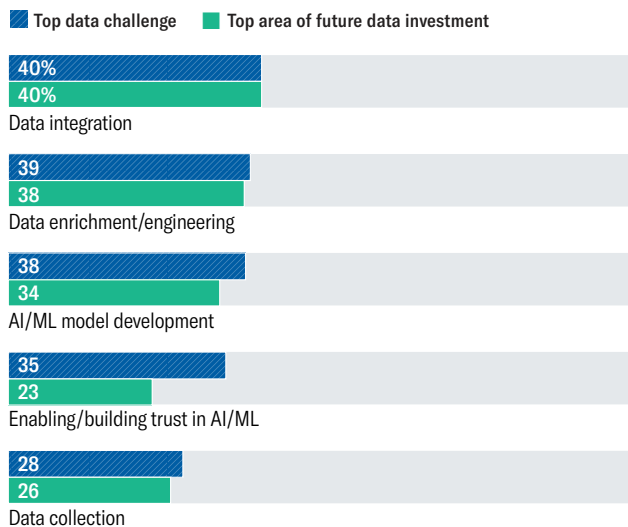
FIGURE 4

Data, Data Everywhere

Money flows to address the biggest AI data hurdles

What data-related processes are the most challenging to your organization’s internal AI/ML efforts? [SELECT UP TO THREE]

In which data-related processes will your organization be investing the most over the next 18 to 24 months, if at all? [SELECT UP TO THREE]



Source: Harvard Business Review Analytic Services survey, June 2021

about whether they have the right data and if it is clean, structured, and ready to use.

Just over a third of respondents (36%) say data integration challenges are one of the top three hurdles their organizations face in scaling the use of AI/ML models, making it the most common answer, and three in 10 cite poor data quality. “There’s a whole exercise companies have to go through, getting their arms around data. Many do not have a central data lake or platform. They don’t have a data architecture capable of pulling in data from different places and cleaning it up so it’s usable for AI technology,” says Ammanath. “As a result, there are a lot of data janitors out there having to do this work and build out the plumbing necessary.”

In any transformation, there will be challenges related not only to technology, but to people and processes, as well. Also high on the list of issues respondents name as the greatest impediments to the expansion of AI/ML model applications are a lack of necessary skills (35%), organizational change management (31%), and difficulty advancing from pilot projects to in-production models (28%). “People may not have the right skill sets or they may not be assistive in imparting their [domain] knowledge for AI efforts because they fear being replaced by automation,” says Butterfield.

Data science talent is in short supply; even AI-first leaders have to fight to recruit and retain critical capabilities. When it comes to developing the most effective AI/ML models, domain expertise is also essential. “You may need an aerospace engineer or manufacturing expert to explain to the data scientists what the data columns mean, what is normal versus an anomaly, and create those connections,” says Ammanath. “Capturing that information is a hurdle.”

Existing processes can thwart change, as well. “They are, by far, the biggest inhibitor to easy transformation,” Butterfield says. “If you are streamlined, lean, and mature in process understanding, AI-enabled transformation will be easier than it is for those with processes that are quite inefficient or don’t have a decent understanding of their existing processes.”

The Promise and Pain of the Cloud

Today’s organizations are the beneficiaries of the cloud that aids them in achieving their AI/ML ambitions. “The world’s most powerful algorithms are available on your desktop or laptop for pennies on the dollar,” says Butterfield. “These big technology organizations, with billions of data points and huge cloud infrastructures, have made their AI tools readily accessible. That has transformed the way an organization can access this level of technology.”

Currently, it seems organizations are taking a variety of data storage approaches for their own AI/ML model data. More than a quarter of respondents (27%) say the majority of data used for internal AI/ML modeling is stored in on-premises



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data centers, the most of any model. Multi-cloud, hybrid-cloud, and private cloud were in a three-way tie, with 15% of respondents naming each environment as the place where the majority of their AI/ML data lives today. And just over 10% say the majority of their AI/ML model data is housed in either a hybrid multi-cloud environment (12%) or by a single public cloud vendor (12%). Still, it seems that more organizations are moving toward a multi-cloud or hybrid-cloud future. Seventy-five percent of respondents agree that a multi- or hybrid-cloud strategy is necessary for their organizations to achieve their AI ambitions.

“In some ways, that brings in a different level of complexity,” says Mittal, noting that business leaders will have to consider what is the best home for different types of data, understand the different functionality and performance offerings of various vendors, and analyze the financial impact of cloud versus local storage in order to determine how to best optimize the usage of cloud for AI/ML model data.

Many organizations are turning to data platforms to rein in the complexity. “An enterprise data cloud approach that can help address some of these issues—manage the performance of AI/ML workflows and provide a single pane of glass for organizations—can have a lot of utility,” Mittal says. “It gives you the ability to consolidate and integrate monitoring tools and perform ongoing optimization.”

Best Practices for an AI-First Future

There are some lessons from early adopters that organizations can apply now to mitigate some of the common challenges of AI/ML adoption and expansion in the enterprise.

Establish ownership for enterprise AI and build a data strategy.

Once they start on this journey, most organizations will bring in a chief data officer to drive this mandate. “Investing in a C-suite executive to develop a data strategy and governance metrics sooner rather than later is key,” says Ammanath.



“Transformation using AI requires a collection of people, departments, technology types, and more all coming together under a single umbrella. It is going to be difficult,” says Wayne Butterfield at ISG.

Invest in talent.

For many organizations, this task will require partnering with third parties that have AI/ML expertise. “Not having the talent or the right partnerships holds a lot of organizations back,” says Ammanath. Data science is not the only necessary skill for effective AI/ML adoption; it also requires the involvement of domain experts within the business.

Build trust.

The mandate may come from the top down, but user adoption will make or break AI initiatives. “You can build the best ML model, but if no one uses it, it will fail,” Ammanath says. “It’s important to build trust in the AI systems and foster a company culture that drives AI adoption.” AI will touch everything “so you have to take employees, customers, and partners along on the journey,” Mittal says.

Start with the business problem, not the technology solution.

Seasoned chief information officers know this, but other business leaders may be dazzled by the promise of AI. Don’t pursue AI for AI’s sake, says Mittal. In some cases, a simple rules-based engine or even an Excel workbook may be a better solution.

Consider context.

There’s surprisingly little magic to AI. It all depends on data. “If you’re in a highly regulated industry, you may not even be allowed to use the data you want,” says Mittal. “Or you may be able to use the data, but it’s not in the right format. Context is key.”

Make AI accessible.


Organizations that want to scale the use of AI/ML throughout the enterprise should focus on data and AI democratization. While the chief data officer plays a critical role in the early days of AI/ML, that executive can become a bottleneck long term. “Make it accessible to users across the organization versus a few teams of AI experts,” advises Mittal. “Help users build their understanding of AI and its implications, offer more self-learning tools, and embed AI training into onboarding.” Increasing data and AI literacy throughout the organization ultimately widens the talent pool and further drives AI-enabled transformation.

Conclusion

Most organizations are in the early stages of their application of AI/ML models. Results are more likely to accrue incrementally over the next few years—a gradual transformation that will ultimately become part of the fabric of leading companies. “It will be more like a slow birth than a sudden overnight shift,” says Butterfield.

This low-speed transformation will require significant determination and coordination. “Transformation using AI requires a collection of people, departments, technology types, and more all coming together under a single umbrella,” he asserts. “It is going to be difficult.”

However, as respondents indicate, the effective integration of AI/ML models will soon be an existential issue. Now is the time to work through the key data challenges, learn from early efforts, and develop the most effective data strategies and processes for the future.



**Increasing data and
AI literacy throughout
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transformation.**

METHODOLOGY AND PARTICIPANT PROFILE

A total of 247 respondents drawn from the HBR audience of readers (magazine/enewsletter readers, customers, HBR.org users) completed the survey.

Size of Organization

48% 10,000 or more employees
11% 5,000–9,999 employees
19% 1,000–4,999 employees
9% 500–999 employees
6% 100–499 employees
7% Fewer than 100 employees

Seniority

19% Executive management/ board members
45% Senior management
30% Middle management
6% Other grades

Industry

32% Technology
18% Manufacturing
16% Financial services
All other sectors less than 8% each

Job Function

57% IT
10% General/executive management
All other functions less than 8% each

Regions

41% North America
26% Asia/Pacific/Oceania
20% Europe
8% Latin America
4% Middle East/Africa

Figures may not add up to 100% due to rounding.



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