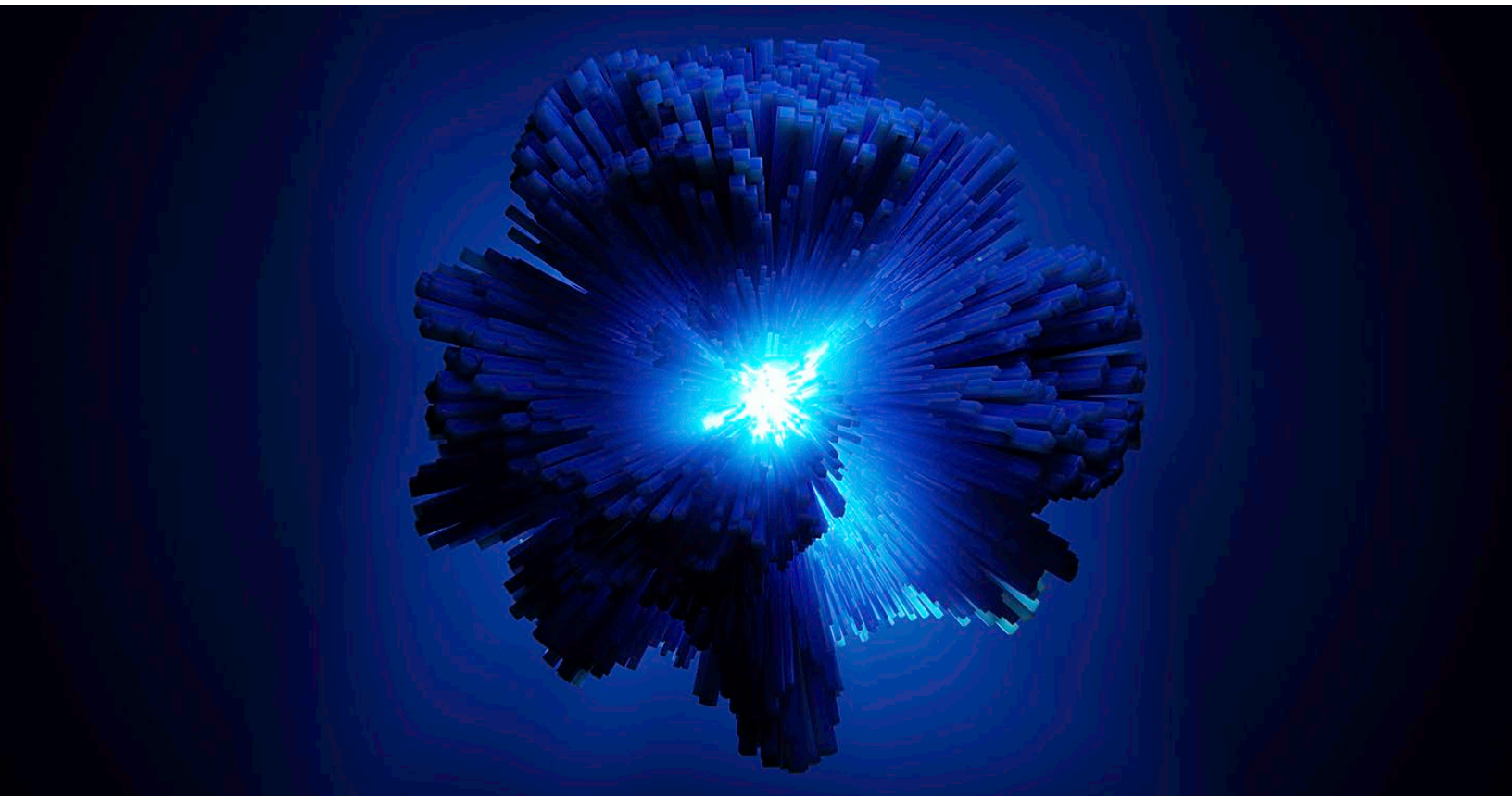
McKinsey Digital

Ten unsung digital and AI ideas shaping business

Keeping your eye on where value comes from is still the name of the game.

by Kate Smaje and Rodney Zemmel



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If you wanted to boil down 2023 to one concept, it would have to be generative AI (gen AI). Few of us can remember a technology that has swept through the business community with such speed and impact. Hardly a day passes without a new development hitting the headlines. While still blanketed with caveats and unknowns, gen AI stands to have a profound impact on how we live and work.

But the very excitement around gen AI is in danger of distracting business leaders from some other core business imperatives and the importance of rewiring their companies. For this reason, we thought it might be helpful to take a quick look at ten underlying ideas that might not be dominating the headlines but are shaping the modern business landscape. Some of these ideas represent significant shifts, such as the importance of architecting the business so that everything can be tested, or how to think about a workforce where everyone has their own gen AI "copilot." Others, like keeping a tight focus on value, relate to business fundamentals that are often overlooked under the stresses of day-to-day demands and technology hype.

1. Builders are eating the world

We're all familiar with Marc Andreessen's frequently referenced insight, "Software is eating the world." While that's as true as ever, the more important focus for business leaders is how well they can use that software to *build* things, from businesses to digital products. The cost of building new digital products and services will continue to come down while the tools available will be easier to use, opening the door to many more citizen builders and making the build process faster and cheaper. Scaling will continue to be a challenge requiring specific focus (see Idea #2), but companies that learn to build, test, and adapt quickly will be in the best position to create value. This is especially true as AI continues to advance and costs for technology-based innovation decline, both of which will challenge not just businesses but also business models.

Key facts: We estimate that about $30 trillion in corporate revenues will arise from products that have not yet reached the market.[1] Some 70 percent of digital-transformation leaders are already building their own software in areas that drive competitive advantage, and we expect that percentage to increase as costs to build continue to fall. Meanwhile, CFOs see building new businesses as their organizations' most likely strategic action in the next 12 months.

Implications: Focus on the two most important elements of being a builder: one, build something that matters: a new product, solution, or business that creates a competitive advantage; and two, architect a team with the right incentives, tools, and governance to build products or services. Lack of ideas is rarely the cause of failure in building something new. Rather, companies struggle to execute them.

Questions to consider:

— How are you building an engineering culture where people have the opportunity and incentives to create and innovate?

— What are you building in the next 12 months that will create an advantage for your business, not just a commodity or, worse still, a money pit?

— Are you using software to build products, services, or businesses that create a true competitive advantage for your business?

Read more on McKinsey.com:

"CEOs' choice for growth: Building new businesses"

"Every company is a software company: Six 'must dos' to succeed"

[1] Roberto Argolini, Federico Bonalumi, Johannes Deichmann, and Stefania Pellegrinelli, "Digital twins: The key to smart product development," McKinsey, July 31, 2023.

2. Innovators dominate headlines, but scalers dominate markets

See if this sounds familiar: an exciting new technology hits the scene, and a mad scramble results in lots of experiments and a few promising developments that often run into headwinds, fail to scale, and peter out. Gen AI could become the latest victim of this pattern. Our unscientific but plausible view is that large language models (LLMs) that underpin gen AI represent only about 15 percent of the effort to scale but currently occupy 85 percent of the airtime. It's critical to remember that getting the full potential value from technology requires companies to be able to scale it.

Achieving scale comes not just from building the range of supporting capabilities (see more about this in Idea #3) but also from focusing on the specific processes and mechanisms that enable scale from the beginning of any venture, whether that's harnessing a technology or launching a new business. While the question still stands whether start-ups—unencumbered by legacy systems and having access to LLMs and cloud technologies—have the advantage over legacy businesses when it comes to scale, even they need to keep a clear eye on building capabilities that enable scale. Successful CEOs are as passionate about scale as they are about strategy.

Key facts: We have already learned that more than 40 percent of digital and AI transformations stall out at the scaling phase.[2] Incumbents launching new businesses aren't immune to this issue either—about 80 percent of them fail to scale.[3] Top economic performers are almost twice as successful as their peers at sustaining the value of their digital transformations.[4]

Implications: The value from technology-driven innovation comes only when companies drive change deep into the organization's data architecture, technology environments, talent strategy, and operating model. Executives and their boards must navigate many decisions in driving large-scale transformations, but it's critical to understand the specific capabilities it takes to scale—such as reusable blocks of code and data products, and standardized tool sets and protocols—and build them into the road map.

Questions to consider:

— How are you incentivizing scale (not just innovation)?

— What specific initiatives on your road map directly support scaling?

— Have you identified the specific roadblocks to achieving scale, and are you clear about how to deal with them?

Read more on McKinsey.com:

"Scaling AI for success: Four technical enablers for sustained impact"

"The big boost: How incumbents successfully scale their new businesses"

"Executive's guide to developing AI at scale"

"Tipping the scales in AI: How leaders capture exponential returns"

3. Leaders master the digital 'More law' of compounding value

We've all heard of "Moore's law": the number of transistors in an integrated circuit (IC) doubles about every two years. There's a similar trend at play when it comes to digital and AI in terms of compounding advantage—we call it the "More law." The distance between digital and AI leaders and their industry competitors is growing. A set of leading companies haven't just figured out how to harness digital and AI to generate value but also how to do it faster and increase the distance between themselves and other players. This is

[2] McKinsey's global survey of digital strategy, 2019.
[3] "The big boost: How incumbents successfully scale their new businesses," McKinsey, August 27, 2020.
[4] Laura LaBerge, KateSmaje, and Rodney Zemmel, "Three new mandates for capturing a digital transformation's full value," McKinsey, June 15, 2022.

happening because digital and AI, implemented well, compound competitive advantages.

These leaders know it's not about building one "magic" use case. Instead, it's about having hundreds of technology-driven solutions working together to create great customer and employee experiences, lower unit cost, and generate value. This is hard to do, but also hard to copy. We see clearly in our banking research that digital leaders were much better at integrating digital and AI across the entire landscape of customer journeys. This reduced friction points, which increased their advantage in online sales over digital laggards and reduced their costs to serve. These effects contributed to their profit-and-loss (P&L) edge and enabled multiple expansions, resulting in significant TSR outperformance.

Key facts: Over the past three years, the spread in digital and AI maturity between leaders and laggards has increased by 60 percent.[5] In the banking sector, which we've studied in detail, digital leaders saw 40 to 70 percent growth in digital sales, while digital laggards grew only 8 to 17 percent.[6]

Implications: Rewired companies build capabilities that build on each other so that, over time, value compounds—more value, more speed, more digital distance over peers. Focus on a domain where you can move the needle quickly, and be clear about what mutually reinforcing capabilities you need to develop.

Questions to consider:

— Do you have a clear view of your rate of technology-driven growth today compared with that of your direct competitors?

— Are you developing those hard-to-copy capabilities (processes, workflows, automations) that power the products and services you need to build and improve?

— Are you clear about the three most important improvements you should make to increase the pace of your development?

Read more on McKinsey.com:

"Rewired to outcompete"

"Rewired and running ahead"

4. Digital and AI leaders must be forever transformers

Digital has seeped into almost every aspect of our lives driven by the confluence of new technologies (cloud, AI), new architectural paradigms (microservices, APIs), and new ways of building software (agile, DevSecOps). As long as tech continues to evolve, your business will need to evolve. That's why it's important to think of digital and AI transformation as something you're going to be doing for the rest of your career rather than as a final destination. A digital and AI transformation is a journey to continuously increase your competitiveness by positioning your business to incorporate new technologies quickly. With technology's growing importance, distinctions between business leaders and technology leaders will continue to blur. All senior executives will need to know how to get the most from technology in their business area.

Key facts: Almost every large business has embarked on some type of digital and AI transformation. Organizations invested more than $1 trillion in technology trends in 2022, reflecting a strong faith in their value potential. Nascent technologies, such as quantum computing, continue to evolve. McKinsey analysis shows that four industries—automotive, chemicals, financial

[5] The scores are based on McKinsey's Digital Quotient (DQ) and AI Quotient (AIQ) assessments, which measure digital and AI maturity across core capabilities, as well as across the management practices essential to capturing value. The DQ and AIQ standard deviation, or spread, was 10.3 points in the period from 2016–19. This increased to 16.3 points in the period from 2020–22.

[6] Eric Lamarre et al., "The value of digital transformation," *Harvard Business Review,* July 21, 2023.

services, and life sciences—could gain up to $1.3 trillion in value by 2035 through the use of quantum.[7] Digital and AI transformation is a team sport requiring leaders who are fluent in tech. Currently, 67 percent of companies in the bottom decile of digital maturity have no more than two digitally savvy people in leadership roles, while 47 percent of those in the top decile have seven or more.

Implications: Companies should not only be focusing on how to integrate a specific technology, such as gen AI or quantum. Instead, they should concentrate on building the broad set of capabilities—strategy, talent, agile operations, technology, data, and adoption and scaling—that can harness new technologies, scale them, and ensure they create value. Those capabilities should combine to power an operating model that allows for rapid iteration and progress toward a clear and well-articulated goal grounded in value (see Idea #9 for more).

Questions to consider:

— Have you identified the next two to four domains you want to transform and the resources you need to complete the work?

— What long-term metrics, objectives, and key results (OKRs) do you have in place, and is your board tracking them?

— Do you have a clear view of which emerging technologies could most enhance your competitive differentiation?

Read more on McKinsey.com:

"McKinsey Technology Trends Outlook 2023"

"How to implement transformations for long-term impact"

"In digital and AI transformations, start with the problem, not the technology"

5. If knowledge is power, data is knowledge

It's long been fashionable to talk about the "knowledge economy" as something distinct from the broader economy, but the reality is that every company is in the knowledge business, and every worker is becoming a knowledge worker. This is increasingly evident as advanced AI capabilities and enhanced tools and techniques are made available to every worker. How well companies embrace their knowledge dividend will come down to how well they harness their data. It's fair to say that no company can have an AI or business strategy without having a data strategy. That's because without good, clean data that is easily (and responsibly) accessible across the business, it will be impossible to generate business, operational, and AI value.

Key facts: Data products—high-quality, ready-to-use data formatted so that people and systems across an organization can easily access and apply it—can deliver new business use cases as much as 90 percent faster and reduce the total cost of ownership by 30 percent.[8]

Implications: Value will accrue to businesses that have proprietary data that they can use to improve the capabilities of their foundation models in ways their competitors can't. "Data mesh" and "data as a product" are the most practical ways to reduce centralization and scale the use of high-quality data across an organization. Ensure that data products have dedicated teams and product owners to secure the data, evolve data engineering, keep a clear focus on end-user needs, and implement self-service access and analytics tools.

[7] "Quantum technology sees record investments, progress on talent gap," McKinsey, April 24, 2023.
[8] Veeral Desai, Tim Fountaine, and Kayvaun Rowshankish, "How to unlock the full value of data? Manage it like a product," McKinsey, June 14, 2022.

Questions to consider:

— Are you clear on how your proprietary data, combined with the world's public data, will lead to competitive advantage?

— What standards and best practices do you have in place for building data products across the organization, and are they easily accessible by relevant teams?

— Do you have data governance in place that builds digital trust with your customers and stakeholders?

Read more on McKinsey.com:

"The data dividend: Fueling generative AI"

"The data-driven enterprise of 2025"

"How to unlock the full value of data? Manage it like a product"

6. A workforce with gen AI 'superpowers' needs a human breakthrough

Gen AI has started as a copilot technology and may evolve to become an automated pilot for some tasks. This essentially means everyone will have a utility belt of AI superpowers, creating a workforce of "superworkers." Tech breakthroughs have increased productivity and created both different and more work for humans. For this reason, companies need to shift their focus to human breakthroughs in learning, reskilling, upskilling, and career management to enable their workforce to best take advantage of gen AI and other technologies.

The gains in productivity will not be evenly distributed and will depend on the complexity of tasks and the maturity of the AI copilot. More important will be understanding what skills humans need in order to adapt and take advantage of their copilot's capabilities. Gen AI will make natural language, for example, the new user interface, requiring people to learn how to talk differently to machines.

Key facts: There is currently no simple metric showing how productive people can be when supported by gen AI's tools. Much depends on the task and the person. Our own initial experiments have shown that gen AI tools can reduce time spent on refactoring code by 20 to 30 percent and on generating code by 35 to 45 percent, but speed gains vary by task complexity and the developer's experience.[9] These tools perform best for relatively repetitive tasks and in providing a starting set of code that developers can work with and improve. While recognizing that true productivity is hard to measure, we're seeing gains of 50 to 75 percent in productivity for developers with sufficient training (though we expect significant variance as the technology matures and new tools come online).

Implications: How your organization works will need to change. That can seem overwhelming. Start by identifying a business area and think through what changes are possible in how its work gets done. Pay particular attention to understanding which pivotal roles could benefit most from copilots. Nurture a strong learning culture and structured skill building that incorporate both formal programs, such as reviewing documentation, learning tools and code, and going to conferences, and informal programs, such as communities sharing information, making it easy to practice with new tools, and LLMs.

Questions to consider:

— Have you identified the most important roles in your business that could benefit from a gen AI copilot?

— Which communities of developers are active in sharing knowledge?

[9] "Unleashing developer productivity with generative AI," McKinsey, June 27, 2023.

— In practice, how well have your data scientists and engineers learned to work with their copilots?

Read more on McKinsey.com:

"Unleashing developer productivity with generative AI"

7. Every company will become a 'neural business'

Speed and innovation will come from small teams led by engineers with sufficient autonomy and clear guidelines for decision making. Most of us will recognize this as a description of agile. While many might be tired of this overused term, its importance is core to a business's ability to scale innovation (see Idea #2). As the boundaries of agile expand across an organization, it will need to function like a neural network connecting small teams at its edges to enable the speed companies need to grow and adapt.

Key facts: The top half of companies in terms of the maturity of their product and platform operating models have 60 percent greater total returns to shareholders than bottom-half companies, and 16 percent higher operating margins.[10] Top-performing teams are small and optimized for "doers." A top engineer is ten times more productive than a novice, requiring companies to not just hire more of them but also give them work conditions where they can practice their craft most effectively.

Implications: While any company can get a handful of pods to work well, standing up and scaling hundreds or even thousands of them is another story. Companies need an operating model built around products (with dedicated teams developing and providing technology-enabled offerings or services used by customers and employees) and platforms (with dedicated teams that provide the back-end technology and data capabilities that support products). For these teams to work effectively, companies need to ensure that the broader organization (legal, cyber, risk, purchasing, finance, and so on) works closely with them to identify and resolve issues quickly. Our research shows that the greatest positive impact on outcomes is driven by reducing dependencies between working teams, establishing a consistent product development lifecycle, and empowering product owners and managers.

Questions to consider:

— How many of your teams and solutions are led by a high-quality product owner?

— Is the C-suite aligned on the operating model to enable hundreds of pods to deliver digital innovations?

— How quickly are you able to conceive of, build, and launch a new product or service?

Read more on McKinsey.com:

"The rewired enterprise: How five companies built to outcompete"

"What separates top product managers from the rest of the pack"

"The bottom-line benefit of the product operating model"

8. IT as a service is the next generation of your tech function

To enable an atomized business, companies need their technology team to operate more as a service function. Distributed digital innovation is the end state of a rewired company in which tech teams can develop digital and AI solutions to improve customer experience and lower unit costs. Tech will eventually be embedded

[10] Aditi Chawla, Martin Harrysson, Hannah Mayer, and Megha Sinha, "The bottom-line benefit of the product operating model," McKinsey, December 19, 2023.

into every product and function, and "heritage" centralized IT functions will be massively automated and delivered like cloud-provisioned services. IT can't support this kind of distributed innovation environment by sticking to its traditional role as a controlling entity managing technology from the center. The value will now come from IT's ability to enable innovation by shifting from the protection of big tech assets to purveying small blocks of code. APIs will be the primary way companies expose their digital capabilities. They will be integrated into "superapps" stitched together with gen AI–type code generators for better user functionality.

Key facts: A global cloud-microservices-platform market could generate $4.2 billion in revenue by 2028. Software sourced by companies from cloud-service platforms, open repositories, and software as a service (SaaS) is estimated to have a CAGR of 27.5 percent from 2021–28.[11]

Implications: The gold standard of IT effectiveness will be its ability to help developers stitch together snippets of code into a useful product. Cloud will need to be a core part of IT's distributed operating model to enable speed and scale. IT's key role will be to provide standards, such as for APIs, and guardrails, such as embedding policies in code; protect the business's most sensitive information, such as customer data and financial records; and track the adoption of developed products and platforms.

Questions to consider:

— How often are the code and solutions that developers create reused by other teams?

— How many libraries exist for key artifacts such as APIs and prompts, and are they used frequently by your technology teams?

— How many as-a-service capabilities has your technology function developed?

Read more on McKinsey.com:

"Technology's generational moment with generative AI: A CIO and CTO guide"

"The big product and platform shift: Five actions to get the transformation right"

"In search of cloud value: Can generative AI transform cloud ROI?"

"Security as code: The best (and maybe only) path to securing cloud applications and systems"

9. The name of the game is the same: Value

This might sound like business 101, but it's surprising how often companies lose sight of it: the point of digital, AI, and tech isn't getting better at digital, AI, and tech; it's building value. A big reason for falling short of financial targets in a digital and AI transformation is not setting the targets correctly from the start. Too often, companies shoot for marginal gains, but that constrains thinking, and small thinking leads to small results. Our rule of thumb is that a robust digital road map should deliver EBITDA improvement of 20 percent or more.

Key facts: Organizations that lead successful transformations set ambitious goals and targets—and deliver 2.7 times the value initially estimated. They also move quickly and renew the pipeline.[12] The value advantage can be significant. Digital leaders in insurance have five-year growth in TSR that is six times higher than lagging companies. Leaders in consumer packaged goods (CPG) and retail perform three times better than their sector peers, while those in energy, materials, and agriculture perform twice as well.

Implications: Identify a few important and self-contained domains in your business, rethink them completely, and be explicit about the value they

[11] Steve Van Kuiken, "Tech at the edge: Trends reshaping the future of IT and business," McKinsey, October 21, 2022.
[12] Jose Pimenta da Gama, Fabio Stul, Cesar Okajima, and Sara Pliego, "How bold is your business transformation? A new way to measure progress," *McKinsey Quarterly,* July 28, 2023.

can create. Make sure that the solutions on your road map are tied to specific OKRs that directly generate value. Relevant leadership should meet at least once a quarter (though generally more often) to see whether the initiatives you've launched are actually creating the value you've identified. There's no such thing as being on autopilot when it comes to managing progress and capturing value.

Questions to consider:

— Is your digital and AI transformation effort focused on a domain that is large enough to create meaningful value but small enough to be accomplished with the resources you have?

— Is the target of your digital and AI transformation to increase incremental value by at least 20 percent?

— How much value have your digital and AI initiatives generated in the past six months?

Read more on McKinsey.com:

"How bold is your business transformation? A new way to measure progress"

"The economic potential of generative AI: The next productivity frontier"

"Three new mandates for capturing a digital transformation's full value"

10. The best companies will be the best testers

If you believe that change is only going to continue to accelerate—and we can all probably imagine the hundreds of entrepreneurs cooking up new businesses in their garages right now—adaptability will become one of the most important attributes of a modern company. That means being able to test more, test cheaper, and test faster. The capabilities to do so are here and growing: gen AI to boost productivity, automation to accelerate pace and scale through MLOps, software tools that are easier to use, more-sophisticated digital-twin capabilities, and an increasing number of software developers entering the market.

These developments will change strategy (you can quickly test market demand for a solution), operations (you can test operating models and settings), and design (you can quickly build and iterate on millions of versions of a solution before building it). In some cases—like building live telecom networks—training the AI will be hard or impossible without a digital twin.

Key facts: The number of developers in the world is growing at about 21 percent each year, and broke the 100 million mark in 2023.[13] The global market for digital-twin technologies is forecast to grow at about 60 percent annually over the next five years, reaching $73.5 billion by 2027. Some companies report that products starting out as digital twins have 25 percent fewer quality issues when they enter production. Almost 75 percent of companies have already adopted digital-twin technologies that have achieved at least medium levels of complexity.[14]

Implications: Embrace the mindset that treats your firm as a continuous testing ground, and then determine which part of your company you should treat as a digital twin. Instrument everything and simulate everything for better insight, experience, and impact. Advanced software practices incorporate tags to help collect feedback, while the best gen AI developers are those who build testing capabilities into models to accurately measure how they perform in the field. For complex machines that typically use a combination of existing and newly engineered elements, consider creating and managing a library of digital-twin models of key components to test against.

[13] David Cahn, "The next billion developers," Sequoia Capital, November 15, 2023.
[14] "Digital twins: The key to smart product development," McKinsey, July 31, 2023.

Questions to consider:

— How have you changed your approach to strategy and operations based on digital-twin and testing advances?

— How well integrated is your digital-twin platform integrated into your product, solution, or business development?

— How good (and pervasive) is your A/B testing capability?

Read more on McKinsey.com:

"Digital twins: The key to smart product development"

"Digital twins: From one twin to the enterprise metaverse"

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