

Seven bets



When US President John F. Kennedy gave his famous “moon speech” in September 1962—against the backdrop of the Cold War—he described “an hour of change and challenge, in a decade of hope and fear, in an age of both knowledge and ignorance.”¹

Those words could have been uttered today. JFK acknowledged a pervasive anxiety and uncertainty that had taken hold, straining conventional approaches and systems. But rather than succumbing to this environment, he set forth a hopeful vision, inspiring progress to meet societal, technological, and business challenges.

Sixty years later, as climate change, economic turmoil, geopolitical conflict, and generative AI converge in the aftermath of a pandemic, businesses need an optimistic vision of progress to rally around—and leaders willing to bet on the future.

As far as bets go, we bet on human ingenuity.

Working together, we can slow global warming, prevent the next pandemic, manage systemic financial risks, cure cancer, and create a more sustainable future for human kind. The bets we make today redefine what’s possible tomorrow.

We live in a time of challenge and change. Drawing on real-world experience and in-depth research, we have identified seven business trends that we expect to shape the world in the next three years—and seven bets worth making to benefit from them.



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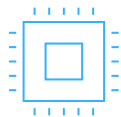
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The trend: Tech-led disruptions are accelerating, driven by generative AI.

The bet: Implement secure, AI-first intelligent workflows to run the enterprise.

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The trend: Every product is becoming a digital product.

The bet: Invest as much in your software supply chain as in your physical supply chain.

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The trend: Experience matters more than we think.

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The trend: The pragmatic metaverse will enhance the physical world, not replace it.

The bet: Invest now in augmented reality (AR) solutions with clear benefits.

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The trend: Reglobalization, reskilling, and new partnerships are transforming value chains.

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The trend: Sustainability promises are just beginning to show progress.

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The trend: Skills scarcity and demographic shifts are defining the new social contract.

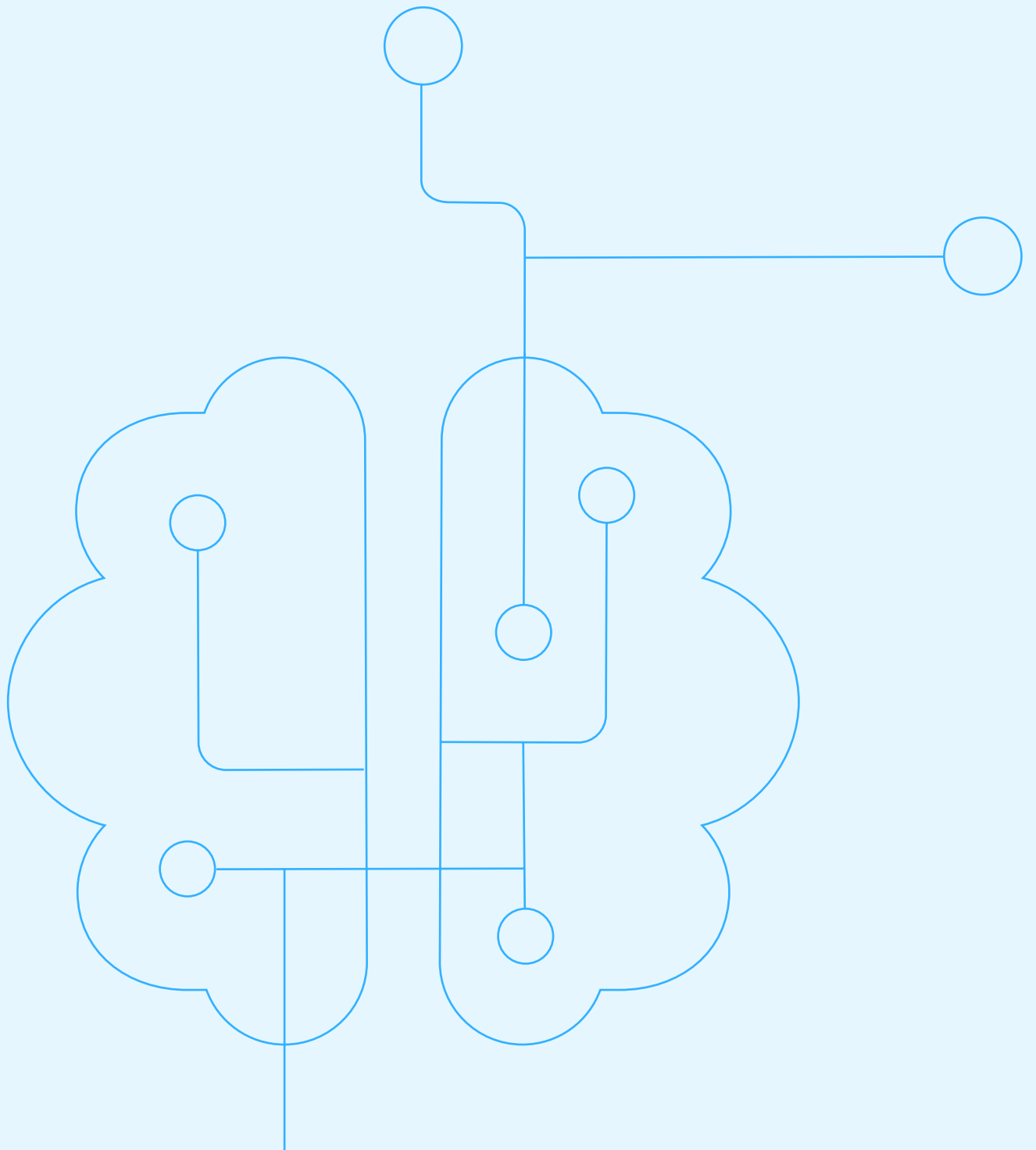
The bet: Embrace a new work-life continuum in a tech-enabled workplace.

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Seven bets

The trend:

Tech-led disruptions are accelerating, driven by generative AI



Generative AI, made popular by the consumer application ChatGPT, has democratized AI and accelerated the largest commercial opportunity in today's economy, sized at \$15.7 trillion of GDP by 2030.² While this next generation AI represents a significant inflection point, it is not the only technology-led disruptions facing business and society: cyber attacks will amount to \$10.5 trillion of damages annually by 2025.³ And by the next decade, quantum computing will create \$700 billion in value for industries such as pharmaceuticals, chemicals, automotive and finance.⁴

Leaders must understand *the now*, *the new*, and *the next* of technology disruption, and embrace the opportunities while protecting against the risks.

Pandora's AI box has been opened.

For years we have known that AI would transform business in most industries, but adoption—while accelerating—was slow and expensive. Foundation models have changed that: pre-trained AI can easily be used almost “out of the box” for tasks that now can be automated and improved with minimum additional training. Generative AI further expands the scope of what can be automated, especially in administrative, marketing, and service fields. And user-friendly interfaces, such as chat or voice, have lowered or eliminated the friction at adoption.

It's clear that AI will transform how we work. CEOs and boards of directors must understand how to seize the opportunities and as importantly, mitigate the enhanced risks AI presents to business. In the last few months, AI has been used to:

- Create voice cloning applications that break banking contact center security
- Create deep fakes of humans used for nefarious purposes
- Create generative artwork based on copyrighted works by human artists that have resulted in major intellectual property infringement lawsuits.

This is one reason that organizations' spend on AI ethics doubled between 2018 and 2021, rising from 3% to 6% of overall AI spend. And they expect to invest 40% more over the next three years, as AI ethics laws are passed and regulatory oversight increases.⁵

Cybersecurity continues to grow, and so do regulation and governance requirements.

It takes 277 days and somewhere between \$5-10 million to contain a data breach today. Executives who implement a zero trust security strategy, which requires all users to be continuously validated, can reduce that expense by \$1.5 million. Those who invested in extended detection and response technologies (XDR) reduced breach life cycles by 29 days.⁶

Plus, recent research from the IBM Institute for Business Value found that, over a five-year span, organizations with more mature security capabilities have shown a 43% higher rate of revenue growth than their less mature peers. Additionally, two out of three executives now view cybersecurity as a revenue enabler, rather than a cost center.⁷

Quantum is quickly approaching the ability to break public key encryptions.

In 2022, the US White House issued a national security memorandum warning that existing systems could be vulnerable to future quantum computers.⁸ Yet, only 18% of executives are actively investing in quantum-safe capabilities.⁹

By 2030, quantum computers may be capable of cracking some commonly used approaches to data encryption.¹⁰ Organizations will need to roll out quantum-safe encryption as soon as it is available to reduce the future fallout of quantum hacks.

The priorities:

Companies have long expected that AI would change everything one day—and that day has finally arrived. Organizations are now racing to incorporate all forms of AI, looking for ways to boost productivity faster and more effectively than the competition. However, security, privacy, and intellectual property rights must remain top of mind.

New productivity possibilities

Generative AI significantly expands the scope of tasks that can effectively be automated by technology. Foundation models lower the cost and time to implement AI. This results in a change in cost, effort and scope that can generate significant productivity improvements in the enterprise.

Many design, composition, and summarization tasks in processes were not addressed by the prior automation wave, and in some cases, even those areas automated with AI peaked at lower levels of performance than are possible today. It is imperative for enterprises to iterate in their existing productivity programs with new expectations and expanded possibilities.

Cyber secure today and tomorrow

As part of a zero trust security strategy, organizations need to develop a culture of modern security practices and automated controls. In the event of a breach, this type of security posture helps organizations contain risks, limiting the likelihood of a material loss. For example, research from the IBM Institute for Business Value revealed that 55% of zero trust leaders were able to prevent malware propagation, compared to just 35% of others.¹¹

Transparent AI governance

New legislation around ethical uses of AI includes regulations around data privacy and governance. The EU AI Act, for example, will require AI incidents to be managed like data security incidents.¹² The act would also create regulatory oversight for high-risk AI applications, including hiring software and medical devices.¹³

ChatGPT has recently illustrated the multiple categories of privacy and intellectual property risks introduced to businesses by foundation models such as OpenAI's GPT4. The intellectual property used to train the models to generate derivative works is not protected; the privacy and confidentiality of new prompts and training data is not assured; and the generated work (text, code, images) can't be copyrighted.

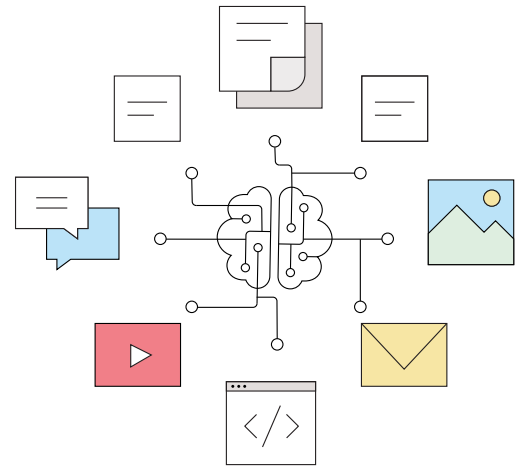
In this environment, three out of four executives say it's important for their companies to address data privacy and AI ethics.¹⁴ However, building trustworthy AI requires significant commitments across product engineering, IT, and governance. Tools that detect bias, diverse and inclusive teams, and guidelines for AI design can help companies develop AI that will create positive change—and an AI risk Center of Excellence can help ensure no important steps are skipped, including establishing policies for AI ethics.

IBM's principles for Trust and Transparency¹⁵ outline a framework for the development and use of ethical AI and can be a place to start:

- The purpose of AI is to augment human intelligence.
- Data and insights belong to their creator.
- New technology, including AI systems, must be transparent and explainable.

The bet:

Implement secure, AI-first intelligent workflows to run the enterprise



Businesses have been using AI for years, but generative AI will change the game for everyone. Here are three ways leaders can take advantage of the step change that generative AI offers.

Relaunch AI-first enterprise automation programs.

- Change the enterprise mindset from “adding AI” to “starting with AI,” reinventing processes, tasks, workflows, and jobs to deliver productivity improvements.
- Reevaluate prior automation scope based on the new generative AI capabilities.
- Redefine jobs and skills based on the higher-value-added tasks where AI is less useful.

Operationalize AI and algorithmic accountability governance to design and operate trustworthy technology.

- Make sure use cases are easily explainable, that AI-generated artifacts are clearly identified, and that AI training is transparent and open to continual critique.
- To manage risk, document—with fact sheets—every instance of AI use in the organization and the current governance around it. Ensure AI-generated assets can be traced back to the foundation model, dataset, prompt (or other inputs), and seed in digital asset management (DAM) and other systems. Be prepared to make adjustments based on regulation changes.
- Re-skill the employee base to understand AI and the proper and improper use of it. Build AI ethics and bias identification training programs for employees and partners to comply with AI ethics regulations.

Accelerate transition to zero trust across the enterprise and partner network.

- Implement AI-enabled security intelligence and ensure clear incident escalation policies are documented at every level, including board of directors.
- Establish role-based controls for access to data. Implement multifactor authentication (MFA) for critical apps and data assets.
- Start a Quantum Center of Competency with initial focus on quantum-safe.

Case study

A life sciences manufacturer repositions security as a business enabler

Faced with skills shortages and cost pressures across non-core functions, a life sciences manufacturing company needed more mature capabilities to help stave off a new generation of cyber attacks. They decided to outsource IT operations.

To help ensure separation of duties between the client's IT provider and IT security functions, the company chose to supplement IT services with a managed security services provider (MSSP) that could successfully integrate with other partners across the organization's ecosystem. Through integrated operations and shared governance, multiple parties across the ecosystem could realize operational benefits.

The solution began with an aggressive transition plan and associated transformation roadmap designed to steadily mature the company's security capabilities. It included an open platform that provides 24x7 threat management capabilities, enabled by an accelerated transition to new IT and IS service providers. The company established a common governance model to provide continuous alignment across multiple strategic partners.

Now, with consolidated security operations and increased security maturity, the company has improved management of cyber risk and threat management efficiency. Application of a streamlined transition methodology enabled the company to accelerate cost savings and time to value. Through this transformation, the life sciences company has repositioned security as a business enabler.

Case study

A global payments company uses AI to improve productivity and customer experience

There's little room for error in the competitive financial services sector. When customers complain, companies need to act fast—and not just to resolve individual issues. They need to understand where systemic problems are creating a bad customer experience and make necessary changes across the board.

But when millions of customer complaints come in each year, it can be tough to separate isolated issues from systemic problems. This is where the transformative power of AI comes into play. Rather than manually categorizing and analyzing complaints, which took weeks, the company wanted to leverage AI foundation models to gain immediate, actionable insights.

IBM Consulting trained a large language model (LLM) on public banking datasets, and then fine-tuned the model to align with the specific business context. The resulting AI model delivered near real-time insights and 91% accuracy for granular classification of complaints. As a result, it now takes the company fewer than 15 minutes to identify emerging issues—compared to three weeks before.

"I am confident we have a fantastic product that will make my team's workload shift from slow manual processes to focusing on protecting our brand, stopping customer harm sooner, and building better products," said a senior manager of global commercial services for the payment company.

Case study

Vodafone takes a quantum-safe security posture

Quantum-safe security can't wait until tomorrow. That's why IBM and Vodafone agreed to be initial members of the Global System for Mobile Communications Association's (GSMA) Post-Quantum Telco Network Taskforce, dedicated to helping define policy, regulation, and operator business processes for the enhanced protection of telecommunications in a future of advanced quantum computing.¹⁶

As part of the taskforce, IBM, Vodafone and other members have also published the Post Quantum Telco Network Impact Assessment: an in-depth analysis of the quantum security threats facing the telecommunications industry and a detailed, step-by-step list of potential solutions to prepare for these threats.

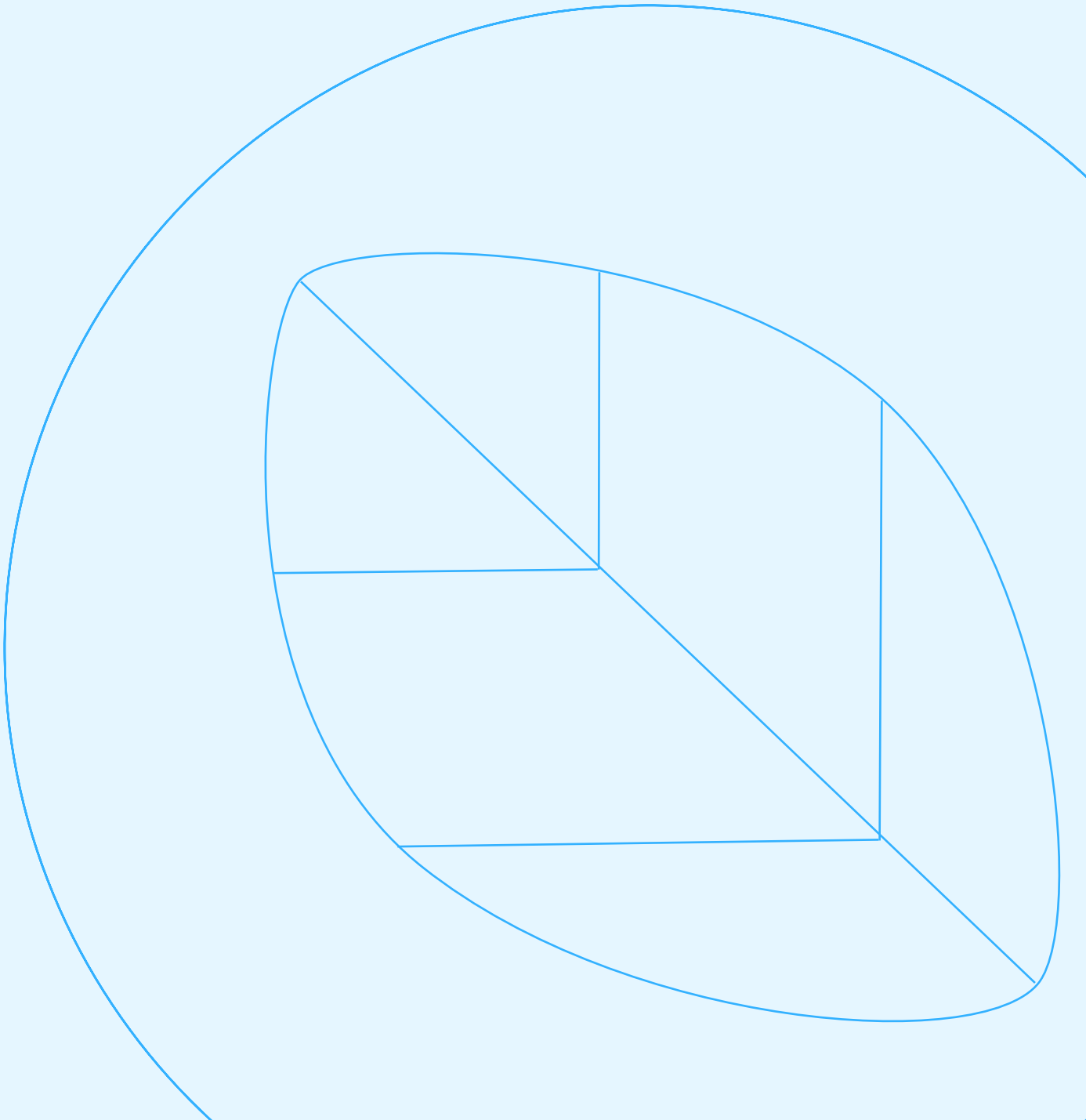
Quantum-safe cryptography protocols offer the capability to help protect classical data and systems from future quantum computers' potential decryption capabilities. The US National Institute of Standards and Technology (NIST) recently announced that four algorithms have been chosen to be part of a protocol for standardization by 2024.

Separately, Vodafone has joined the IBM Quantum Network to explore quantum computing for a variety of telco use cases and will advance its employees' skills in quantum technology through iterative prototyping, as well as actively recruit quantum computing experts to build a dedicated capability. As part of this engagement, Vodafone will also explore applications of IBM Quantum Safe cryptography across its diverse network infrastructure and systems.

Vodafone joins more than 250 members of the IBM Quantum Network, a global community of Fortune 500 companies, start-ups, academic institutions, and research labs working to advance quantum computing and explore practical applications. This engagement is designed to set the company on a path to tap into a future of quantum advantage capabilities: when a computational task of business or scientific relevance can be performed more efficiently, cost-effectively, or accurately using a quantum computer than with classical computations alone.

The trend:

Sustainability promises are just beginning to show progress



Many businesses set out aggressive decarbonization targets before they knew exactly how those would be achieved—and now those commitments need to be operationalized and become economically viable. Integrating sustainability goals into operational metrics among the myriad of standards continues to be a limiting factor. Indeed, while 86% of executives say their organization has a sustainability strategy in place, only 35% have acted on it.¹⁷ Looking to the future, several factors are pushing leaders to start making big strides.

Sustainability commitments are being operationalized as scrutiny on disclosures increases.

The actions organizations take today will define the health of society and the planet for future generations. As economic pressures intensify, sustainability budgets are being stress tested. At the same time, increasing regulatory requirements demand greater transparency in ESG reporting. Activist investors are pushing their priorities on both sides of the debate and carbon reduction targets are being scrutinized.

As a result, leaders are searching for specific ways to achieve more concrete sustainability targets, extend their reach, and operationalize their sustainability projects.

Differentiating beyond general net zero commitments will require clearer purpose, profit, people, and planet-specific objectives.

While almost three in four organizations have set net-zero emissions targets, fewer than 10% of executives say their organization has prioritized biodiversity-related sustainability goals, such as preserving life on land or below water.¹⁸ Businesses will need to choose a specific area of impact that aligns with their purpose. They need to align business strategy with consumer demand and social, governance, and decarbonization targets.

For example, research from the IBM Institute for Business Value revealed that individuals are invested in a wide variety of issues beyond decarbonization, including clean water (92%), deforestation (91%), and biodiversity (91%).¹⁹ And roughly four in five consumers say sustainability is important to them when choosing a brand.²⁰ By focusing on the elements of the “quadruple bottom line”—people, planet, profit, and purpose—that matters most to them, organizations can build trust with consumers, investors, employees, and business partners, and actually make progress in alignment with their business strategy.

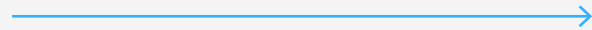
Preserving the planet will require changing consumer choices.

To state the obvious, the choices consumers make every day have a significant impact on actual carbon emissions. Therefore, to accelerate carbon reduction in a sustained way, every sustainability strategy needs to address how to effectively change employee and consumer behavior. We have seen a number of effective tactics, some as simple as showing consumers the carbon footprint of their choices when selecting a specific product or service.

This can be as granular as the Sustainable Travel Approval Tool (STAT), which IBM created in partnership with a professional services firm to empower employees to make carbon-wise travel choices. In a pilot, STAT helped the firm meet emissions goals two years ahead of schedule.

The priorities:

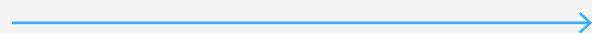
Too many executives still see sustainability and profitability as conflicting, rather than complementary—even though 80% of CEOs say they expect sustainability investments to deliver business results within five years.²¹ To make that vision a reality, businesses need to operationalize their goals today—and adopt technology to support automation, transparency and accountability. These can lead to fast-paced progress.



Automated end-to-end data transparency

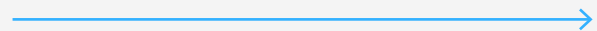
CIOs now cite sustainability as the top area where technology will have the greatest impact over the next three years.²² However, almost half (44%) of CEOs said a lack of data insights is a top challenge in achieving their objectives.²³

Executives can leverage automation to track sustainability metrics, emphasizing transparency, long-term objectives, and new sources of value.



Reimagined supply chain

To set and reach sustainability targets, organizations need to engage with supply chain and ecosystem partners early and often, redesign supply chains for circularity, and increase transparency and accountability across the value chain. Consider Scope 3 emissions: cloud-based platforms can make it easier to track third-party emissions—which come from upstream and downstream sources—as well as waste, energy usage, and other sustainability metrics.



Public accountability

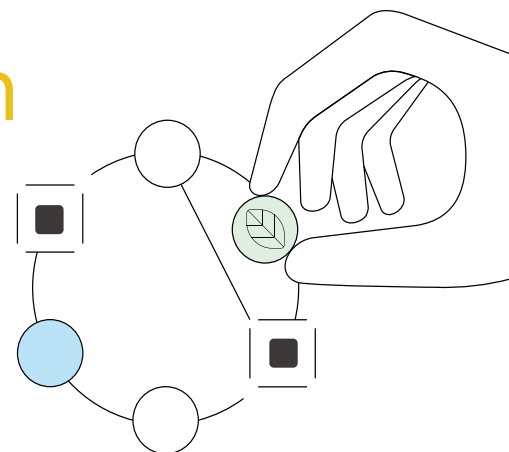
Transparency builds trust. While consumers are skeptical and keep a keen eye out for “greenwashing” campaigns, honesty builds trust-based relationships with principled customers for years to come.

Executives should seize this opportunity to guide their own sustainability narrative. By offering clear, transparent information about their sustainability and social responsibility initiatives—and their yearly progress on those goals—companies can help people make informed choices and build loyalty with a new breed of purpose-driven consumers.

The bet:

Avoid false choices between sustainability and profit—deliver both

Environmental sustainability needs to be embedded in economic sustainability. Programs must focus on alternatives and solutions that inspire innovation and deliver the committed decarbonization, social equity, diversity, and sustainable business economics through the transition and to the end state of a new business model. Here are three ways to approach this quadruple bottom line of purpose, profit, people, and planet.



Implement robust sustainability systems of record that create an end-to-end ledger of transparency and accountability.

- Roll out technology platforms that can provide the data needed to record, report, and act.
- Expect a Chief Sustainability Officer (CSO) and Chief Financial Officer (CFO) to create the balanced sustainability/profitability roadmap.
- Make sustainability goals operational in each functional and business area.

Accelerate projects that deliver near-term efficiency and sustainability outcomes.

- Consider reducing your IT carbon footprint with green IT solutions that reduce up to 30% of computing cost.²⁴
- Visualize carbon and other sustainable metrics in the key decision processes to establish operational accountability, and to realize energy efficiency and sustainability targets.
- Include Scope 3 data instrumentation early in the design process and engage with ecosystem partners to ensure shared purpose and accountability.

Design and deliver products and experiences that motivate adoption of sustainable behaviors.

- Design for sustainability to reduce up to 80% of the lifetime carbon footprint of your products and services.²⁵
- Change workflows to maximize adoption of sustainable choices, inspired by behavioral economics.
- Work with ecosystem partners to offer sustainable choices that are both convenient and transparent to clients and consumers.

Case study

Iberdrola scores its supply chain suppliers on sustainability

Sustainability goals are only meaningful if companies can measure their progress, but many still struggle to assess their impact. That's why Iberdrola is bringing shrouded supply chain sustainability data into the light.

"Sustainability is in our DNA," says Ramón Zumárraga Gorostiza, Director of Purchasing Services at Iberdrola.²⁶ "That's why we've made it our mission to provide affordable, clean energy to as many people as we possibly can, while ensuring that our business model is environmentally sustainable, competitive, and profitable."

Serving over 100 million energy customers in countries across Europe, as well as the US, Brazil, Australia, and Mexico, Iberdrola plays a leading role in helping businesses and communities build a more sustainable future.

Iberdrola set the ambitious goal of ensuring that 70% of its core suppliers have put in place effective sustainable development policies and standards by 2022. To achieve this, the company looked for ways to improve its supplier relationships, monitor and measure progress, and make smarter, more efficient purchasing decisions.

Its existing supplier relationship management (SRM) solution offered limited governance features for company-wide purchasing and, most importantly, provided no capability to assess new and existing suppliers against sustainability criteria.

Iberdrola chose to retire its on-premises SRM system and move to SAP® Ariba® cloud solutions with the support of IBM Consulting.

Leveraging the API-connectivity of SAP Ariba, Iberdrola worked with IBM to implement a third-party solution that helps the company score suppliers on their commitment to sustainability and responsible corporate governance.

"Integrating SAP Ariba with our supplier sustainability scoring tool gives us a detailed view of the environmental impact of our supply chain," explains Zumárraga Gorostiza. "Using this information, we can make sure that all of our suppliers are as equally committed to environmental sustainability as we are."

Case study

Melbourne Water uses its IoT platform to combat the effects of climate change

Melbourne, Australia is experiencing more severe rainfall events due to climate change. Rising sea levels are expected to lead to more coastal flooding caused by storm surges.

To help protect against flooding, the city's water management utility, Melbourne Water, operates a vast drainage network that includes about 4,000 collection pits and grates. To function properly, the stormwater drainage system requires regular inspection and maintenance, and Melbourne Water needed a solution that met both business and environmental goals.

"Our real need was to increase inspections to keep grates in an operational state," says Russell Riding, Automation Team Leader for Melbourne Water. "We knew there was a smarter way we could be working. That's one of the reasons why we started looking at remote inspection alternatives with IBM."

Melbourne Water installed still image cameras, which were integrated into its connected IoT network, including IBM's Maximo products.

"It's easy for us to spin up and scale up services with IBM Cloud," says Zoltan Kelly, Asset Information Improvement Specialist for Melbourne Water. "There hasn't been a thing we wanted to do that we haven't been able to do with it."

As cameras monitor more pit grates, and fewer crews are sent out for onsite inspections, Melbourne Water expects to save thousands of staff hours. When the system is completed, preliminary estimates of cost savings range up to hundreds of thousands of dollars per year.

Case study

Global professional services firm empowers employees to change behavior and shrink emissions

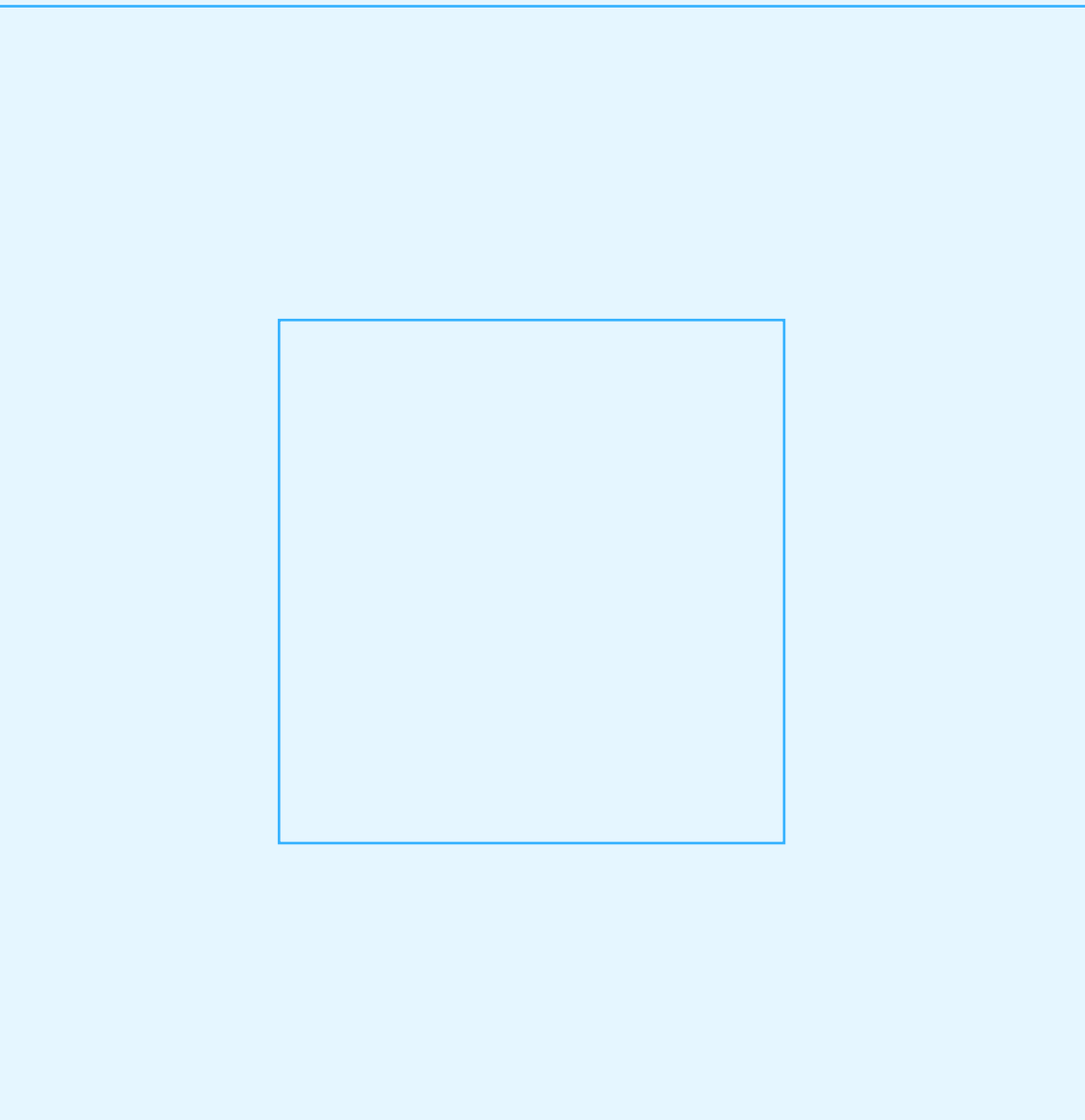
To encourage more sustainable choices, companies need to make it easy for people to make a change. The Sustainable Travel Approval Tool (STAT)—an intelligent, pre-booking tool—helps companies reduce their carbon emissions and achieve their net zero goals by empowering employees to make carbon-wise travel choices.

STAT has been developed by IBM for a global professional services firm and uses the IBM Environment Intelligence Suite (EIS) at its core to drive employee choices with consequential travel cost savings.

By gamifying carbon reduction, STAT helped the firm meet its emissions goals two years ahead of schedule. STAT is in production and delivering for the professional services firm in eastern Europe, with plans to roll out worldwide in 2023.

The trend:

Every product
is becoming
a digital product



Marc Andreessen's famous prediction has come true: software is eating the world.²⁷ That's why the savviest executives are building a product engineering mindset. They understand that technology adoption is critical for success, and employees and customers expect a great digital experience with every product and service.

The stealth “software supply chain” is taking over industries.

Physical products across industries are being enhanced with digital technologies, increasing the need for all companies to have software product engineering capabilities and skills. Half of all companies—and 70% of top performers—are now using software they developed internally to differentiate themselves from their peers.²⁸

As software is eating the world, AI is now eating software. That means companies will use AI to compose and reuse software from multiple sources, integrating a software bill of materials into their own product development processes. They will use platforms to manage the end-to-end software life cycle.

Open-source code—used in 96% of code bases—speeds development and innovation.²⁹ The downside is that if bad actors introduce malicious code into open-source software or its components, infected code can easily be shared across the software supply chain. Between 2020 and 2021, software supply chain attacks grew by 650%.³⁰

Hybrid cloud infrastructures will continue to be the standard for the foreseeable future.

As digital transformation and business automation accelerate, the so-called hybrid cloud architectures have become the most compelling standard for mission-critical systems. These architectures enable running the same applications in private, dedicated, or public clouds. They increase productivity and resilience of IT departments seeking to transform the skills and ways of working while helping ensure data privacy, cost savings, and operational flexibility without single points of failure. A hybrid cloud approach yields 2.5 times more value than using a single public cloud as a base for new IT architectures.³¹

Enterprise IT leaders will need to develop product mindsets.

CEOs are starting to prioritize employee experience equally to customer experience, and they're looking to their top technologists to elevate digital products and experiences across the board. Incumbents in industries like banking are attracting digital natives to help IT departments think like product engineers.³²

Successful future CIOs will understand that user adoption is the most important factor in digital transformation, and will apply consumer application mindsets in order to generate enterprise IT experiences similar to those created for consumer apps.

The priorities:

Transformation is greater than the sum of its parts. While each technology brings its own benefits, leaders need to rethink their operations holistically to develop a digital-first strategy.

Customer obsession

Great product organizations get the right products to market quickly by testing, learning, and iterating—something enterprise IT departments rarely do well. They must be entrepreneurs, technologists, and engineers all at once. This is especially true for CIOs, who tend to think in terms of requirements and tickets, not user experience and adoption.

Continuous innovation

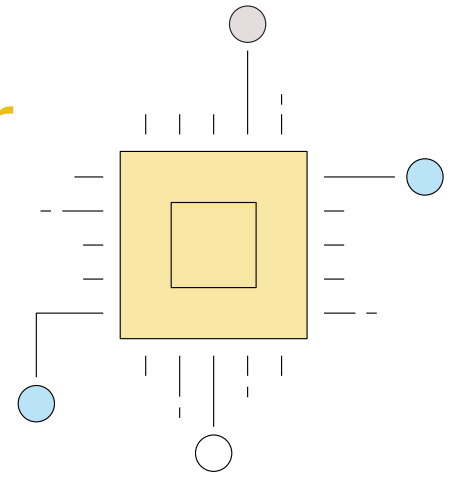
Shifting to a product engineering mindset requires companies to reward innovation—even if it fails to produce the desired results the first time. Recent research from the IBM Institute for Business Value found that a culture of not penalizing failure in the context of technology adoption and digital transformation delivers a 10% revenue growth premium.³³ Leaders need to inspire teams to be willing to test hypotheses even if they are wrong, and showcase teams that take these risks.

Open architecture

Developing next-gen digital products requires partners across the ecosystem to increase quality, resilience, and speed to market. To get the most from these collaborations, organizations need the right technology infrastructure. An open hybrid architecture provides flexibility that allows teams to write and maintain one single version of code that can run everywhere. This shift requires organizations to strengthen their tools, governance, and skills, and adopt a “DevSecOps” culture.

The bet:

Invest as much in your software supply chain as in your physical supply chain



Assembling the jigsaw puzzle of apps, software, systems, and AI isn't a straightforward process. In a world of digital products and services, investments to build foundational software supply chain capabilities is essential for survival. Here are three ways businesses can support building a digital product mindset.

Invest in digital product engineering partnerships and skills, understanding they are different from legacy enterprise IT.

- Act like a software company: set up agile squads that pair product, technology, and functional skills with a single definition of success.
- Realign teams in product-centric squads empowered to drive the end-to-end lifecycle of products.
- Develop and reskill team members to new digital skills, including design, software engineering, digital content management, and AIOps.

Retire “technical debt” that constrains speed and agility.

- Adopt open hybrid cloud architectures to enable flexibility, scalability, and resiliency now and in the future.
- Implement a data fabric strategy that allows applications to access data across the organization and ecosystem in real-time.
- Accelerate the creation of “digital twins” for mission-critical constraints to improve early detection, simulation, and reaction to demand signals, driving significant cost improvements and decreasing risk.

Create consumer grade applications and empower employees to self serve.

- Transform IT to deliver no-code/low-code applications for employees that are as easy to use as those built for consumers.
- Eliminate complexity and training requirements by implementing a natural language interface to back office systems.
- Introduce feedback mechanisms and update apps frequently to improve employee experience.

Case study

Red Hat and GM are turning driving into a digital experience

In May 2022, Red Hat, the world's leading provider of open source solutions, and General Motors (GM) announced a collaboration to help advance software-defined vehicles.³⁴

Red Hat's cloud-native, enterprise-grade open source operating system is now accelerating the development of GM's software-defined vehicle programs, following the initial launch of its Ultifi platform. This will enable both companies to offer customers more valuable features responsibly in a fraction of the typical development time.

In-vehicle software systems are complex and require high levels of cybersecurity protection and stringent certifications due to critical safety priorities. In current systems, these robust requirements can often lengthen the development process and make vehicle software updates difficult, with each update requiring recertification.

Together, GM and Red Hat intend to make these complex vehicle updates simpler, safer, and more frequent by implementing continuous functional-safety certification into the Ultifi platform, with Red Hat In-Vehicle Operating System pioneering the continuous certification approach. The integrated software is expected to support a variety of in-vehicle safety- and non-safety-related applications, including infotainment, advanced driver assistance systems, body control, and connectivity.

Common standards can also help increase software reuse and achieve a more scalable design process, giving GM the ability to dedicate more resources toward new personalized in-cabin experiences, vehicle modes, and other features customers will enjoy.

The automotive industry is at an inflection point as consumers begin to assess what the future of their driving experience could look like. As open source and automotive leaders respectively, Red Hat and GM are poised to help define and connect the automotive ecosystem that will drive solutions for next-generation vehicles.

"With Red Hat's operating system as a core enabler of Ultifi's capabilities, the opportunity for innovation becomes limitless," said Scott Miller, Vice President, Software Defined Vehicle and Operating System, General Motors.

Case study

Connectivity and data deliver innovation in the field (and on the lawn)

A leading global manufacturer of agricultural equipment looked to emerging technologies (analytics, sensors, and software) for inspiration to meet its innovation goals and develop a revolutionary product offering for its commercial businesses.

Using design thinking approaches, the working team conducted user interviews to uncover the unexpressed need and pain points of the manufacturer's landscaping customers. The team built detailed service blueprints and customer journey maps as they looked for invention or improvement opportunities.

To operate more efficiently at scale, the team designed advanced sensors, which were integrated into the machines and into light wearable vests for crews. This technology delivered the ability to collect data across the operation—from property schematics to machine operation. This manufacturer also designed and developed a user-friendly software dashboard that allowed management to centralize, visualize and measure the data in real time.

With the new easy-to-use and up-to-the-minute data dashboard, operations managers were able to instantly visualize and evaluate the efficiency of each mower, manage downtime, coordinate routes and schedules, monitor worker safety and capabilities, optimize fueling strategies, predict equipment attrition, and anticipate maintenance needs for the machines.

By applying sophisticated technology to a traditionally hands-on industry, the client created a unique product that revolutionized the way professional landscaping companies conduct their business. The level of data provided by the innovative hardware and software applications resulted in a significant increase in the efficiency of crews, machines, and organization, and allowed for a more streamlined approach to managing landscaping projects. As a result, the client was able to gain a meaningful competitive advantage.

Case study

A global restaurant brand delivers dynamic product development

With the right technology, employees have the power to boost customer loyalty and elevate the brand. Franchisees of this Fortune 500 global restaurant brand excel through new digital offerings.

Over the past decades, the expectations of the franchisees have become significantly more sophisticated. The company has struggled to modernize its IT organization to meet these rising expectations of better overall experience, faster development, and more flexible solutions.

The Chief Technology Officer had a vision to make a clear distinction between core IT services and mission-critical product engineering that would drive solutions into the hands of the business owners. He engaged IBM to provide a "Product Team as a Service" to prove out this bifurcated model. They landed a multidisciplinary squad of product specialists, strategists, designers, engineers, and quality specialists to introduce a new way of working in this traditional environment.

The product team rapidly engaged with representatives from the franchise community to understand their most burning needs and challenges, creating a backlog of potential products and features to drive the most impact in the shortest period of time. The first product was a Menu Management System that would allow for real-time reaction to changes in both customer needs and available ingredients. Benefits include optimizing revenue through dynamic pricing, increasing margins by reducing labor costs and food waste, and improving the franchisee experience which ultimately fuels growth and expansion.

The trend:

**Experience matters
more than we think**



The best experiences create passionate customers... for a minute. A great experience is the ultimate change management tool, helping employees improve productivity and speed adoption of new ways of working. Leaders in outperforming companies wake up obsessed with customer experience and how they should extend that to every touch point and every role in the enterprise. A few key factors are defining how to create teams that consistently deliver delightful client experiences.

Value increases when design meets technology.

Every technology product, no matter how functional it is, gains significant value when combined with a high-quality experience. Conversely, technology makes experiences personalized at scale in a way not possible without it.

Whether it is an account origination of a financial product, the digital instruments on a new car, or the end-to-end journey of a flight as enabled by a travel app, experience makes technology more valuable. Technology makes experiences more personalized. And the magical combination makes any product or service much more unique and profitable.

People will do what's easy more often than they do what's right.

Foundation models and generative AI are great advancements for AI, but the bigger opportunity is how important it is to embed technology into the ways people work and live—in the easiest to use way possible—if we want to change what people do. This is a critical insight for enterprise transformation and modern change management.

Open AI's ChatGPT (short for Generative Pre-trained Transformer) seemed like an overnight sensation when it attracted more than 100 million users in the first two months, making it the fastest-growing consumer application in history.³⁵ But Open AI launched its first large language model (LLM) in 2018 to little fanfare. It was human feedback that adjusted the responses, and enabled the creation of a simple user interface, ChatGPT, that triggered mass adoption. While the algorithm might have been good enough on its own, the “magical experience” made all the difference in its adoption.

Design-led products and services will grow faster and be more profitable.

Consumers are now accustomed to digital products and experiences that evolve every day. Companies push updates based on user data, streamlining design and optimizing product offerings based on their behavior. However, it's hard to be customer-centric if you don't understand their motivations and behaviors. When designers can tap into near-real-time data and insights, they can develop experiences that give people more of what they want—and less of what they don't. Today's instrumentation of user interactions with websites, phones, and products is accessible real time and offers new ways for designers to implement “continued product design” and correct product and service irritants with over-the-air updates, resulting in more revenue and better experiences.

The priorities:

A flash of genius isn't worth much on its own. It's the painstaking process of implementation that turns brilliance into profits. Getting there requires a keen understanding of human behavior and relentless focus on design thinking across the enterprise.

People-centered design

Putting end users at the center of the design process gives disparate teams a guiding principle. It breaks down silos and blurs the boundaries between disciplines. And when this practice is applied in business, it can significantly boost the bottom line. Recent research from the IBM Institute for Business Value found that companies taking a design-led approach, which is characterized by empathy for end users, business needs, and broader cultural concerns, have a competitive edge. By embedding design thinking in customer, employee, and ecosystem experiences, these organizations saw a rate of revenue growth that was 58% higher than other companies.³⁶

Behavior-driven design

Behavioral science attempts to explain why people do what they do, and what are the “predictably irrational” actions most people take when presented with a set of facts. Behavioral economics is the method of analysis that applies psychological insights into human behavior to explain economic decision making. The fascinating power of behavioral economics is that organizations can generate massive improvements in performance sometimes by making simple changes. For instance, in most decisions—“how” they are presented can be up to 500% more important in determining success than the facts.³⁷ From simple “opt-in vs opt-out” to one-click buying, every enterprise should be applying behavioral economics and design to implement new workflows that can enhance performance and outcomes.

Trust by design

By understanding customer needs and consistently (and proactively) meeting them, organizations can also develop personalized experiences that build trust. This can be as simple as a chatbot that greets the customer by first name or as complex as using AI to recommend new products based on previous purchases or products viewed. But that trust is easy to break.

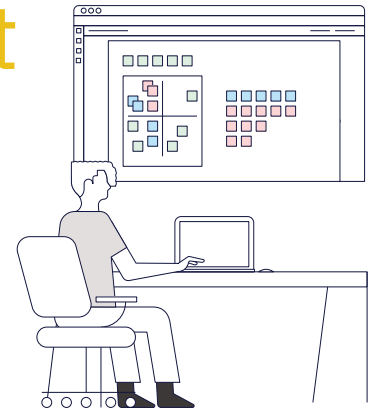
Recent research found that 37% of consumers have switched brands to protect their privacy. And 57% are uncomfortable with how companies use their personal or business information.³⁸ To build and maintain trust with customers, companies should use their data fairly and transparently, give people the ability to opt-out of certain uses, and provide clear value in exchange.

The bet:

Apply design leadership to change every aspect of the enterprise



Experience is where art, science, and technology meet. Design can help accelerate the change across functions that are required to succeed. Here are three ways to embed design leadership across the enterprise.



Integrate creative and technology teams to improve how things work, not only how things look.

- Instrument customer journeys with analytics to understand every product and experience.
- Ensure full-time professional designers are embedded into every transformation team and empower them with co-creation methods such as IBM Garage.
- Constantly monitor digital and physical customer journeys to detect and eliminate irritants.

Design frictionless workflows as an effective change management tool.

- Consider behavioral economics skills to increase the likelihood that users will follow the intended journey. Make the desired workflow the easiest one from the perspective of the users.³⁹
- Increase design, AI, and data science competencies in your enterprise through continued engagement and training.
- Help holdouts see the value of changing habits by highlighting how new workflows can boost their performance.

Shift to experience-led strategies, products, and services.

- Engage partners to drive better experiences. Build more insightful personas and empathy maps that deeply connect teams to customers.
- Design for trust. Make sure consumers can dictate how their data will be used, give people the ability to opt out of certain use—and ensure that your employees practice proper data governance.
- Rethink your definition of customers to include employees. Embed design thinking into internal processes and technology.

Case study

Bestseller India designs experience to connect producer and consumer needs

When fast fashion hits the mark, fresh clothing designs fly off the shelves. But if the new designs miss with consumers, inventory gets marked down—and some of it ends up in landfills. When fashion designers are enabled with the latest experiential technology, they can drive better alignment with customers.

Bestseller India is a subsidiary of Bestseller, a worldwide retailer based in Denmark that is a leader in “fast fashion”—a dynamic business model that moves trendy clothes from the runway to the rack in a matter of days or weeks.⁴⁰ The apparel manufacturing industry is also a major consumer of raw materials, water, and energy.

By more closely aligning consumer demand with design and production, the fashion industry can improve profits while also supporting environmental sustainability. That’s why Bestseller India turned to technology to help designers and buyers develop better forecasts and deliver the right product at the right time.

Bestseller India set a very ambitious goal to develop a totally new, bespoke platform with AI capabilities to support preseason design, planning, production, and forecasting.

After months of work and iteration, the Bestseller India-IBM Garage team brainstormed 61 unique concepts for the platform—called Fabric.ai—which became the first AI-powered tool for the Indian fashion industry.

With Fabric.ai optimized for designers, Bestseller India has a digital platform to help inform more sustainable material choices up-front in the value chain. Fabric.ai also provides product planners with data-driven perspectives on producing clothing with a leaner environmental footprint.

Case study

Health Services Executive of Ireland improves first-touch experience for COVID vaccination process

The Health Service Executive (HSE) of Ireland partnered with IBM and Salesforce to create a national vaccination platform that could safely and quickly vaccinate the country’s population against COVID-19. The COVAX (COVID Vaccination Information System) platform prioritizes human-centered design principles and incorporates empathy for users.⁴¹

The platform, which captures all the necessary data to produce a vaccination certificate and helps ensure sensitive personal information remains in GDPR compliance, was designed to make the vaccination process easier for key people who would first use it: vaccinators, care-home patients, and healthcare workers.

The platform was built by the technical team before the solution plan was finalized due to the urgency of the pandemic. It uses various Salesforce clouds for appointment scheduling, helpdesk support, employee training, and integration with other systems.

To stay current and keep up with changing priorities issued by multiple government agencies and committees, the virtual development team used an extremely responsive process, including agile methodologies, to rapidly develop, test, and iterate the solution.

The agile process allowed the team to adapt to the rapidly changing COVID-19 vaccine availability and rollout plan. The platform has been a significant factor in Ireland’s success in tracking nearly 11 million COVID-19 vaccinations across the country.

Case study

Boots UK improves customer experience and drives growth

Boots UK needed a better digital customer experience. The number of customers shopping online kept increasing—especially in the wake of COVID-19—but its site wasn't able to keep up.⁴²

For over a year, IBM and Boots worked together using the Red Hat® OpenShift® container platform to build, replicate, and test the digital environment. Then came the real test—Black Friday, the busiest shopping day of the year in many countries.

That day, the company's website saw an average basket size that far exceeded anything the team had forecasted. Boots' new infrastructure didn't just run smoothly, it performed exponentially faster and, at its peak, handled more than 27,000 visitors without a hitch.

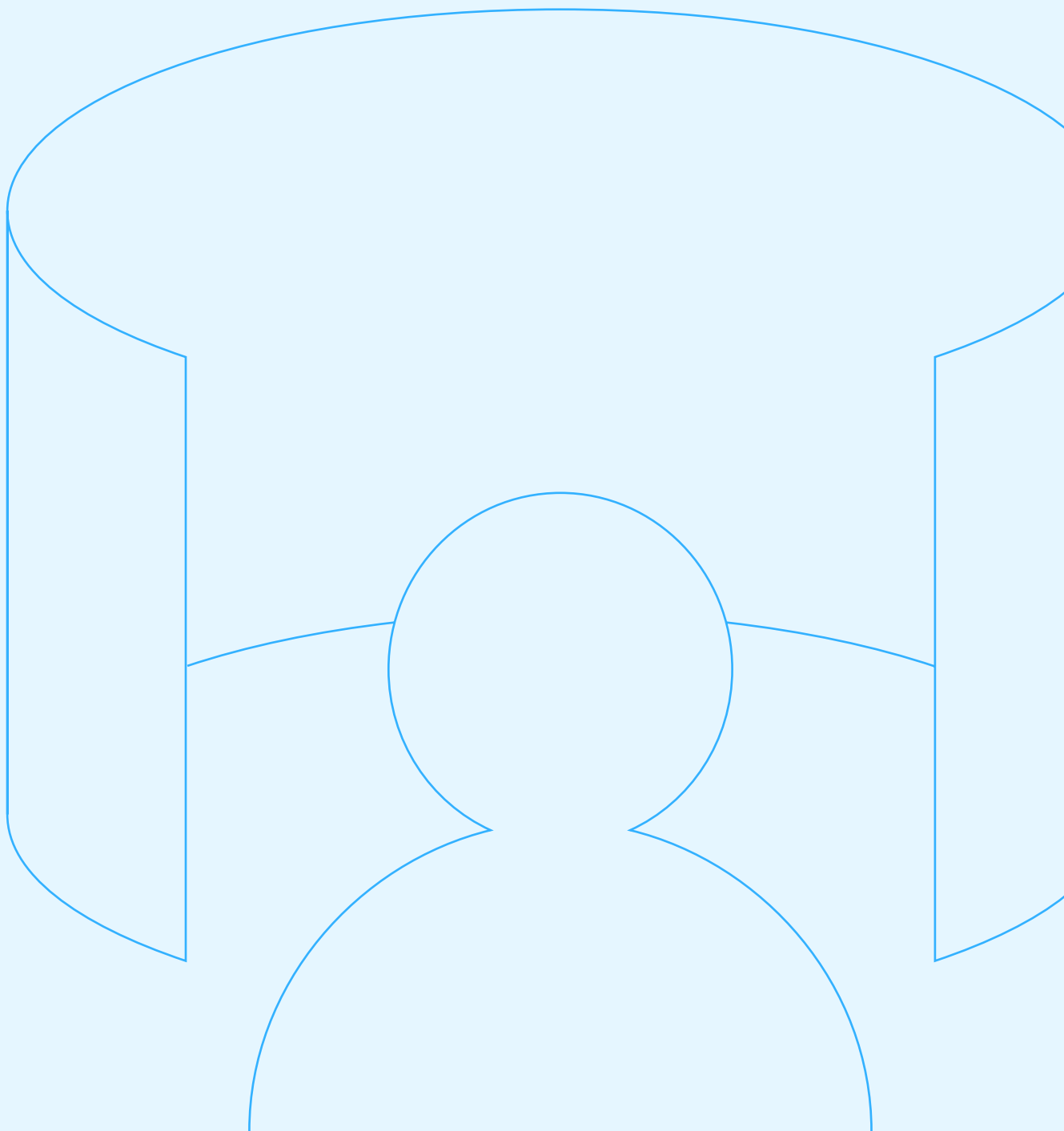
Boots is now measuring significant growth rates following its digital transformation:

- Revenue is up more than 54% annually, and up more than 115% over two years.
- The company's customer base has grown by more than 45%, and orders increased by more than 42% annually.
- Conversion rates are up by more than 16% annually and 43% over two years.
- Average order value increased by more than 8% annually and by more than 13% over two years.

"IBM has not only set us up with a new modernized infrastructure and tools, but also an environment that allows us to build on continuously," says Richard Corbridge, CIO. "It isn't a one-hit wonder and we're done; it's a continuation, a real explosion of how a partnership can work."

The trend:

The pragmatic metaverse
will enhance the physical
world, not replace it



Hype about the metaverse has obscured momentum for augmented reality (AR), artificial intelligence (AI), and virtual reality (VR), which combine to bridge the virtual and physical worlds.

The metaverse will become mainstream, but not in the ways you might think.

The maturing of spatial and display technologies enables the integration of virtual and physical worlds like never before.

Advanced computer-aided design (CAD), once limited to automotive and aerospace industries, is being democratized and is now used across consumer packaged goods, manufacturing, and maintenance industries to accelerate product designs and reduce time to market and cost of operation.

Enhancing the physical world with additional digital experiences is going to revolutionize how we do everything from shopping to working to living.

Augmented reality will create safer, more efficient workforces.

Integrating robotics with AR can increase worker safety. For example: an agile, mobile robot built by Boston Dynamics uses AR to help factory workers identify and solve maintenance problems without having to enter potentially hazardous worksites.⁴³

While much is discussed about autonomous operations, some of the greatest efficiencies in manufacturing and energy automation are achieved with remote monitoring and management. If an entire manufacturing company is integrated, AR can also help increase efficiency. Maintenance staff can use smart glasses to accelerate a repair and reduce safety risks.

Enterprise “holodecks” are coming soon, as IoT adoption leads to high-fidelity simulations.

According to research from the IBM Institute for Business Value, simulation technology increases problem resolution by 70%.⁴⁴

The democratization of technologies such as LIDAR, AI, and high-performance display and optics has already made possible consumer Augmented Reality (AR) shopping applications where buyers can see objects in their living room through a mobile device before they buy anything. Conversely, they can look at consumer electronics through phones to see technology analytics overlays in the physical world, such as temperature and alerts which guide troubleshooting and fixing issues. Technology is ready now—the main requirement is the business case for these applications to become the norm in the enterprise. Bidirectional digital twins will become the norm, as the cost to digitize the real world plummets, and AI helps more effectively bridge virtual and digital versions of reality. Industry-specific AI foundation models and new 3D engines help simulate what-if scenarios in realistic digital twins of operations before decisions are committed to the real world.

The priorities:

Successfully bridging the physical-digital divide to achieve enterprise interoperability requires investment in spatial technologies and skills. These capabilities need to be implemented in secure environments.

Enterprise metaverse platforms

While it's fun to engage in public virtual worlds, AR games and phygital communities (meaning the combination of physical and digital—if the word mashup wasn't clear), organizations require safe and secure access to enterprise data, combined with the enhanced experience of the virtual environments. Most of today's public metaverse environments don't meet these standards, and new platforms such as IBM's Spatial Platform are emerging to close this gap. These enterprise platforms help connect experiences across public and private spaces, enable pervasive access to 3D models in today's devices, and provide single sign-on into XR applications that reimagine “click-and-mortar” use cases into a new set of experiences.

Interoperability

Seamless movement between spaces is a key requirement to deliver business value from enterprise investments in VR and XR. Integration across technologies and consistency of use cases are key requirements to reduce cost of deployment and training.

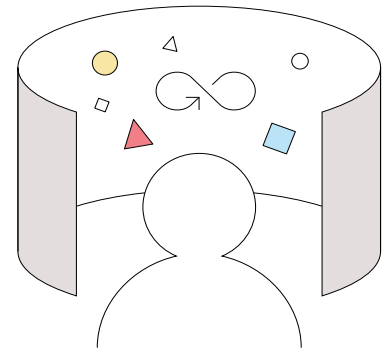
Security

As companies across ecosystems scale up metaverse implementations, security and infrastructure will need to keep up. Given the additional attack surface when integrating IoT data, zero trust strategies are critical to secure real-time monitored operations. Yet, seven out of 10 organizations are currently unable to secure data that moves across multiple clouds and on-premises environments.⁴⁵

The bet:

Invest now in augmented reality (AR) solutions with clear benefits

Every executive should be preparing to combine virtual and physical worlds. And skills development is front and center. Here are three ways to build spatial design and simulations competencies across the enterprise.



Invest in spatial design skills and apply them to product engineering, field services, manufacturing, and operations. A simple website search demonstrates the potential for cost reduction, such as:

- Up to 40% increase in productivity when using digital twins.
- In simulation, up to a 40% reduction in training costs.
- In marketing, up to 50% increase in additions to cart when interacting with a 3D viewer.

Create a spatial design Center of Competency (CoC) focused on product innovation.

- Recruit teams that have the following skills: spatial design, simulation, metrology, industrial design, and visualization.
- Adopt 3D printing for new use cases with clear return on investment.
- Select the top three use cases—field service, maintenance, and product design—to start implementing XR solutions.

Implement an enterprise simulation platform to leverage secure data and create new digital twins.

- Accelerate data and IoT programs to enable high-fidelity “digital twins” of operations and complete your digital-physical journey by bringing real-time experiences and data directly to IoT programs.
- Enhance intelligent workflows with “heads-up display” use cases that enhance safety and efficiency for key enterprise workflows.
- Metaverse skills are still scarce, so be prepared to build rather than only hire them.

Case study

Boston Dynamics builds agile, mobile robot that connects physical and digital worlds to automate maintenance

Automation and robotics are the norm on the factory floor. But manufacturers and other plant operators must maintain and repair those machines to keep their plants running, which requires constant data collection and analysis.

Spot, the agile, mobile robot created by Boston Dynamics, collects data more frequently and more accurately than relying solely on humans.⁴⁶ Like a search-and-rescue dog that augments its handler's effectiveness, Spot can enter dangerous environments where human workers cannot go because of chemicals or noise or other hazards.

And with help from IBM, Spot can interpret what it "sees" through its onboard cameras and sensors. The analytics happens on the robot in real time, and can be integrated into any VR environments or workflows.

Instead of just identifying a problem, highly customizable, optimized AI models help Spot to detect anomalies and immediately initiate corrective actions, helping increase equipment uptime.

"Spot, connected to IBM services, can provide a lot of insight so that customers can run these assets for longer periods of time, catch problems before they happen, and avoid downtime so that they can keep their assets up and running," says Michael Perry, former Vice President of Business Development at Boston Dynamics.

Case study

An insurance company uses digital reality to streamline claims

Bridging the physical-digital divide promises to streamline workflows across sectors. To boost efficiency in the claims process, a US-based mutual insurance company is creating a claims solution that leverages AR- and AI-powered mobile capabilities.

When measuring roof damage, claims assessors turn to an app that uses AR, underpinned with visual recognition, to interpret what the user is seeing and AI to offer a conclusion or recommendation.

This enables assessors to recognize animal, hail, or mechanical damage in real time with a measurable confidence level. The app is designed to work both online and offline, a key consideration for field agents where connectivity might not be available or in disaster situations when the need for reliable solutions is paramount.

In addition to reducing the physical burden on claims adjusters due to needing materials and equipment at the site of damage assessment, the insurer achieved 25-50% productivity gains in the claims adjuster workflow, with improved customer service and satisfaction in a more efficient claims adjustment process.

Case study

Sund & Bælt brings the pragmatic metaverse to its physical infrastructure

Sund & Bælt Holding A/S owns and operates some of the largest pieces of physical infrastructure in the world, including the Great Belt Fixed Link—an 11-mile bridge and tunnel combination that is the largest construction project in Danish history.⁴⁷

One of the company's greatest challenges has been would be the slow and manual process for conducting regular maintenance inspections.

To inspect bridges, Sund & Bælt often hired mountaineers to scale the sides and take photographs for examination. An inspection could take a month, and the process had to be repeated frequently for bridges near oceans or in other corrosive environments. Paradoxically, this organization with a huge physical presence turned to the metaverse for part of the solution.

"We have more than 300,000 square meters of concrete that has to be visually inspected every six years," says Bjarne Jørgensen, Executive Director of Asset Management and Operations at Sund & Bælt. "That is heavy work to do manually, and it's very expensive."

Sund & Bælt identified that it could reduce time and costs while improving quality if it automated more of its inspection work.

With the new IBM® Maximo® for Civil Infrastructure solution, Sund & Bælt gathers data from drone photographs to monitor status without dangerous and time-consuming human inspections. The solution consolidates this data with maintenance records, design documents, and 3D models to help identify cracks, rust, corrosion, displacement, and stress.

"The more we can use robots, drones, and other new technology to do our inspections, the more safety and quality we can achieve from the inspections," Jørgensen says.

The social, political, and economic environment we live in is undergoing a radical transformation, impacting trade, talent, and the drivers of success. At the center of this vortex are several disruptive forces that leaders need to navigate.

Supply chains are adapting to a new geopolitical and economic cycle.

The era of stable inflation and geopolitical relationships is gone for the foreseeable future. Relationships between nations are shifting. And according to the World Economic Forum's 2023 Global Risks Report, "Geopolitical fragmentation will drive geoeconomic warfare and heighten the risk of multi-domain conflicts."⁴⁸

In response, global supply chains are becoming shorter and more segmented. Governments are fast-tracking legislation to incentivize local production. Businesses are rearranging supply contracts and manufacturing capacity, turning to "re-shoring," "friend-shoring," and otherwise diversifying their operations. The imperative is a resilient and responsive system that can absorb significant change and uncertainty.

New talent frameworks will be needed to close skills gaps.

Moving to a multidisciplinary skills framework will be needed to help organizations close the skills gap. Research from LinkedIn found that, on average, 25% of the skills required for a specific job changed between 2015 and 2021. At this pace, between 40% of skills could need updating by 2025.⁴⁹

Cross-skilling employees allows them to major and minor in a portfolio of skills, empowering teams to work in a more agile manner. This will be critical as in-demand skills remain scarce.

Building resilience and agility will require partnerships.

In a fractured, fast-shifting world, no single company owns innovation—or will always have all the answers. Success has become less about reinventing the enterprise and more about reinventing the ecosystem.

Collaboration also increases resilience and agility, as partners can help leaders see what's coming down the pike. Recent research from the IBM Institute for Business Value found that roughly half (48%) of global CSCOs report increased design and collaboration with partners to increase flexibility across the supply chain.⁵⁰ Sharing resources and information in real time helps boost performance, in part, by making it easier to manage complexity.

The priorities:

In a time of challenge and change, rethinking legacy practices and embracing a new set of priorities, which encompass agility, predictive technology, and open innovation will drive competitive advantage.

Resilient agility

When the IBM Institute for Business Value surveyed CEOs about their priorities for the next two to three years, aggressively pursuing operational agility and flexibility was cited more than any other action.⁵¹ This requires investment—and bravery—to create entirely new ways of working. Investing in emerging technologies, such as hybrid cloud and AI, can optimize agility, enhance scalability, and accelerate the data-driven insights that help leaders respond to disruption and change.

Predictive technology and simulation

Almost half (47%) of global CSCOs said generating more accurate forecasts is a top priority for the next two to three years.⁵² That means using near-real-time data, analytics, and AI to proactively run their businesses. Virtualization, simulation, and predictive technology can help executives anticipate and respond to change. Generative AI makes building 3D digital twins much faster, and simulation software can help a virtual factory evaluate hundreds of scenarios before acting on any of them.

Open innovation and shared talent

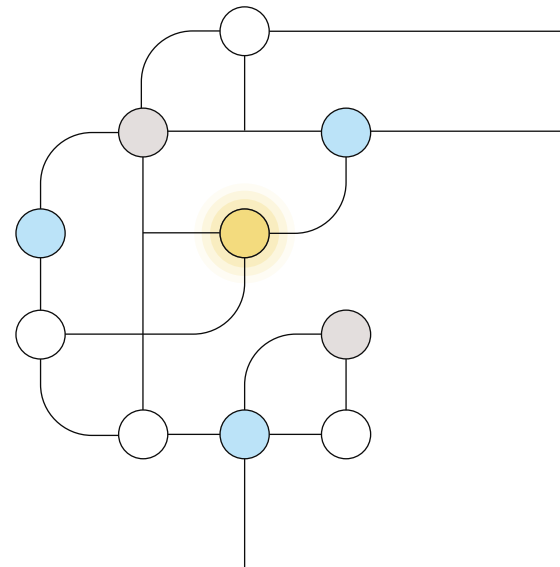
Companies that open the door to closer collaboration can gain a competitive edge. One study from the IBM Institute for Business Value found organizations that focus on “openness” or “ecosystems” in their technology adoption see revenue growth that is 40% higher than their competitors. Success is now based less on enterprise-to-enterprise competition, and more on ecosystem-to-ecosystem engagement: 84% of executives say open innovation is important for their future growth strategy.⁵³

Ecosystem engagement relies on building partnerships that leverage other organizations’ innovation dollars and talent to enhance your own. In fact, IBM Institute for Business Value research found that three out of four CEOs say ecosystem partners are essential for their talent and skills strategy.⁵⁴

The bet:

Simplify, digitize, and partner to build a resilient enterprise

Building the resilient enterprise of tomorrow requires investing in simplicity, automation, access to skills, and a robust ecosystem today. Here are three ways to make your business more resilient.



Eliminate, simplify, and automate the entire organization.

- This is a time for bold change: eliminate non-value-adding tasks. Simplify operating models, and automate management systems across the organization. Shift more costs from fixed to variable.
- Digitize end-to-end workflows. Implement “digital-first” solutions to increase efficiency, engage talent, and develop new skills.
- Break down jobs into collections of tasks, and decide which of those tasks can be aided or automated with AI. Redefine the jobs and reskilling strategy based on the tasks less likely to be automated, and implement AI that reduces people’s low-value transactional burden.

Inner-source, crowdsource, and partner to secure skills and flexibility.

- Adopt open-source collaboration practices inside the enterprise, de-risking and lowering the cost of innovation. Implement skills-sharing platforms to create internal markets for talent to flow to their most productive jobs.
- Leverage digital credentials to find talent with verifiable capability based on demonstrated application of skills, rather than relying on self-assessments or manager endorsements.
- Outsource non-core functions to digitally enabled partners to better navigate the ebbs and flows of the business cycle.

Select key ecosystem partners and double down.

- Evaluate the strength of your partners—and whether they are part of the winning ensemble in this new environment. Invest in the few that will make a difference.
- Strengthen the organization’s ability to manage strategic partnerships for mutual success.
- Increase security at every point in the ecosystem by adopting zero trust security practices.

Case study

IBM and Rapidus bolster the global semiconductor supply chain

Partnerships build resilience in times of disruption. And in the global semiconductor market, disruption is a constant. IBM and Rapidus announced a joint development partnership to advance logic scaling technology as part of Japan's initiative to become a global leader in semiconductor research, development, and manufacturing—and strengthen the global supply chain.

To that end, IBM and Rapidus Corporation, a newly formed advanced logic foundry backed by major Japanese companies, will further develop IBM's breakthrough two-nanometer technology for use by Rapidus at its fabrication plant in Japan.

This work, which will draw from IBM's decades of expertise in semiconductor research and design, is expected to start production in the latter half of the 2020s.

The new agreement will directly support efforts to advance Japan's position as a world leader in the development of emerging technologies—from advanced semiconductors today to future work on quantum computing—as well as IBM's interest in bolstering the global semiconductor supply chain.

IBM will also continue its efforts to boost R&D and the manufacturing of semiconductors in the US, including working with the US government and industry to realize the goals set forward in the CHIPS and Science Act.

Case study

The world's largest soccer event ups its ecosystem game

Speed in world-class soccer is usually defined by great athletes. In technology, it's defined by open innovation.

For IBM Consulting, world-class speed was defined by developing—in less than five months—a technology platform that has supported the fan experience for the more than three billion fans who watched the 2022 series at the world's largest soccer event.

The governing body's goal was to greatly enhance the fan experience with advanced technology—from motion-tracking balls and AI-assisted offside detectors to advanced stadium cooling technology and access for the visually impaired.

To develop solutions and applications for the event, deliver a digital experience for the matches, booking of transportation, and amenities for the fans in five months, IBM and Red Hat partnered with engineering teams in three different countries. This was the ecosystem required to win and deliver a resilient, scalable solution in record time.

The IBM team additionally partnered with a large German engineering company's business and technology team through value-based iterations to help ensure value orchestration and manage all impediments. They've built a mass usage platform with focus on the human experience and integrated it with the mobile app in less than five months. Only through the ecosystem trio consisting of IBM, the engineering company, and the soccer governing body could this collaborative alliance design and create an open, flexible, and secure solution based on real-time data.

Case study

Autostrade per l'Italia drives simplicity with virtualization

MOVYON is a leader in the development and integration of intelligent transport system solutions—and a center of excellence for research and innovation at Autostrade per l'Italia.⁵⁵

Autostrade per l'Italia adopts MOVYON's technology solutions to help manage and maintain its approximately 3,000 km of highways, keeping them safe for drivers. Autostrade per l'Italia also manages more than 1,900 bridges and viaducts, nearly 1,800 overpasses, and 574 tunnels throughout Italy.

MOVYON turned to IBM Consulting to help create a new type of infrastructure management solution that the two companies could offer to other roadway operators.

“Our role was to integrate these technologies and, together with IBM, create something that didn't exist before,” says Lorenzo Rossi, Chief Executive Officer at MOVYON.

The IBM Consulting team worked with MOVYON to design a comprehensive solution enhanced by AI for a smarter approach to infrastructure management.

The platform, known as Argo, communicates in real time with IoT sensors. The solution also includes a simplified building information modeling (BIM) technology model of bridges and viaducts generated from the data available in the Argo solution.

The project also defined a new, digital inspection process for field operators. It enables multi-device access through a mobile app. The app lets technicians view a simplified 3D model of the bridge, comparing it to the structure in front of them and ensuring that they inspect each part.

IBM and MOVYON put the Argo platform into production in just 18 months. It now helps Autostrade per l'Italia monitor, manage, and maintain infrastructure assets, predict failures, and prioritize repairs across the 4,000 bridges, viaducts, and flyovers of the Autostrade per l'Italia network.

The trend:

Skills scarcity and
demographic shifts
are defining the
new social contract



Few executives have figured out the next future of work, how to address the qualified skills shortage, and the best way to keep a talent pipeline filled with engaged, inspired (and inspiring) teams. Additionally, the next generation of both human workers and AI is changing the nature of jobs and the skills required, particularly in creative, service, and administrative jobs, with a magnitude of impact equivalent to what the Third Industrial Revolution meant to manufacturing. A few key factors will define how the talent marketplace evolves.

Skills shortages and generative AI will accelerate the automation of jobs.

The skills shortage will likely continue to strain organizations—even with recession and layoffs. In the US, there are twice as many job openings as unemployed workers to fill them.⁵⁶ In 2021, almost two in three (64%) global IT professionals said talent availability was the largest challenge to emerging technology adoption—up from 14% in 2019.⁵⁷ And experts estimate that G20 countries risk missing out on up to \$11.5 trillion of cumulative gross domestic product (GDP) growth by 2028 if the digital skills gap is not addressed.⁵⁸

Generative AI will continue to change the kinds of specialized skills that will be required. By augmenting human workers with digital workers, enterprises can likely increase productivity. However, the rapid expansion of generative AI is also highlighting the need for humans with new skill sets for roles like prompt engineering and generative artists. With the new types of work AI will create, the digital skills gap will continue to widen if organizations don't actively upskill and reskill the workforce.

Whipsaw effects on talent demands strain every aspect of the talent function.

As volatility shifts the HR function from hiring to reducing staff, skills shortages and economic uncertainty continue to put pressure on finding and attracting top talent. Many organizations are outsourcing talent acquisition to reduce the strain.

The global recruitment process outsourcing market is expected to expand 14% in 2023—and grow by \$7.6 billion between 2023 and 2027. In addition to carrying some of the load, outsourcing agencies can often access talent pools faster and more efficiently than internal teams can do on their own.⁵⁹

Enterprise cultures evolve from employee engagement to purpose and well being.

The three most important factors for today's employees are working conditions (77%), work-life balance and flexibility (76%), and competitive compensation and benefits (75%). They also say they want their work to align with their values. About two-thirds want their organization to promote social responsibility (68%), environmental sustainability (64%), and a culture of diversity and inclusion (61%).⁶⁰

In fact, many of these shifts correlate with the demographic changes in the workforce, which supports the differences identified in data across countries, regions and diversity segments.

The priorities:

At the heart of the new way of working is a social contract that understands and adapts to people's new priorities and the realities of a post-pandemic workplace. Leaders must adopt talent approaches that make employees feel like strategic business partners and enable them with productivity-enhancing technologies.

People-centered workplaces

Employers that care as much about the experience of their diverse, empowered teams as they do about their customers see 32% higher revenues and deliver outcomes twice as fast as other enterprises.⁶¹ Why? Because they make people feel like they're part of something larger than themselves—without asking them to sacrifice their well-being for the privilege.

They use data and AI, along with pulse surveys, to assess engagement and wellness of employees.

People-centered workplaces are hybrid. They also use AI to streamline people processes and provide personalized experiences to their employees. Ladders, a career site for positions that pay \$100,000 or more, reports that 36% of all professional jobs are now remote. Prior to the pandemic, only about 4% of high-paying jobs were available remotely.⁶² Having a clear workforce location strategy that defines which job roles and responsibilities need to be done in person and which can be done remotely also removes unnecessary constraints from the talent search.

"Super-coaching" middle managers

Middle managers serve as the glue connecting leadership to rising talent as the organization navigates constant change. The new middle manager must be a super coach, motivating, developing, and rewarding team members based on their individual wants and needs. With AI automating management tasks, middle managers become more like fleet trainers than an administrator. They need to build cohesive teams in a hybrid work environment, which can often feel fragmented. Given the increasing importance of this role, 65% of CEOs are investing to improve people manager skills today and 72% plan to increase their investment by 2025, according to research from the IBM Institute for Business Value.⁶³

New talent pools and tools

Businesses should look for people with the right skills, rather than the right degrees, to increase their candidate pools. For instance, Salesforce recently awarded \$5 million in grants to help people from underserved communities start successful careers in technology.⁶⁴ And IBM announced the Skills Build program with a commitment to help 30 million people globally.⁶⁵ These reskilling initiatives can help close the talent gap while creating new economic opportunities.

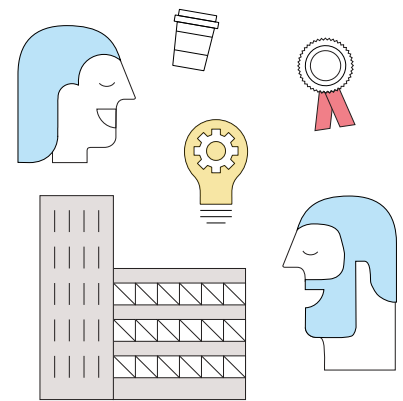
Companies should invest in new AI tools to augment their workforce productivity. For example, text tools like ChatGPT can help a non-artistic person generate prompts that can be used with graphics tools such as Midjourney or DALL-E. Leading companies will use AI guides for their employees for most of their activities.

Companies can also create internal marketplaces to help talent and jobs to find each other—and make the most of the talent they already have.

The bet:

Embrace a new work-life continuum in a tech-enabled workplace

As technology disruption accelerates—and the demand for digital skills skyrockets—leaders need to adapt to a changing workforce. Here are three ways to bring the right people and technology together.



Hire for skills and diversity, not just degrees in traditional labor pools.

- Catalog the skills required for each position, eliminate degree requirements for those where it is not needed, and hire people who can do the job, whether or not they meet traditional education requirements.
- Look to your ecosystem to provide skills the organization doesn't need at scale or that have a high degree of variability.
- Enable inner-sourcing by building a marketplace where those with skills (or the interest in learning them) can be matched with opportunities.

Use AI to transform talent support functions to improve experience and shift fixed to variable costs.

- Outsource employee services and talent acquisition to AI-enabled trusted partners who can operate these functions at scale, reducing the cost, volatility, and risk of these functions.
- Join forces with your ecosystem partners to create larger pools of qualified and diverse candidates with the skills required to sustain growth.
- Build digital skills academies that prioritize collaboration, communication, and empathy as part of the curriculum.

Redefine roles to automate tasks and align with shifting values and demographics.

- Give employees tools and resources to help them manage their lives, as well as their careers. Reevaluate benefits to align with the new workforce demographics.
- Reconcile a sustainable hybrid work model for different jobs, reinstating expectations of physical presence in the workplace, aligned with each role.
- Instrument near real-time views of employee engagement and wellness more frequently throughout the year.

Case study

BuzzFeed uses AI to identify and recruit top talent

BuzzFeed reaches millions of people every day through its fun, engaging, and informative content—and every year, thousands of people apply for jobs in the company.

With application volumes increasing every year, BuzzFeed saw an opportunity to boost the efficiency of its recruitment processes.

“Some of our most sought-after roles attract hundreds of applications per day for several days after we post them—and with such large talent pipelines, pinpointing the top performers is often a tough challenge for our hiring managers,” says Dan Geiger, Former Recruiting Ops Manager and Lead Recruiter at BuzzFeed.

To streamline this process, BuzzFeed is using IBM Watson Candidate Assistant to engage candidates in personalized career discussions and recommend positions that fit them best.

Prospective applicants can type questions about working at BuzzFeed into the chat, and receive real-time answers in the form of text, videos, and links to open positions.

Eighty-seven percent of BuzzFeed applicants coming in through IBM Watson Candidate Assistant move through the process from phone screenings to face-to-face interviews, compared to only 53% of applicants from other sources.

“For us, there’s no better proof of the effectiveness of the pilot than the quality of the candidates that are coming through,” says Geiger. “And so far, the results are extremely encouraging.”

Case study

New-collar workers are the next generation of talent

The global job market is facing a shortage of skilled workers, especially in technical roles. IBM is working with partner organizations to close the skills gap by providing non-traditional education paths to people in traditionally underserved communities.

These new-collar workers can help fill the demand for traditional tech roles such as operations and system administration, as well as emerging roles that require new skills in data science, cloud computing, and artificial intelligence.

IBM Z Academic Initiative System Program offers no-cost access to high performance computing, mainframe hardware, software, courseware, and a network of industry experts to train tomorrow's tech professionals.

In partnership with non-profit Per Scholas, teachers were trained in IBM Z-specific skills, and enabled with specific course materials. The five week intensive program included technical training as well as programs around interpersonal skills to help students adapt to the demands of an enterprise.

Similarly, non-profit LaunchCode partnered with IBM Global Training provider, LearnQuest, to deliver two educational programs. After training, applicants began 180-day paid apprenticeships at a client company, with the potential of a job offer at the end. This allowed the company to hire more than 20 new full-time employees.

Case study

Goodwill builds its elite middle management bench with AI insights

Every day, thousands of people face barriers to finding work and earning a paycheck to support their families. Sometimes it's lack of training or education, limited job skills, or a disability. Goodwill of North Georgia is using IBM solutions to build a highly skilled workforce that can navigate the complexities of helping people find work.⁶⁶

Goodwill catalogs skills and uses skills profiles to define what success looks like for each of its 38 job roles. Using IBM Watson Talent Frameworks, Goodwill can identify skills gaps faster and attract and develop top performers. When a new employee joins, the organization can use prescriptive learning suggestions to shorten their path to productivity.

With deeper insight into skills across the organization, Goodwill is building the strong talent bench it needs to connect more than 20,000 people across Georgia with employment opportunities every year.

"Since we deployed IBM Watson Talent Frameworks, 19 management opportunities have come up—and we were able to fill them all with internal talent," says Thea Parlagreco, Training Manager at Goodwill. "As well as helping us to retain and develop our top talent, recruiting internally helps contain our human resources expense—contributing to a significant reduction in our operational costs."

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