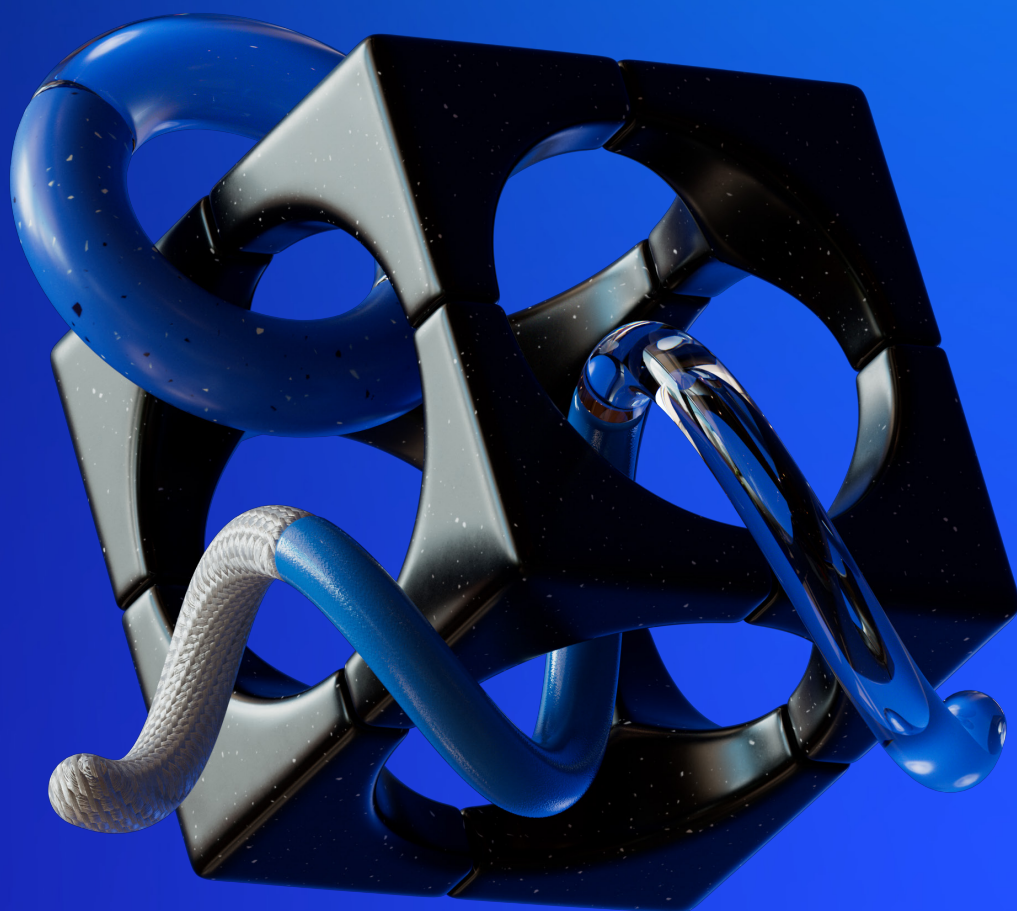


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Rewiring For Productivity – Tech Enabled Operational Excellence

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Operations Practice

Breaking operational barriers to peak productivity

Our latest research examines how a new take on operational excellence can help rekindle productivity—and reveals five practices that matter in jump-starting performance.

by *Erik Schaefer, Joris Wijkema, and Richard Sellschop*



The world needs more productivity growth. As a [recent McKinsey Global Institute report](#) argues, it's the best possible antidote to wealth inequality, inflation, and exploding debt and could provide crucial funding for the net-zero transition and improved living standards.

It's also what every company needs. Yet productivity growth has largely declined since the global financial crisis of 2007–09, particularly in the most advanced economies (Exhibit 1).

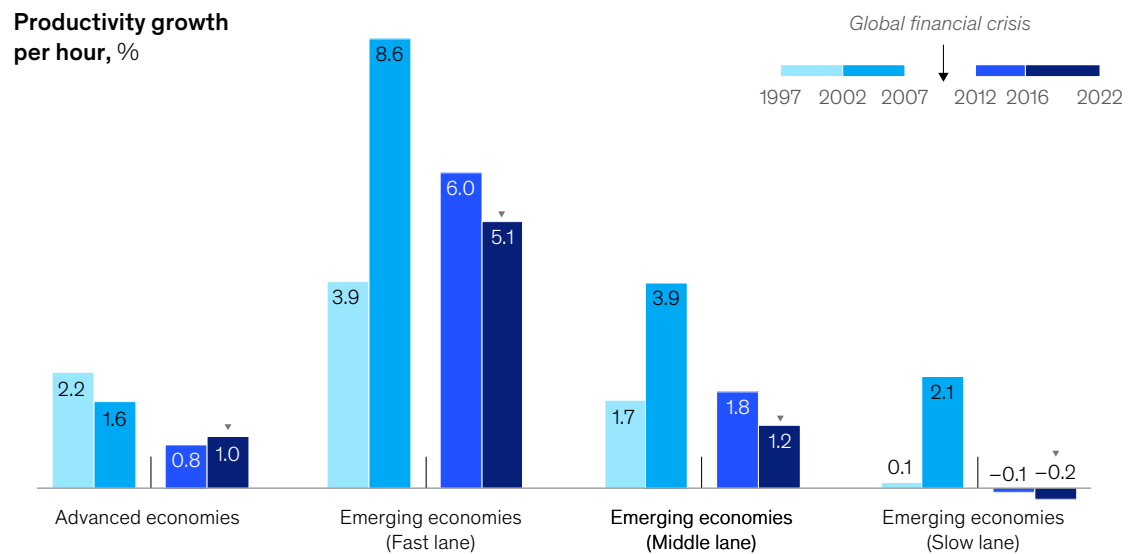
The macro causes of declining productivity growth are visible in everyday life. First, the dramatic benefits of technological change—such as Moore's law, the doubling of transistors on a chip every two years—have faded, with improvements becoming

more incremental. Second, investments in restructuring and offshoring also reached a point of declining returns.

Our latest research (see sidebar “Our methodology”) suggests that there are also micro causes of declining productivity growth, which are harder to see until the observer reaches the operating level of a factory or call center. The loss of operational discipline in the wake of the repeated shocks of the past five years led to high levels of attrition and job churn. Practices that had been painstakingly refined, codified, and passed down from worker to worker—often over decades—were set aside during the initial COVID-19 emergency. The [subsequent loss of critical talent](#) (Exhibit 2) meant that the chains of knowledge stayed broken.

Exhibit 1

Productivity growth has slowed across almost all economies since the global financial crisis.



Note: 2022 international dollars (purchasing power parity), weighted average per group; n = 125 economies, excluding DR Congo, Iraq, Syria, Venezuela, Taiwan, and Yemen.
 Source: Output, Labor, and Labor Productivity data set, Total Economy Database, Conference Board; McKinsey Global Institute analysis

Our methodology

This article synthesizes findings from two surveys, both launched in 2023, that explored how closely organizations adhere to practices that contribute to operational excellence.

The first survey, the Next-Generation Operational Excellence Survey (NGOES), comprised 1,000 employees representing hundreds of organizations. Half of the respondents were senior leaders, defined as C-suite executives and their direct reports, and half were either frontline workers or middle managers. Slightly more than half (52 percent) of the

respondents worked in the manufacturing sector, with the remainder working in services, including the government and social sectors. At the individual level, 29 percent of respondents said their roles were in manufacturing, while 71 percent were in services, such as procurement or HR staff, working for a manufacturer. Geographically, 35 percent of respondents were in North America, 30 percent in Europe, 20 percent in Asia-Pacific, and 15 percent in Latin America.

The second survey, the Operational Excellence Survey (OES), comprises a

somewhat larger number of respondents, 1,225, at just 15 organizations—12 in North America and three in Latin America. About 21 percent of the respondents were senior leaders, and 79 percent were frontline workers or middle managers.

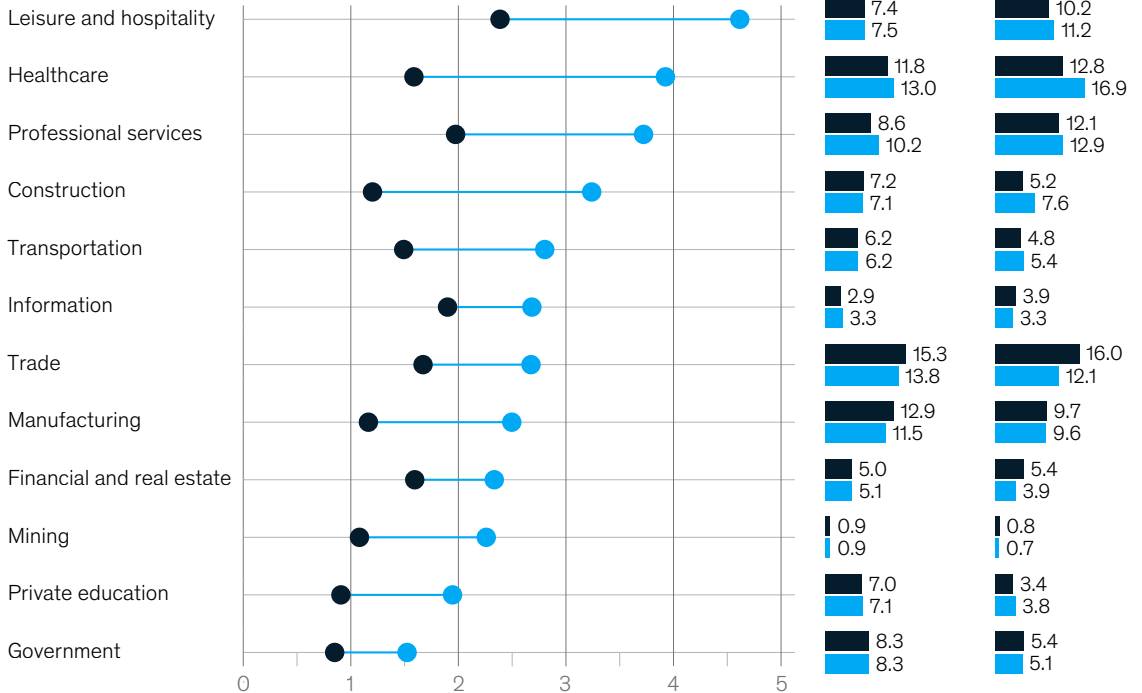
The NGOES research allows for a broad view of the current state of operational excellence across many organizations, while the OES research—still ongoing—allows for a more detailed perspective, reflecting multiple responses at a single organization.

Exhibit 2

Across advanced economies, all sectors have higher job vacancy rates today than in 2010.

Job vacancy rate by sector, average,¹ %

2010 ● — 2023 ●



Note: Full-year 2023 data for all 7 countries, except Germany, for which employment and vacancy data go to Q3 2023.

¹Australia, Canada, France, Germany, Italy, the United Kingdom, and the United States.

Source: Australian Bureau of Statistics; Eurostat; Statistics Canada; UK Office for National Statistics; US Bureau of Labor Statistics; McKinsey Global Institute analysis

These challenges arise at the same time that new technologies—whether advances in automation and analytics under the Fourth Industrial Revolution (4IR) or, most recently, [generative AI](#) (gen AI)—show great promise as a means to increase productivity.

The risk, of course, is that the high initial impact from such technologies proves difficult to sustain in the absence of a broader commitment to operational excellence. Most leaders know what the required operational excellence looks like: five elements that together enable organizations to operate at the highest level (see sidebar “What is operational excellence?”). Achieving it, however, has never been easy: the new research points to specific challenges to implementing each of the five elements.

The better news is that the data also point to practical actions companies can take that can not only get them back on track but also help them make the most of the digital world. Companies that reach this standard of performance record transformative outcomes not only in the short term—increasing customer satisfaction by ten percentage points, reducing CO₂ emissions by 20 percent, improving employee retention by 25 percent—but also continue to improve year after year. That’s where lasting productivity gains come from.

They’re available to any organization that’s willing to examine its current practices in depth, understand where improvement is needed, and commit to change.

What’s blocking operational excellence

Over the past few years, three primary vectors of operational improvement have promised to raise productivity, but companies have often struggled to take full advantage of the potential:

- The [technologies collectively referred to as 4IR \(or Industry 4.0\)](#) can improve performance across an entire value chain. But McKinsey research indicates that [only 30 percent of organizations successfully scale and sustain digital improvement](#).

What is operational excellence?

More than two decades of McKinsey research has found that high-performing organizations execute well on [five elements that collectively define operational excellence](#):

- crafting a *purpose and strategy* that is clear to the entire organization
- articulating a set of *behaviors and principles* that put the strategy and purpose into effect
- building a *management system* that reinforces the behaviors and principles through a holistic set of processes
- refining the *technical systems* associated with value delivery to eliminate waste
- applying *technology* to augment human capabilities, rather than simply replacing humans with machines

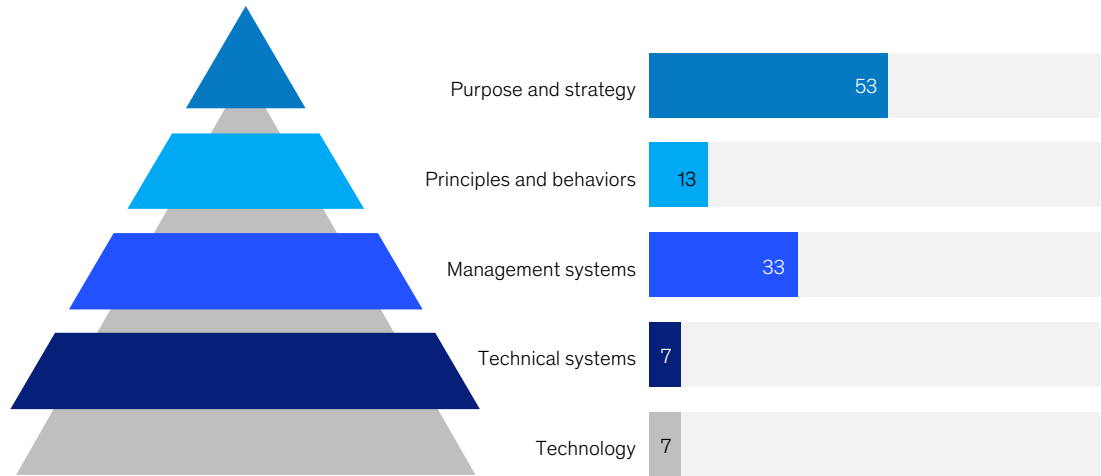
- In 2023, research from McKinsey Digital estimated that [gen AI could add \\$2.6 trillion to \\$4.4 trillion to the global economy](#). But by 2024, [only about 5 percent of organizations said they could attribute at least 5 percent of their EBIT to gen AI](#).

- Core operational excellence practices have a proven track record of creating significant improvement across variables ranging from cost reduction to employee retention—with the effects increasing over time. But data from the Operational Excellence Survey (OES) indicate that few organizations perform well across all five elements (Exhibit 3). Those that do are far more likely to sustain impact from 4IR and gen AI: [operational excellence increases the value that technologies can generate](#).

Exhibit 3

Few organizations excel across all elements of operational excellence.

Practices aligned with operational element,¹ %



¹“Aligned with element” reflects responses of “agree” or “strongly agree” to questions about whether respondents’ organization engages in practices that support the element. “Not aligned with element” reflects responses of “somewhat agree,” “neither agree/disagree,” “somewhat disagree,” “disagree,” or “strongly disagree.”
Source: Based on 15 organizations’ responses to an Operational Excellence Survey, Jan 9, 2023–Feb 16, 2024; n = 1,225.

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The results of the OES research and the Next-Generation Operational Excellence Survey (NGOES) showed that for each element, critical barriers are keeping companies from achieving and sustaining operational excellence. The research also revealed differences among regions, particularly in Asia and Latin America, that could merit additional attention from companies operating in those locations (see sidebar “Regional variations”).

A clear purpose and strategy aren’t enough

McKinsey research from 2021 on attrition and attraction trends found that purpose is essential to employees throughout the organization, with [70 percent of surveyed employees saying that their individual purpose is defined by their work](#). It also correlates with performance: a 2019 study

by academics at Columbia, Harvard, and Wharton found that clarity of purpose increases companies’ returns on assets by 3.8 percent.¹

Our findings on corporate purpose are at least somewhat encouraging: in both surveys, respondents said that purpose and strategy were the strongest of the five operational excellence elements at their organization. But only half of the OES participants say their organization’s purpose and strategy were reasonably clear and aligned with their own day-to-day work—a figure that fell to 40 percent for NGOES respondents. Moreover, according to our survey analysis, only 7 percent of organizations excelled in all elements of operational excellence, which suggests real limits to the impact of even a well-understood purpose and strategy.

¹ Claudine Gartenberg, Andrea Prat, and George Serafeim, “Corporate purpose and financial performance,” *Organization Science*, 2019, 30 Volume, Number 1.

Regional variations

The Next-Generation Operational Excellence Survey’s broad sample revealed region-specific differences in responses from Asia–Pacific and Latin America (exhibit). In Asia–Pacific, respondents across all tenure levels reported lower levels of adoption of

operational excellence practices, on average. That finding may give companies operating in the region even more reason to assess their operations’ practices to gauge potential for improvement.

By contrast, responses from Latin America reflected unusually high

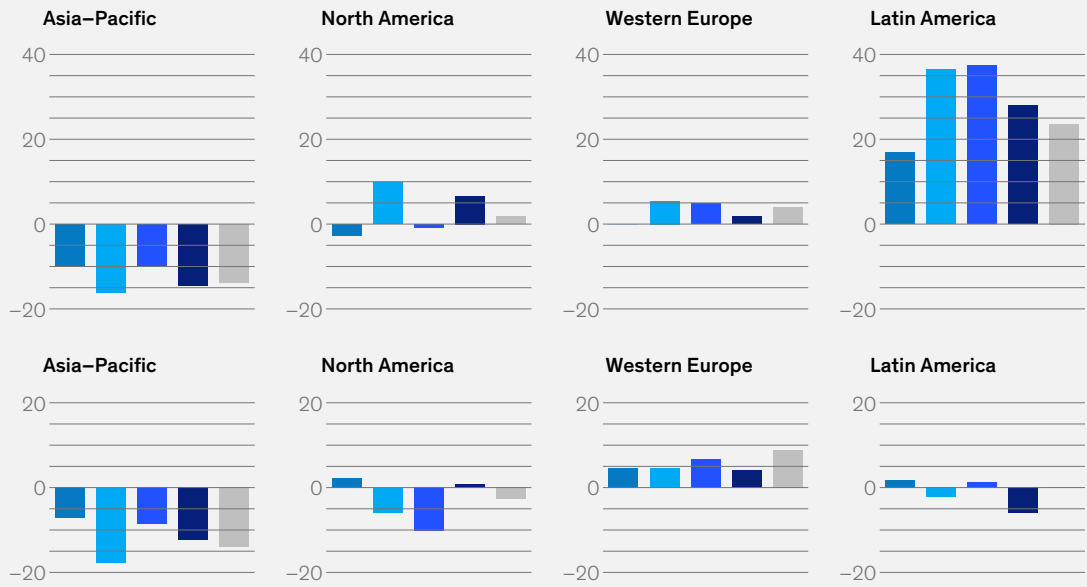
optimism about operational excellence—particularly among frontline workers and middle managers. Most recently, [Latin American companies have achieved recognition for operational excellence, such as through the Shingo Prize.](#)

Exhibit

Survey responses show regional differences in adherence to operational-excellence practices.

Organizational adherence to practices by region,¹% deviation from mean

▲ Purpose and strategy ▲ Principles and behaviors ▲ Management systems ▲ Technical systems ▲ Technology



¹Deviation from mean of respondents answering "strongly agree" to questions about their organization's operational-excellence practices, analyzed by region; 95% confidence interval. Source: Next-Generation Operational Excellence Survey, Dec 8, 2023–Jan 15, 2024, n = 1,000

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Behavior challenges: Providing recognition and feedback

The second element of next-generation operational excellence, principles and behaviors, translates purpose and strategy into everyday norms that define culture. Here, the most striking finding from the two surveys concerned gaps in one of the most

basic elements of a culture: ensuring that good work is recognized and that all work gets feedback.

Regular, development-oriented feedback boosts employee engagement; one recent study found that 80 percent of employees who had received meaningful feedback in the previous week were

engaged.² That is more than triple the global employee engagement rate of 23 percent.³ Yet less than one-quarter of respondents to our two surveys said that their organizations expected leaders to provide development-oriented feedback—and only about 11 to 13 percent said that their leaders actually gave the type of continual feedback that helps employees grow.

Similarly, only one-fifth of respondents said their organizations systematically recognized employees for achievements, either individually or as teams.

A sputtering innovation engine

Management systems, the third element, refers to structures and processes that reinforce behaviors, develop leaders, and strengthen capabilities over time through a [continuous cycle of improvement](#). Organizations that apply rapid experimentation and continuous improvement best practices can

increase productivity by 25 percent or more, largely thanks to innovation.

Both operations surveys found gaps in practices that enable employees to continually improve a company’s operations. Few organizations consistently follow baseline practices, such as conducting frequent check-ins with employees to see how work is going—serving as an early-warning system for problems and opportunities for new approaches. Only 21 percent conduct check-ins on at least a weekly basis.

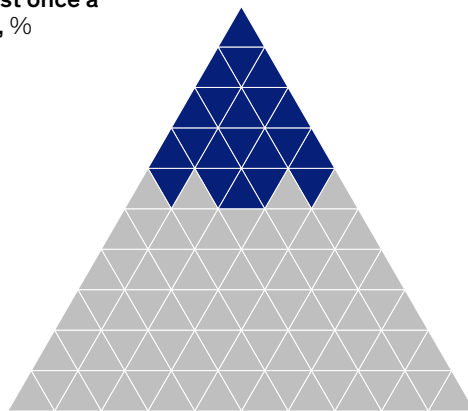
When those check-ins do occur, they tend to be superficial. Almost half of check-ins cover only one or two performance dimensions, such as output, overall equipment effectiveness, or on-time percentage—decreasing the odds of finding and correcting issues before they grow (Exhibit 4).

Exhibit 4

Employees report that they lack necessary building blocks for continuous improvement.

Share of employees who have check-ins at least once a week, %

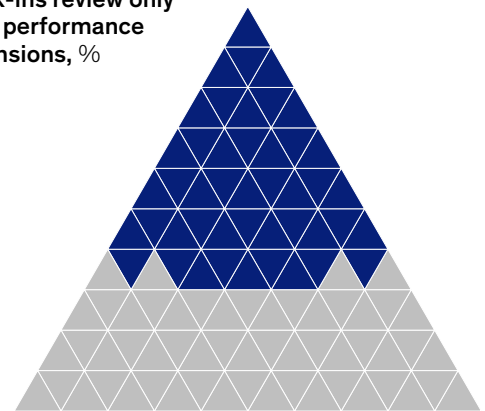
21



Best practice is to check in at least once a week

Share of employees whose weekly check-ins review only 1 or 2 performance dimensions, %

45



Best practice is to holistically review work along 3–4 performance dimensions

Source: Next-Generation Operational Excellence Survey, Dec 8, 2023–Jan 15, 2024; n = 1,000

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² Jim Harter, “A great manager’s most important habit,” Gallup, May 30, 2023.

³ “Indicators: Employee engagement,” Gallup, 2023.

According to respondents, less than half of organizations actively involve employees in developing operational improvements.

Overlooking the basics in visual tools

Technical systems form the core value-generation infrastructure in a business operation. Some technical systems, such as assembly lines in manufacturing, are technology-intensive. But others are not: a problem resolution process in customer service may depend mainly on human interaction. Regardless of the environment, however, the goal is maximizing value creation while minimizing waste.

Effective resource planning using visual tools can improve both resource allocation and execution efficiency. Yet one of the most basic supporting elements of effective management—the use of visual tools that ensure performance transparency, such as digital whiteboards to track core performance metrics—shows surprisingly low adherence among survey respondents. At best, only about one-quarter of respondents used visual tools to support essential tasks such as workload balancing and resource prioritization, with almost no respondents saying that their organization used the tools well.

Technology: Digital needs analog investment

The final element, underpinning all the others, is technology. Most respondents showed frustration with their organization's technology capabilities, with 93 percent expressing concern about how current technology translates to performance, and almost three-quarters saying their organizations lacked defined processes for building business cases for new digital tools.

At the same time, respondents also suggested that priorities other than technology would make more difference to future performance (Exhibit 5).

Respondents identified increasing frequency of development-oriented feedback and transparency of performance management as the two top performance improvement factors. In both,

technology plays at most a secondary role; what matters more is the human willingness to view performance discussions as an opportunity to learn, rather than a danger to be avoided.

Invest more in what matters most

Although the two surveys differ in methodology, several of their strongest findings were strikingly similar, with practical implications for how companies achieve and sustain operational excellence. Most important, the research found that companies are underinvesting in some of the practices that matter most for performance improvement (Exhibit 6):

- **Recognize achievements.** It's easy enough to set up an "employee of the month" program or hand out engraved paperweights for milestone anniversaries. A North American medtech company did much more, designing its recognition program to reinforce a wide range of operational excellence practices and outcomes. Some awards focus on individual achievements in areas such as quality or regulatory compliance; others recognize major group efforts to improve operations strategy or customer service. Regularly updated to reflect current priorities, the program is also integrated with the company's performance management and capability-building programs so that recognition translates into promotion opportunities and new career pathways.
- **Clarify the relation between work and purpose.** At the medtech company, a disciplined internal communications program continually reinforces the connection between people's work and the company's purpose: improving human health. The company brings patients to production sites so that employees can hear how the products they make and the services they support change people's lives. For a chemical manufacturer, the connection is to agriculture: employees understand how their products improve food production, relieve price pressures, and reduce water consumption.

Exhibit 5

The management practices that employees identify as most important for operational performance rely more on humans than technology.

Practices respondents were asked to rank in survey,¹ % rating practice as most important

▲ Purpose and strategy	Helping employees better understand the relationship between their work and the company's purpose	12	100
	Improving the company's understanding of what customers value	11	
▲ Principles and behaviors	Increasing the frequency of high-quality, development-oriented feedback provided by leaders	33	
	Increasing recognition of frontline individuals' or teams' achievements	8	
	Increasing recognition when employees try new ideas or solutions	7	
	Increasing frequency of senior executives' visits to work sites	5	
▲ Management systems	Increasing frequency of senior executives' visits to work sites	5	
▲ Technical systems	Making performance measurement more transparent and visible (eg, through greater use of visual planning or tracking tools)	17	
▲ Technology	Building or acquiring digital and analytics tools to assist employees' work	7	

Source: Next-Generation Operational Excellence Survey, Dec 8, 2023–Jan 15, 2024; n = 1,000

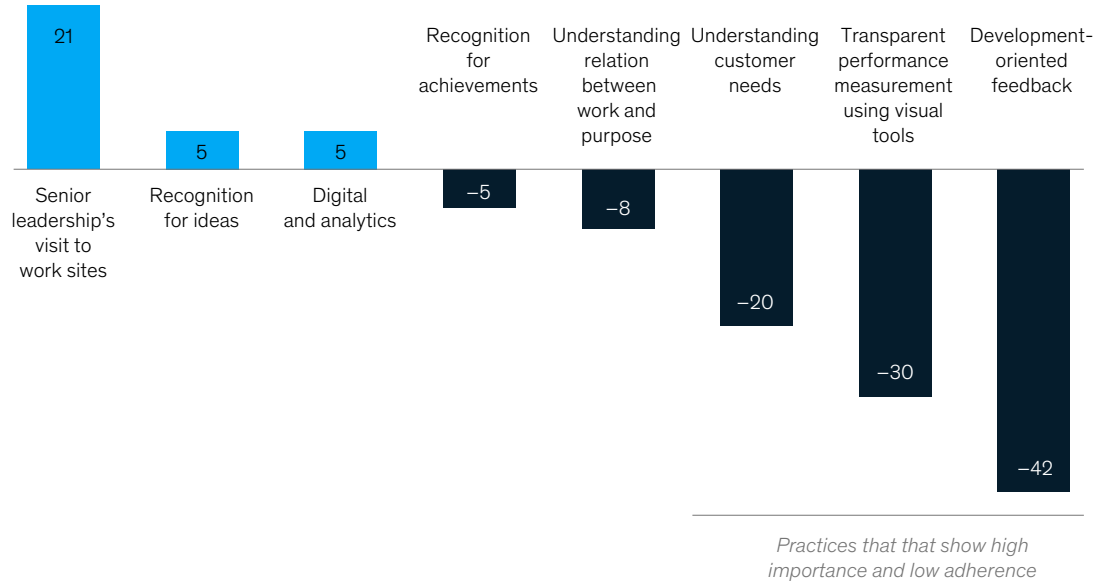
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The research found that companies are underinvesting in some of the practices that matter most for performance improvement.

Exhibit 6

Practices cited as most important for performance show low adoption levels.

Organizational adherence to practices,¹ percentage-point difference



¹Difference between percentage of respondents ranking practice among top three for organizational performance and those saying their organizations adhered to practice. Includes only those practices listed in the survey question, "Which of the following improvements would have the greatest effect on your company's operational performance?"
²Out of a total of 17 practices included in the survey, the only one with an adherence level higher than 40% was "understanding of purpose," at 58%.
 Source: Next-Generation Operational Excellence Survey, Dec 8, 2023–Jan 15, 2024; n = 1,000

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- **Understand customer needs.** At many companies, employees who aren't directly customer-facing may have only a limited understanding of what customers want. The chemical company instead made substantial investments in sending production superintendents overseas to visit agricultural customers. The experience proved eye-opening. Customers showed how impurities and other imbalances in products affected crop production and increased environmental waste. After seeing these effects in person, the superintendents returned to launch major new efforts to reduce deviations from quality standards. At a European telco, employees knew customers were dissatisfied with broadband installation, but not in sufficient detail to identify the right problems to solve. Only by bringing a single, cross-functional team together could the underlying customer needs be identified—and fulfilled.
- **Use visual tools to create transparency about performance.** Although companies have known how effective visual performance management can be—whiteboards showing work status have been around for decades—our surveys indicate that only exceptional organizations maintain the required discipline over time. The medtech company, for example, built a real-time, global platform that shares its major performance metrics throughout the company. Advanced companies, including a Latin American basic-materials company,

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are sharing the metrics via mobile phones so that anyone can look up performance data wherever they happen to be.

- *Double down on development-oriented feedback.* The largest gap our surveys found was in providing development-oriented feedback. The basic-materials company had long followed a very typical top-down management culture in which feedback came only rarely—for many people, only in annual reviews—and with little view to helping employees learn and grow. Part of its transformation centered on teaching managers how to provide better feedback so that people could make improvements and better understand potential career paths.

Together, these sorts of investments can yield major results. The medtech company, for example, has seen its stock price more than double in five years compared with its sector index. The basic-materials company has reduced its costs by 20 percent over three years, as output rose by more than 50 percent.

Senior executives at the companies that have made the most progress toward operational excellence often say that one of the hardest steps is simply to get started. That's especially true for organizations that see themselves as performing well. A *willingness to look at an operation objectively*, with an openness to the possibility of achieving much more, is a prerequisite.

The second step is to *set a bold ambition*. The basic-materials company focused on its best-performing location, where some managers thought that only a few percentage points of improvement would be feasible. Instead, production has risen by more than 25 percent, despite erosion in the quality of raw materials.

The third step is to *commit across an entire organization*. Operational excellence isn't something that can be sustained with only one department or business unit executing the elements needed to succeed. Instead, it requires the whole organization's involvement so that entire processes can be reimagined from supplier through customer.

A few companies are on the path now. Will yours join?

Erik Schaefer is a partner in McKinsey's Toronto office, **Joris Wijkema** is a partner in the Chicago office, and **Richard Sellschop** is a senior partner in the Connecticut office.

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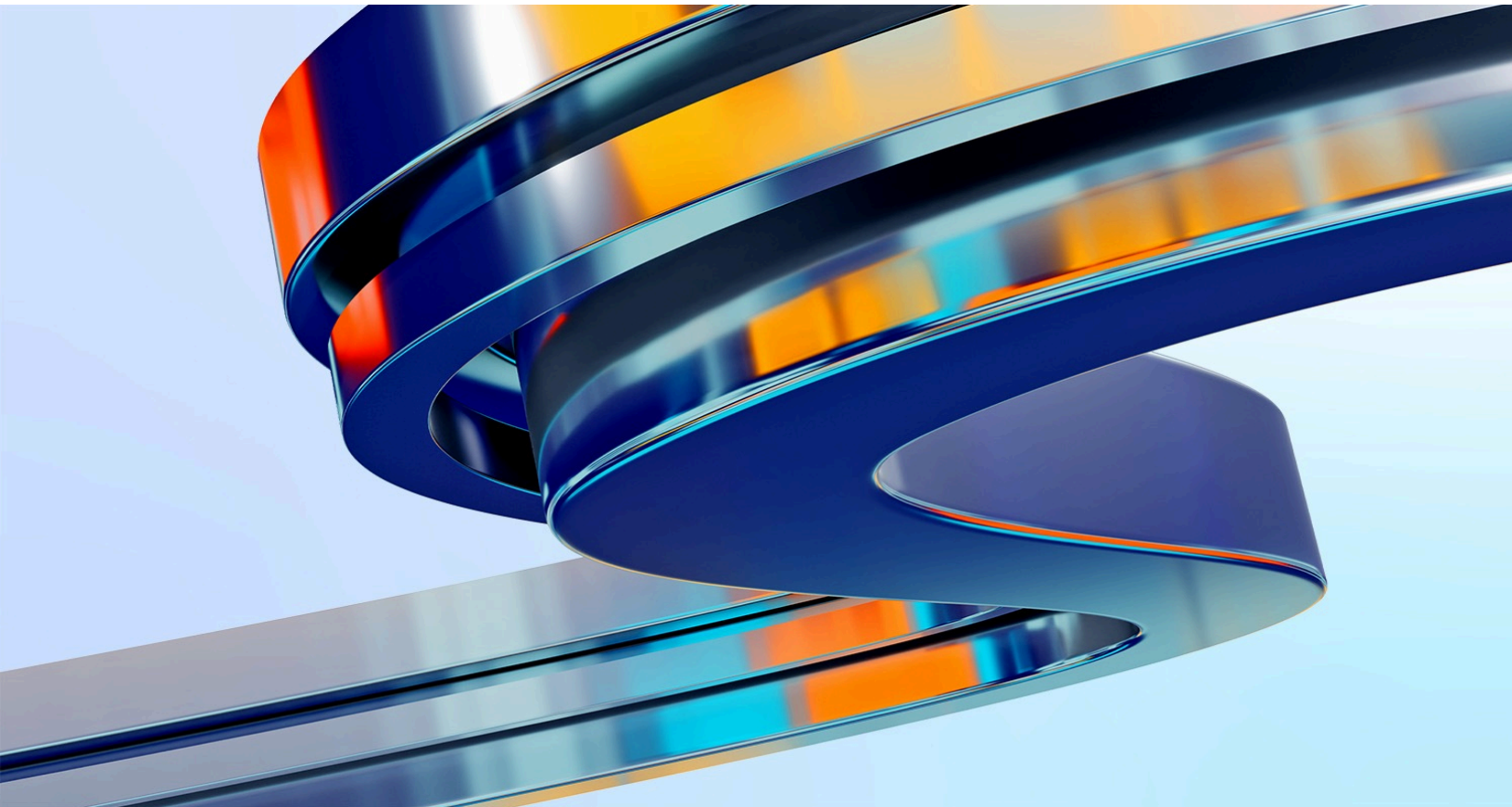
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Operations Practice

Today's good to great: Next-generation operational excellence

Is tech accelerating your business operations—or getting in the way? To get lasting value from their tech investments, business leaders need a renewed understanding of operational excellence.

This article is a collaborative effort by Ian Colotla, William Fookes, Ted Iverson, Erik Schaefer, Richard Sellschop, and Joris Wijpkema, representing views from McKinsey's Operations Practice.



Any business that's still standing after years of disruption has good reason to feel a sense of achievement. Only by learning, adapting, and getting really good at things that didn't exist five years ago—such as the [collaboration technologies and hybrid workplaces](#) that have spread almost everywhere—could a company survive.

There's no stopping now. Not with macroeconomic pressures rising and climate commitments coming due for everything from the energy transition to reducing emissions across the end-to-end supply chain.

But what will it take to get ahead? Companies are jumping into new opportunities: by mid-2023, [one-third of global survey respondents](#) reported that their organizations were using generative AI (gen AI) regularly in at least one business function—and 40 percent said that gen AI advances were prodding their organizations to increase overall AI investment. At the same time, the industrial robotics industry is projected to grow by more than 10 percent annually through 2030.

Whether that investment will pay off, however, is far from clear. So far in this millennium, many of the technological innovations leaders thought would accelerate productivity have instead barely touched it. This is in sharp contrast to 20th-century breakthroughs such as the moving assembly line, the shipping container, or just-in-time lean production (Exhibit 1).

But a few companies, in both the manufacturing and service sectors, are sailing past these obstacles. They're achieving major gains year after year not just in productivity but also in metrics ranging from time-to-market to customer satisfaction and employee engagement.

What these organizations have in common is a renewed and expanded understanding of operational excellence. They aren't simply grafting technology onto existing operations. Instead, they recognize that technology has changed fundamental assumptions about what operations can (and should) achieve—in much the same way that lean management and agile operating models challenged how leaders thought about waste, variability, and flexibility.

Crucially, the high performers routinely review and reimagine how their business generates value, reexamining all five elements of operational excellence (Exhibit 2):

- crafting a *purpose and strategy* that are clear to the entire organization
- articulating a set of *behaviors and principles* that put the strategy and purpose into effect
- building a *management system* that reinforces the behaviors and principles through a holistic set of processes
- refining the *technical systems* associated with value delivery to eliminate waste
- applying *technology* to augment human capabilities, rather than simply replace humans with machines

This approach can turn a challenged organization into a competitor, or a strong performer into a benchmark-setter. It's how a mining company boosted output at its “fully optimized” facility by 25 percent in year one—and an additional 15 percentage points in year two and a further eight percentage points in year three—even as

capital and labor costs remained flat. It's how a financial institution reduced the cost of poor-quality outcomes by 30 percent and rework by 60 percent, while reversing pandemic-era troughs in customer and employee satisfaction.

Real operational excellence takes effort. But the results pay off.

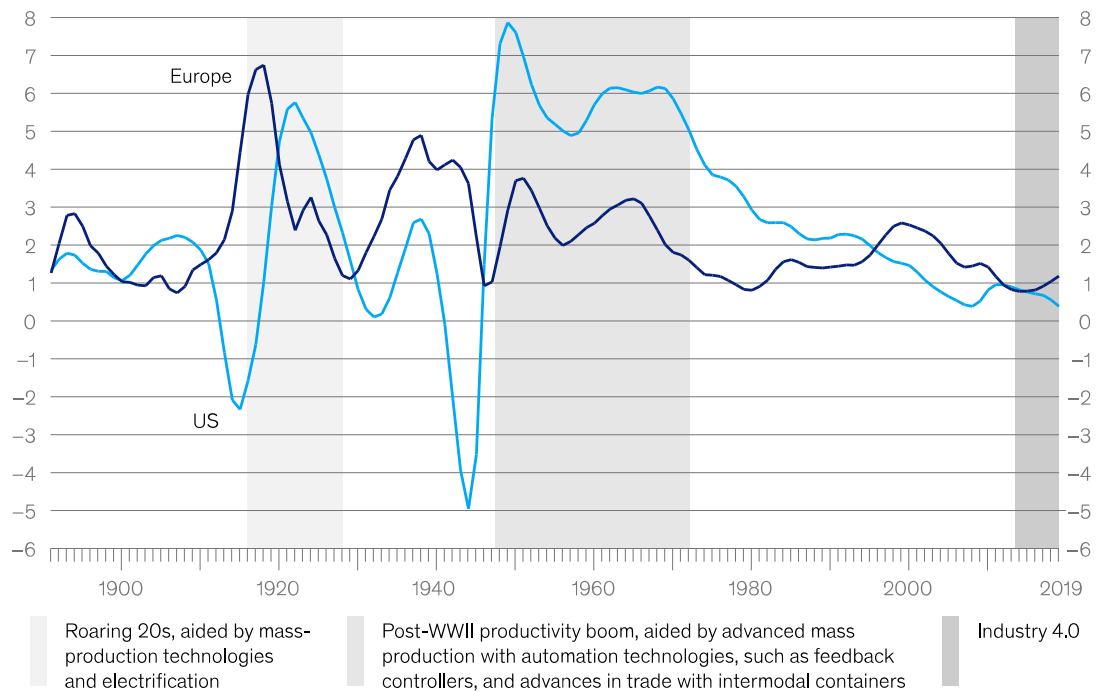
Productivity and excellence depend on people

The payoff that matters is sustained, higher productivity to fuel innovation and growth. That's true for a company and even more so across an entire economy. The McKinsey Global Institute estimates that for the United States alone,

Exhibit 1

So far, Industry 4.0 has failed to deliver strong, economy-wide productivity growth in Europe and the United States.

Trend line of labor-productivity¹ growth for total European and US economies, %



¹Productivity defined as GDP per hour worked, US 2010 purchasing-power parity. Calculated using Hodrick-Prescott filter.
Source: Antonin Bergeaud, Gilbert Cette, and Rémy Lecat, "Productivity trends in advanced countries between 1890 and 2012," *Review of Income and Wealth*, March 2015, Volume 62, Number 3; McKinsey analysis

[the difference between high and low productivity growth would amount to nearly \\$50 trillion in wealth by 2030.](#)

Technology has been a tempting productivity shortcut for companies trying to find value from the latest innovations. [Survey data show widespread disappointment at the returns from technology transformation](#), however, with most organizations achieving less than one-third of the impact they expected.

Even when technology efforts achieve good initial results, the success isn't likely to last long. [A 2022 survey on implementing transformations](#) found that only 12 percent of transformation programs (across all types of transformation) sustained their performance gains for more than three years.

What's missing from these change efforts, according to survey findings from [2010](#), [2015](#), [2017](#), and [2021](#), is a focus on the people side of productivity, performance, and technology. The elements of operational excellence fill that gap, acknowledging that solving a problem that appears to be technological—whether reengineering a factory or optimizing a generative AI prompt—usually requires a human touch.

An opportunity in operational excellence

While many are falling short, some are getting operations right—and reaping disproportionate rewards, as illustrated by examples from a multinational mining company, a North American financial institution, and a natural-resources

Exhibit 2

Operational excellence consists of five core elements.

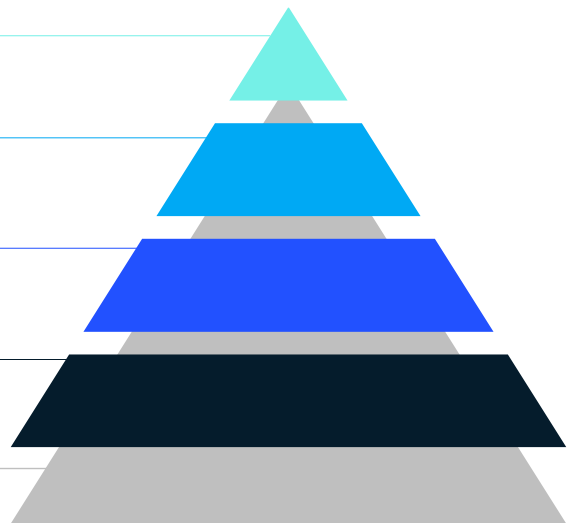
Purpose that defines why the organization exists, creating a common cause, with a **strategy** to achieve it

Principles and **behaviors** to achieve the strategic vision and establish a culture of trust, respect, and constant innovation

Management systems in place that develop leaders, build competency, and drive desired behaviors

Technical systems that eliminate waste and deliver value to stakeholders

Technology that augments human capabilities to continuously improve



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conglomerate. All three started from positions of strength: high-performing and innovative, with fewer problems concerning legacy systems or brownfield sites than their peers. None was facing a crisis, only a sense that if they could get more out of their technology investments, they could pull even further ahead in their respective industries.

Sustained productivity and cost improvement. At the mining company, the most tangible improvements were direct productivity increases from tech optimization. Executives had estimated that its top-performing, most technologically advanced location could increase output only by about 7 percent, but within one year, output increased 25 percent despite no additional capital investment by the company. Two years later, output was nearly 40 percent higher than the starting point, still with minimal investment but with technology now yielding far greater impact. And at the financial institution, costs fell by more than 11 percent thanks in part to a 25 percent reduction in quality issues, together with judicious deployment of technologies that helped employees notice performance issues and make corrections in real time.

Improved organizational health. The natural-resource conglomerate's operational-excellence transformation started with a single division, whose [organizational-health](#) scores rose by 11 percentage points above the rest of the organization. At the financial institution, employee turnover has fallen by about 15 percent. Both companies reported more success in finding latent talent in their organization: "People who said they never saw themselves as manager material are now running whole departments. That fills crucial gaps that we had a tough time filling through external recruitment—and it helps boost our employee satisfaction scores."

Stronger resilience. The mining company credits its operational-excellence practices for its survival during the COVID-19 pandemic, giving its managers the flexibility they needed to respond to severe limits on transportation and staffing. Quick deployment of technology meant that managers who couldn't legally be on-site could nevertheless conduct in-depth examinations of local processes to find new improvement opportunities.

Achieving operational excellence

McKinsey's assessment of operational excellence, the Operational Excellence Index (OEI) (see sidebar, "Measuring operational excellence"), evaluates organizations on their level of adherence to more than three dozen management practices. Few start out scoring well. But the exceptions, such as the companies documented here, show that it is possible for organizations to sustain performance improvement. An analysis of organizations that have repeated the OEI assessment over the course of a transformation finds a crucial inflection point: once an organization sustains a score of at least 40 (on a 100-point scale) for 18 months, it is much more likely to retain a score of at least 40 even after an assessment gap of several years. In short, by adhering to OEI practices for 18 months—even if its adherence isn't perfect—an organization is substantially more likely than its peers to sustain improved performance.

What it takes is leaders who continually monitor all five operational-excellence elements as the operating context evolves and have the courage to make changes wherever needed. That doesn't mean tackling all five elements to the same degree at the same time. Instead, it requires an openness to addressing all five to solve the root causes of a problem that might initially appear much narrower.

Measuring operational excellence

Drawing on more than 1,200 assessments of transformation efforts across more than 70 organizations, McKinsey's Operational Excellence Index (OEI) provides a benchmark for establishing operational performance baselines and measuring improvement over time.

The OEI's aspirational maximum score is 100, with a score below 30 reflecting a basic level of operational excellence and a score above 55 being among the best

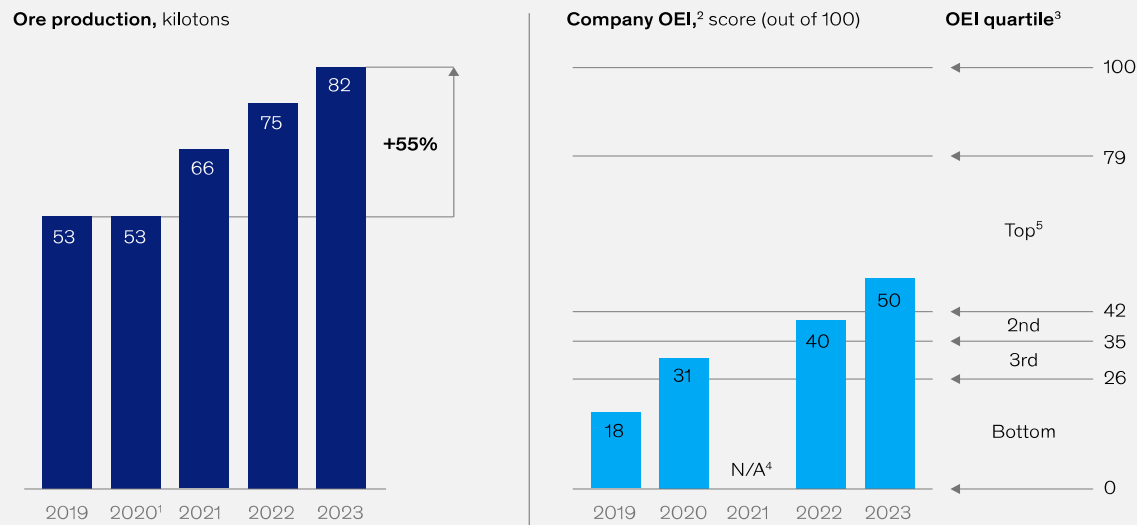
operational-excellence organizations in the world. On first assessment, most organizations score below 30, often despite having completed an operational-excellence program that followed lean or Six Sigma principles; the example mining company's initial score was 18 (exhibit). Organizations that score below 30 are more likely to report dissatisfaction with their technology investments.

The select few companies that score at 55 or above are living best practices every day, making it much more likely for their people to find fruitful ground for application of technology.

Exhibit 3

The right operational-excellence mindsets and management practices can yield record-breaking performance.

Mining company example of operational-excellence improvement over time



¹Same production values in 2019 and 2020 because of effects of COVID-19 pandemic. ²Operational excellence index. ³Across all companies and industries, 2012–23. ⁴OEI not measured in 2021. ⁵79 is maximum score achieved.

Renewing corporate purpose and strategy

The first element for achieving operational excellence—and the most important for sustaining improvement, year after year and decade after decade—involves reexamining how well [the company's purpose](#) meets current reality. Do the company's operations today reflect its unique reason for being and how it says it wants to contribute to society? Do they align with its strategy? Most important, are they understood by the whole organization? At the most effective organizations, the leadership team finds ways [to translate the corporate purpose into employees' day-to-day work](#), from the front line on up. Only then does purpose truly activate the whole organization to deliver on its goals.

In assessing the mining company's improvement potential, leaders recognized that the previously defined purpose, which emphasized performance excellence, no longer engaged the entire organization. The management team therefore gathered representatives from throughout the company, from the front line to the executive office, in an effort to understand how the purpose could evolve.

Only by taking the time and effort to incorporate hundreds of ideas from thousands of conversations could the leaders feel confident that they had arrived at a genuine consensus on purpose that would inspire everyone. The new purpose reached beyond the company to embrace societal impact, with employees understanding that the minerals they extract go into mobile devices that their children use for school and into cars that reduce carbon emissions.

That purpose now informs every aspect of how the company works, including how it measures success, shapes strategic choices, and thinks about technology: not as a tool for making current

operations more efficient but as an opening for new levels of aspiration.

Recommitting to principles and behaviors

In most companies, it's not just internal functions that are siloed but sites as well. Each has its own culture, principles, behaviors—and performance, often with stark differences between high- and low-performing locations. Operationally excellent organizations not only attain higher levels of average performance but also do so with far more consistency across their entire networks.

That's typically thanks to [a clear set of fundamental principles](#), which in turn guide a set of behaviors that everyone in the organization is expected to adopt, from the CEO to the front line. It's how the organization builds a culture that helps the business thrive regardless of external conditions—and that can flex as conditions change.

The example companies illustrate behaviors that are essential to operational excellence. *A relentless focus on waste* enabled the mining company to squeeze more value out of its best-performing site, and the financial institution to break long-standing internal silos between its functions. *Root-cause problem solving* revealed that the mining company's training technology could pay off with only a small additional investment, not wholesale replacement. *Leading with humility* allowed both companies' leaders to *empower frontline employees*, recognizing that their experience gave them the deepest, most immediate understanding of operational challenges and opportunities.

Equally important, all three companies have made substantial commitments, through communications and capability building, to embed the principles throughout their organizations. From the first day on the job and through to executive development, all of the company's employees are constantly

learning about how to put principles and behaviors into action. At the mining company, senior executives received extensive coaching on developing a more open problem-solving environment and then coached their own reports on how to make similar changes in their management approaches. The financial institution built an entire academy of behavioral learning programs, with many offering certifications for career advancement. All three companies have democratized access to data, enabling frontline employees to make real-time adjustments to their work and try new ideas under an agile test-and-learn model that sees failure as a necessary step toward innovation.

Modernizing management systems

The management systems that companies adopt to reinforce new behaviors—the visual-management tools, performance boards, skills matrices, and standard operating procedures that together guide day-to-day activities, [especially at the front line](#)—are often the most visible legacy of an operational-excellence transformation. They're also vulnerable to depreciation. Too often, a crisis or change in leadership provides just enough distraction to cause people to stop maintaining them, or even using them at all.

Yet management systems also represent an extraordinary opportunity for reinvention: technology has dramatically reduced the time and resources the tools require while at the same time expanding their potential results. In an era of flatter organizations and fewer management resources, that's a particularly important boost for increasingly stretched middle managers. It also points to critical investments the companies made in helping leaders and managers learn new digital skills and in setting new expectations and metrics for innovation.

For the financial institution, a crucial change has come from new forms of AI and process automation. An immediate effect was to reduce tedious, manual tasks, but the more significant outcome was to give frontline workers complete, real-time transparency into their work, reducing their dependence on (often-delayed) reporting or manager feedback. Instead, they can immediately see what's working, benchmarked against their team or against the client's previous experiences. At the mining company, standard operating procedures are now in electronic form. Rather than taking months to update written manuals—and, in effect, hoping workers would tell one another about how to deal with changes that weren't yet in training materials—employees can now see new procedures in video form, often at their workstations.

Sharpening technical systems

The next element focuses on the nuts and bolts of how work gets done: the technical systems that process work from start to finish, ideally in a fully integrated, streamlined way. Because technical systems tend to be where problems become apparent—the production line whose maintenance costs keep rising, the customer onboarding processes whose error rates spike—they can easily absorb most of a management team's attention.

What the operationally excellent companies recognize is that problems in the technical system are almost always symptoms of larger issues that can't be solved by technical solutions alone. Deploying technology without understanding the real sources of an issue is a recipe to make matters worse rather than better. Automating a low-productivity assembly line can simply speed up poor quality: leaders may discover that human workers can compensate for variability and instability, whereas sensors and software can't.

For the mining company, a critical root cause of performance issues proved to be a top-down culture in which workers rarely felt encouraged to share their improvement ideas. Creating new space for bottom-up innovation revealed dozens of small process changes that cumulatively have had a huge effect: for each of the past three years, improvements to the technical system helped raise production by at least 10 percent, even as water usage fell by 7 percent—significant in a drought-prone region.

The financial institution faced a very different situation with its problem-resolution team, which struggled to get customers' issues fixed if doing so involved even a small technology change. Crucially, leaders saw that the team didn't need better IT or new tools: what they needed was a better collaboration model with the IT department, which prioritized larger projects. A new, faster escalation track for minor IT issues meant that anyone could get budget and IT support for a quick resolution. The result was 30 percent faster problem resolution and no extra cost.

Generating lasting value from today's technology

Technology permeates operational excellence—but it isn't the primary answer to operational issues. Instead, it's a launching point for three questions that focus on [how technology serves people](#):

- What unique new value could this technology create that otherwise would not be possible?
- How could this technology enhance our organization's overall operational excellence?
- Will this technology augment our people and enable them to engage in a safer, more productive, more satisfying way?

This framing reinforces an end-to-end value stream perspective that is missing in many organizations. The mining company, for example, was fairly typical in that it had deployed tablets and connectivity applications for frontline employees to use in maintenance work. But doing so created little lasting value because the company started with the technology rather than the problem that the workers were having.

Once leaders could see the problem—even with the tablets, training workers on equipment updates took too long—the company could rethink its approach, understanding that the immediate training issue affected a much larger stream of value centering on major capital-equipment investments. The company can now update maintenance processes as soon as new or modified equipment comes online, with training modules delivered instantly to the right personnel.

For the financial institution, the ultimate outcome of its technology investment is data-driven decision making everywhere in the organization. Rather than build a large team of people—at high stress and turnover levels—to deal with quality shortcomings, the company is using AI to overcome data issues that were often the root sources of errors and customer complaints. For the remaining issues, AI is expanding worker capabilities, letting them trawl through previous resolutions to find answers that otherwise were sought over and over in manual processes.

Achieving operational excellence isn't easy. Leaders will need to reassess the organization's purpose and strategy and introduce new principles and behaviors—essentially, they will need to rewire the organization's DNA. They will need to rethink their

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management and technical systems, and the supporting structures, processes, and objectives, with a ruthless focus on value creation.

Operational excellence is not something that leaders can whip up in time for the next quarterly report. It may take years—even decades—to unlock all the latent talent in an organization and deploy it

to its fullest possible effect. If leaders take shortcuts and decide that “the tools alone will get us where we need to go,” the impact will likely evaporate in months.

It’s imperative—and an enormous opportunity—to blend stewardship and striving for excellence into an institution so that it keeps improving indefinitely.

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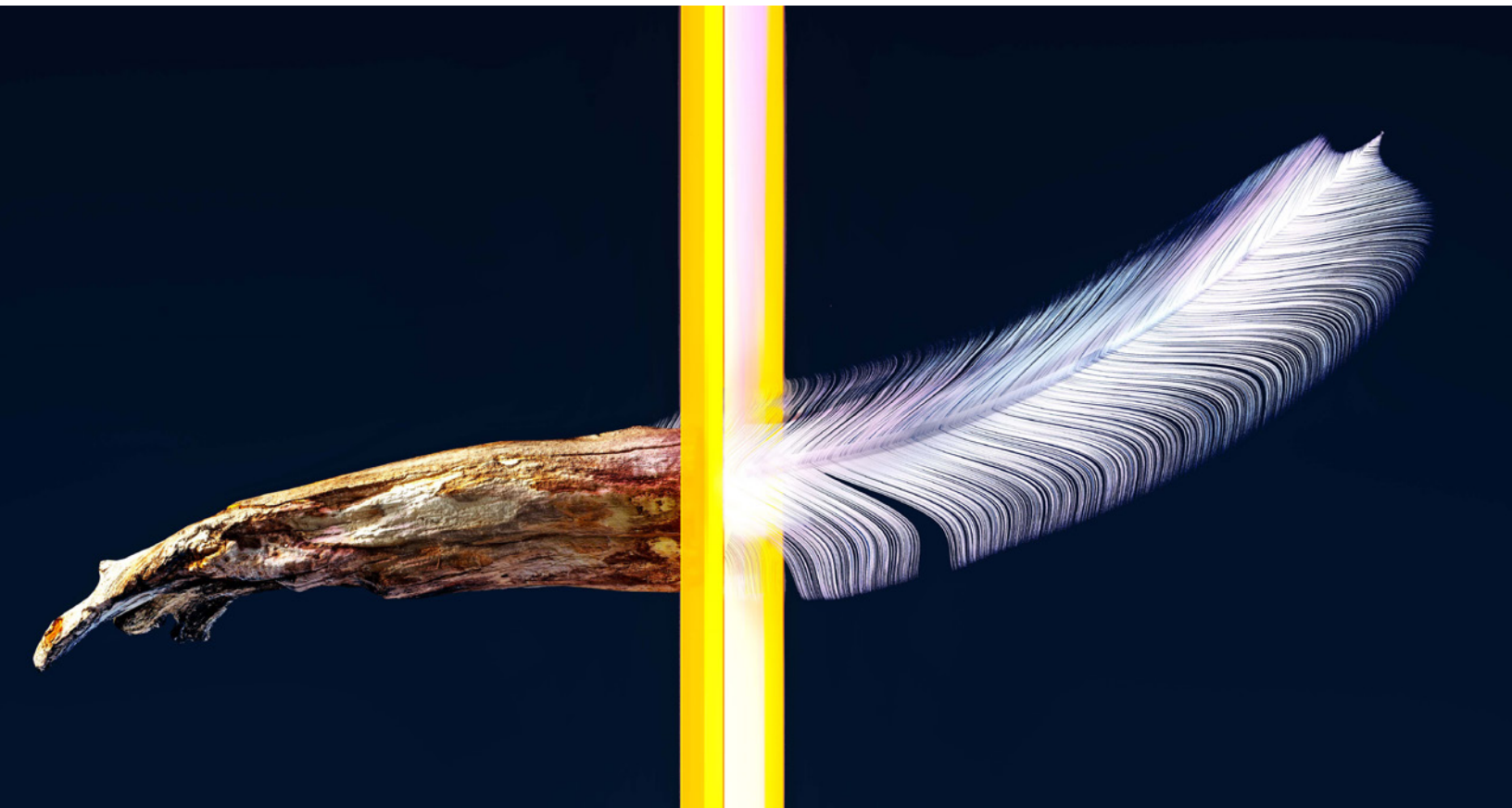
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Operations Practice

Today's industrial revolution calls for an organization to match

Operations technologies are here. Productivity gains are not. Why? It's increasingly clear that to transform industrial production, industrial organizations must also be transformed.

by Dado Misljencevic, Sven Houthuys, Tom Welchman, and Ulf Schrader



What is humanity's greatest innovation of the industrial age—the steam engine? Penicillin? The internet?

These are all good candidates, yet without the productivity gains from another crucial innovation, the modern business company, it's hard to imagine how these inventions could have improved the world at the same scale.

The trouble is that few industrial organizations have truly cracked the productivity code to maintain high performance over the long run. A recent analysis found that as of 2020, the average life span of a company on the S&P 500 index was down to 21 years, compared with 32 years in 1996.

A range of technologies, including most recently generative AI (gen AI), have promised to **transform industrial production**. But despite the real progress some companies have made in the Fourth Industrial Revolution, **productivity growth remains stubbornly low** across most of the world's largest economies (Exhibit 1).

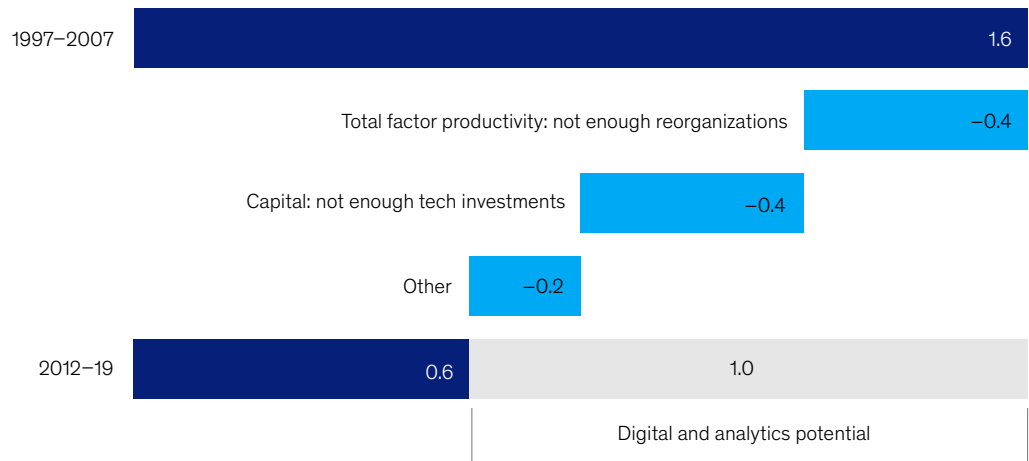
What's missing are the organizational structures required to make technology truly work.

Large industrial organizations have traditionally focused on excellence in processes, often for the mass market, such as cars rolling off an assembly line. But today, standard work is much more automated. What's left is

Exhibit 1

In many countries, technology isn't raising productivity as much as businesses had hoped it would.

Productivity in the top 5 EU countries, % CAGR



Source: EU KLEMS (2023 release); *Investing in productivity growth*, McKinsey Global Institute, March 27, 2024

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increasingly nonstandard, yet most industrial organizations aren't structured for nonstandard work—leaving them unable to change at the pace innovation requires.

The experiences of exceptional organizations show that capturing technology's opportunities means making eight mutually reinforcing shifts that strengthen people, processes, and technology in tandem:

- from process excellence solely focused on repetitive tasks to also applying the principles of excellence to flexible, project-based work, turning the unusual into business as usual
- from control and compliance to empowerment, giving individuals the autonomy and information they need, often based on digital footprints, to work more effectively
- from gathering expertise in specialized silos to making expertise available to all via app stores, allowing workers to integrate highly accessible digital tools for tailored solutions
- from process masters to process reengineers so that rather than simply mastering current processes, managers continually rethink and redesign how tech-enabled processes can improve work
- from going to work to supervising control centers that are increasingly decoupled from physical production flows—opening new opportunities to restructure network strategies
- from Industry 4.0 to “Industry 4 U,” which yields better work environments via stronger technology support, improved ergonomic design, and an inspiring leadership culture
- from ad hoc learning to industrialized capability building to make rapid skill building with large numbers of employees a competitive advantage

- from building internal departments to orchestrating an ecosystem, redesigning how companies integrate knowledge and radical innovation into their value chains by rethinking collaboration models

Building on previous [insights codified in methodologies such as agile and lean](#), the eight shifts collectively represent the greatest change since the matrix organization emerged in the wake of the mid-1960s space race. Meeting the challenge will stretch every critical enterprise capability our colleagues outlined in [Rewired: The McKinsey Guide to Outcompeting in the Age of Digital and AI](#). The question leaders now face is how to prioritize the five actions they must take.

Turning the unusual into business as usual

Mass production of a standard product was the archetype for the modern enterprise. Standardization of products supported standardization of processes, culminating in management systems such as lean, which rely on elaborate codification of “standard work.”

Today, the context has changed. As automation and gen AI take over more tasks, human work increasingly centers on the sorts of “special projects” that once accounted for only a small share—perhaps 20 percent—of day-to-day work. The unusual is becoming business as usual. Yet governance still consists of heavy layers of (functional) processes on top of project management, yielding convoluted, slow, and resource-intensive decision making.

The challenge for business leaders is to flip the ratio: instead of deploying 80 percent of people in processes and 20 percent in projects, they can aim for 80 percent in projects. A few companies have successfully transitioned to a project-based organizational model, such as a major life sciences company that rebuilt its internal structure to

As automation and gen AI take over more tasks, human work increasingly centers on the sorts of “special projects” that once accounted for only a small share of day-to-day work.

support rapid growth. Crucially, the model balances stability and agility by ensuring that every employee has a home unit centered around their skills even as they are working within dynamic project teams whose composition is tailored to specific skill needs.

Within this structure, three additional factors proved critical:

- **Build internal talent markets.** Leaders can't assemble effective teams unless they know who in the organization has the required skills. That means both building a skills profile for each employee and making it widely available within the organization. The company's employee directory now provides detailed skills-based information, such as certification, training coursework, and recent project experience, which is automatically updated after a project ends.
- **Set clear boundaries.** Clear boundaries were established to operate within, consisting of company priorities, product strategy, project team mission, and short-term team goals. It was also important for senior management to provide rigorous oversight; in this way, they could identify opportunities for teams to share resources or join forces and thwart mission creep within teams.
- **Develop achievement-oriented leadership.** Company executives recognized that effective leadership of a project team required different skills from those traditionally encouraged in line

leadership roles. Rather than directing the work of people with similar training but varying levels of experience, project leaders would need to coordinate individuals with deep expertise across many fields. The role of the leader therefore changed to emphasize *what* the project sought to achieve—the problems to be solved—along with *why* and *when*. The role of the team centered on *how*—collaborating to find the best solution.

Getting empowerment right

How do you plan in a world that is becoming more and more complex? Often, the counterintuitive answer is, you don't. The humble baguette illustrates this. Every morning, despite countless potential obstacles, French bakeries sell millions of baguettes—all in what can appear to be a miracle of nonmanagement. Thousands of individual decisions organically converge to produce an essential good, with no need for a central baguette planning department.

However, too many large and complex organizations have yet to emulate the baguette example. They still seek to amass expertise in a traditional hierarchy, even though the assumption that the top of the organization generally knows better than the bottom was never more than partly true—particularly when it comes to understanding how operations really work. The trouble is that many organizations that tried employee empowerment failed and thus reverted to central control.

Getting empowerment right requires a balance: giving workers the independence they need to execute tasks effectively while being prescriptive about what those tasks are meant to achieve. “Independence” and “prescriptive” may sound contradictory, but as long as they are kept in close balance, each supports the other in generating more value (Exhibit 2). Together they call for a new level of transparency regarding both access to data and the data’s implications on results.

Guided by OKRs

Yet access to data is hardly the same as being informed. Frontline workers may now have tools to see exactly how productive their machinery is for different products, but that alone can’t determine how best to improve the line’s productivity—let

alone its profitability. Instead, they need to understand how the organization’s strategy translates to the factory floor.

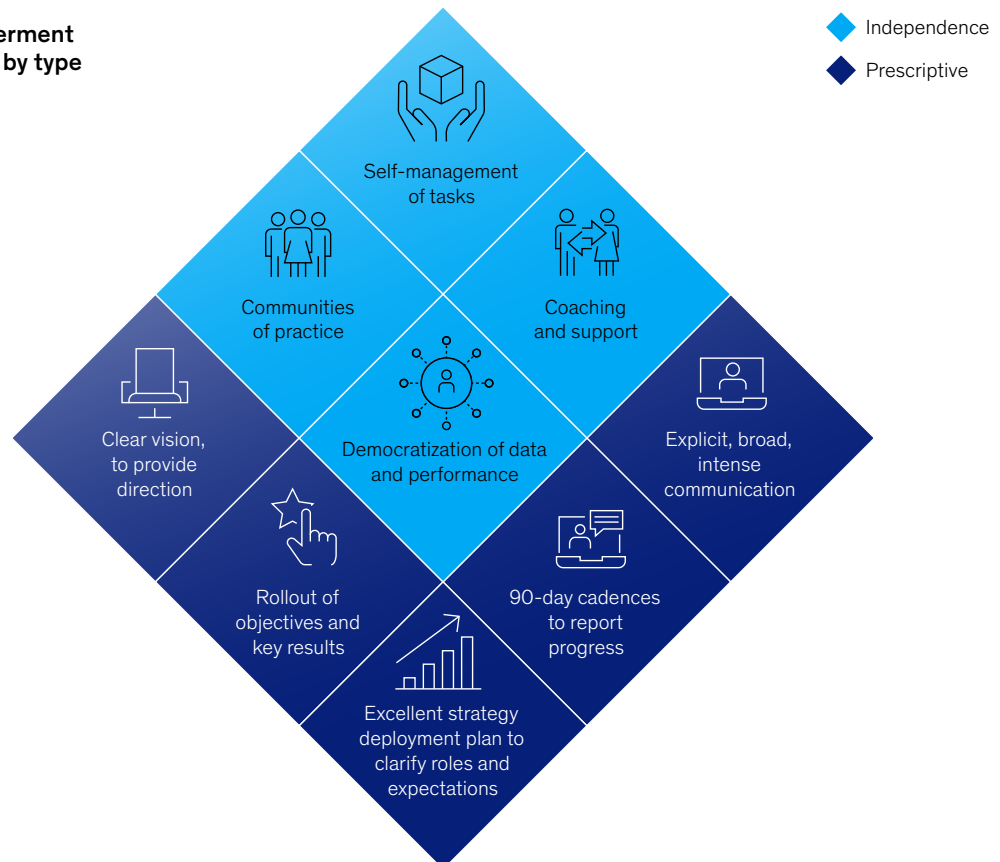
Leaders face the same question, but from the opposite perspective: the need to achieve strategic goals without the wasted effort involved in trying to dictate exactly how the goals are to be achieved.

Originally developed at Intel and expanded at Google, objectives and key results (OKRs) have emerged as an effective balancing mechanism, focusing the organization’s energy on outcomes—the “what”—while allowing greater flexibility on the “how.” The idea is to enable subunits within the organization to use the strategy to articulate goals and, crucially, the results that will matter in achieving

Exhibit 2

Getting empowerment right requires a delicate balance between worker independence and prescriptive management.

Empowerment balance by type



them—thereby aligning what they do each day with the organization’s direction.

Defining—and achieving—OKRs calls for clear direction from senior leaders about the company’s strategic goals, as well as communication at all levels of the organization. Accordingly, an empowered organization requires more effort from senior management, not less. For the factory team looking for ways to improve the line’s profitability, OKRs would need to be tailored to the site, accounting for factors such as its position in the supply chain, its current capabilities, the training of its operators, and the needs of in-development products. Frontline workers and managers can then make intelligent trade-offs between maximizing profitability from current production and reducing potential costs for future changeovers.

Using activity-based analytics to drive business performance

The familiar sight of delivery trucks illustrates even more opportunities for empowerment. When a driver finishes a delivery, a quick scan tracks

completion in the company’s IT system—which also knows who the driver is, where both the driver and vehicle are located, and which route the truck took to get there. The resulting digital footprint gives the company a very different way of managing tasks, controlling quality, and handling documentation.

It also helps employees, suggesting alternative routes when traffic is heavy or finding a different delivery location if the original is inaccessible. Should priorities suddenly change, the system can reprioritize the worker’s tasks automatically—so that the employee can more easily squeeze in a rush delivery and still finish the day on time.

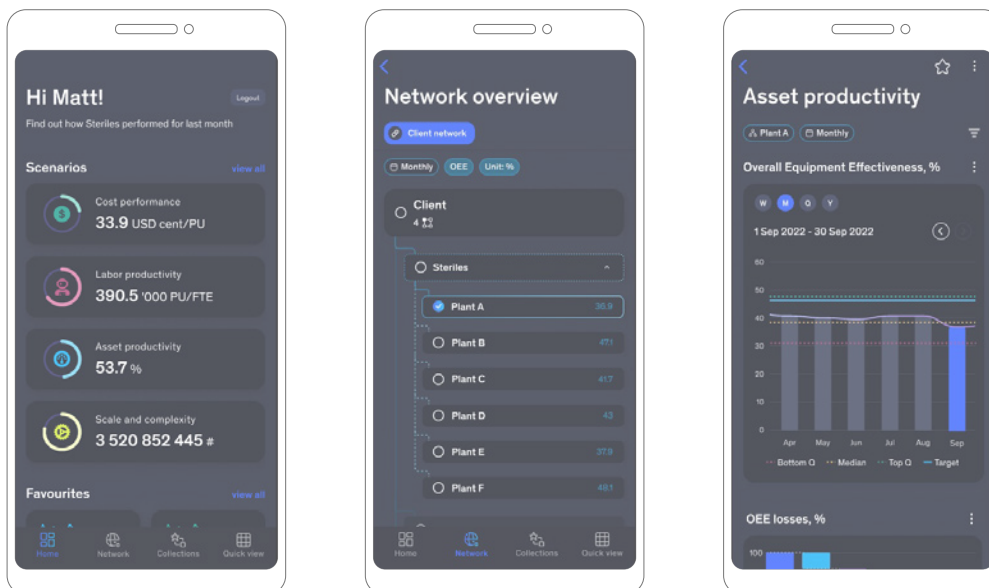
This logistics example finds its equivalent in manufacturing execution systems (MESs) that are broadly installed in factory environments. Advanced versions can do even more, helping employees build their skills and, ultimately, advance on their career paths (Exhibit 3).

Take the example of a manufacturer of customized technology products. Company leaders learned that

Exhibit 3

Democratization of data supports self-management.

Real-time, normalized performance and benchmarks in every employee’s pocket



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frontline assembly workers were often frustrated that when production problems arose, their work wasn't tracked in enough detail for them to find (and fix) the underlying issues. They wanted a system where every line station would accurately log when the project arrived at the station and which assembly tasks were performed, and then see where workers needed more training to avoid rework. The leaders realized that building such a system would improve both product quality and employee retention, without requiring more time or attention from middle managers.

Indeed, technology can now assume many of the work allocation, planning, performance tracking, training, and issue resolution tasks that consume most of a middle manager's day. The implication is that many **middle manager roles could soon become very different**, emphasizing process confirmation and team building as teams become increasingly self-managed (Exhibit 4).

Making expertise available to all via apps

In day-to-day life, knowledge that once took years to acquire is now available instantly, often through an app. But too many companies have been slow to follow this route. Early adopters show how using customized apps in manufacturing operations, for example, can help frontline employees see not only what they are doing but also the value their work is creating. The challenge for companies is to create platforms that replicate these results wherever possible, via apps for everything from monitoring equipment and planning maintenance work orders to guiding defect resolution or extracting strategic insights for production planning.

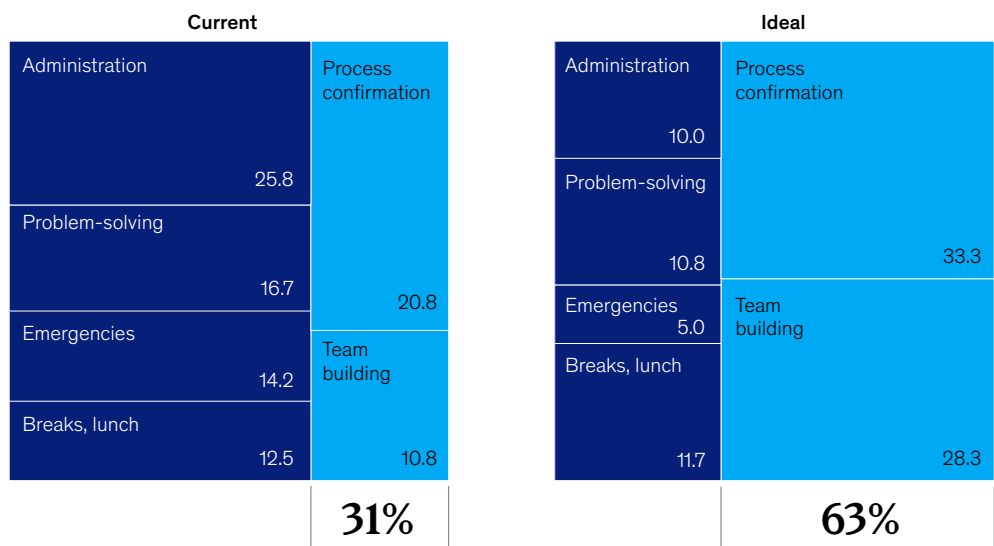
That would mean investing in the standard prerequisites. Companies need data architects to build a flexible technology stack, data scientists to manage analytics, external partnerships to support the latest app development tools and licenses, and

Exhibit 4

At many manufacturers, supervisors don't have time to lead.

Daily activities, factory floor supervisor, % of work shift hours

■ Essential to capability building



Note: Figures do not sum to 100%, because of rounding.

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training programs to help the workforce use apps in solving everyday problems—optimizing inventory, debottlenecking production, or managing logistics.

It also means preparing for jobs to evolve, as traditional and tech-centric roles start to merge. Today, [the chief information officer \(CIO\) is a crucial stakeholder for the COO](#), but tomorrow the COO could simply *be* the CIO. Likewise, other leaders would have a “major” in data architecture and a “minor” in their respective functional domains. In e-commerce, for example, category managers are increasingly data architects first, under the assumption that they can quickly learn about product categories as needed.

Finally, it means getting serious about building a culture of rapid, constant innovation. Software used

to be something most companies would buy. Today, more companies [build their own code](#), written by internal staff as part of a continuous improvement process—which, in the digital world, often boils down to the speed of app evolution. Building an app to track overall equipment effectiveness (OEE) for individual machines is not a one-time commitment. Instead, the app could even evolve toward self-improving as data gets richer and modeling becomes more sophisticated.

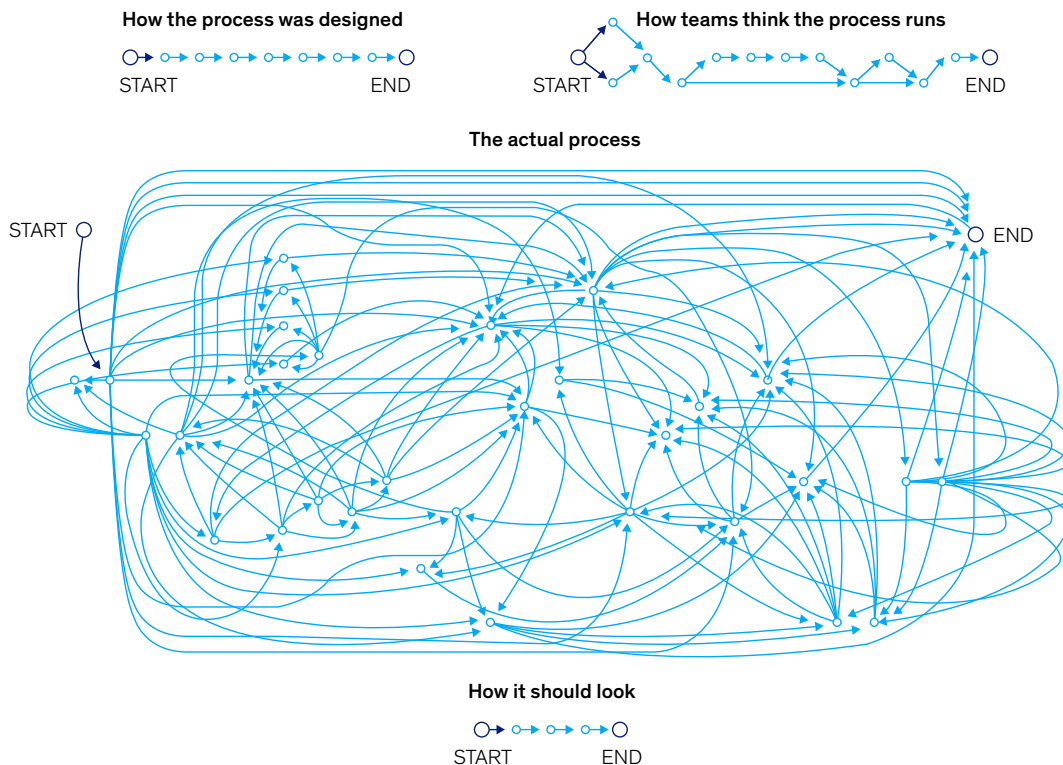
Remastering processes

A perennial problem for organizations is the mismatch between how a process is intended to function and how it actually functions (Exhibit 5). Continuous-improvement disciplines seek to reduce the gap, to create “process excellence.”

Exhibit 5

Every manager needs to be a process engineer.

Intended vs actual process flow



Source: Celonis; McKinsey analysis

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This problem disappears once a process is correctly designed and fully automated. The ultimate example is the so-called lights-out factory, one in which automation takes over production. Snack company Mondelez has fully automated dough production in Beijing. Analytical models optimize quality, such as the texture of the dough, and a closed-loop system adjusts the machine settings in real time.

What does it take to go fully lights-out? Humans. Over the next decade, hundreds (if not thousands) of process reengineers will be needed. Chief process redesign officer may become the latest C-suite title, joining recent predecessors such as chief transformation officer and chief digital officer. And even after processes are reengineered, humans would likely still be essential to build and improve automation models and supervise the system from the control room.

That raises the question of where organizations could find the right talent, particularly at leadership levels.

Reshaping production networks with control centers

The Mondelez example illustrates how automation is changing the factory's role, but that's only the start of the story. The COVID-19 pandemic opened everyone's eyes to the feasibility of remote work. Once most manufacturing tasks—including ones that formerly had to be done in person, such as quality control—require access only to data rather than machinery, sites may start to lose a long-familiar feature: the control room.

If co-location with the production site is no longer necessary, where could control rooms be? Not just anywhere, or where labor is cheapest. The key criterion will likely be access to the right talent and skills, some of [which are currently in short supply in developed economies](#). Technology capabilities are paramount. India, for example, is the world's second-largest producer of graduates in science, technology, engineering, and math.¹ It's also a heavyweight in gen AI use. A recent global survey

found that gen AI penetration was highest among organizations in India, at 81 percent, with Singapore ranking second at 63 percent and Spain third at 57 percent.

Companies' network strategies thus face a refresh, with factors such as geopolitical resilience, language skills, and time zones all important to the mix. [Existing shared-service centers can provide a starting point](#). Their experience in reengineering transactional processes—which increasingly are automated, leaving knowledge tasks organized into service hubs—gives them crucial expertise that reverses the previous outsourcing and offshoring model. Rather than standardize a process before handing it to the service center, it's the service center that has the competence to standardize.

Industry 4.0 to Industry 4 U

By 2040, advanced manufacturing economies from China and South Korea to the European Union, United Kingdom, and United States are set to see contraction—or, at best, much reduced growth—in their active workforces as societies age. In the United States, for example, the ratio between people aged 20 to 24 and people over 55 in the manufacturing workforce dropped by 16 percent between 2014 and 2022.

[Raising productivity growth](#) will be essential to maintain standards of living in advanced economies while raising them in emerging ones. Investments in technologies such as advanced automation and gen AI, especially for routine and knowledge tasks that previously were done by humans, could unlock billions of dollars in economic activity.

Even more important, it would free up workers for [higher-skilled work, where labor demand is already outstripping supply](#). Companies in [especially affected sectors](#), such as US construction and manufacturing, are discovering the importance of an attractive work environment that provides opportunities to learn and grow. The technology that workers use becomes part of an employee-centric approach

¹ Brendan Oliss, Cole McFaul, and Jaret C. Riddick, "The global distribution of STEM graduates: Which countries lead the way?," Center for Security and Emerging Technology, November 27, 2023.

to digitization, one that seeks to fundamentally change the employee value proposition. “Industry 4.0” becomes “Industry 4 U.”

Industry 4 U is about giving workers the right tools, based on technologies that they’re using in their personal lives, along with a workplace that’s healthy and inspiring. Together, these elements add up to an engaging leadership culture. At a global oil and gas operator, this transition anchored a restructuring of the end-to-end employee experience so that the company could better attract and retain new workers—an especially difficult task in an era of increased environmental awareness and competition from the tech industry. On its own, the company couldn’t reverse climate change or technology shifts. But it could address long-standing on-the-job frustrations for a better working environment, especially during the critical first months of an employee’s career.

Listening to early-stage employees revealed a strong need for additional support, particularly in the renewable-energy business unit. The company responded with a comprehensive employee onboarding app that guided new colleagues through the first few weeks of work. Built in only three months, the app not only created a more positive and connected experience for new hires, reducing attrition, but it also resulted in a new way of working for the technology team.

Industrializing capability building

For an experienced process engineer with a PhD in pharmacy, today’s definition of a successful career would likely mean leading the development of a handful of drugs that, after navigating a complex, high-risk regulatory environment, finally reach the market and are helping patients.

That definition is poised to change. What if instead of a handful of successfully launched drugs, that engineer could point to dozens—because deep learning models had eliminated much of the guesswork that led to development dead ends? And what if newer AI models had made process

refinement faster and more accurate so that more products could be developed more cheaply?

McKinsey research estimated that by 2030, [activities accounting for 30 percent of current work hours could be automated](#). Reaching this world would require the engineer to learn new skills, particularly in softer skills such as [design thinking](#)—critical for blending decades of hard-won expertise with the promise of AI. Leaders recognize this need: for integrating gen AI into their processes, more than half of employers said they plan to rely on internal capability building to meet their skills needs.

Traditionally, industrial organizations have relied on apprenticeship-based capability building. That model worked well enough for helping small numbers of workers develop well-understood skills, but it can’t meet the scale and speed needed for the rapidly evolving world of AI. The good news, however, is that the upskilling gap may now be shrinking because of easier access and lower cost of reskilling tools. Online courses and immersive-learning platforms make upskilling easily available on a self-service basis. Individual course segments can be slotted into day-to-day business, allowing for continuous learning. Gen AI even offers personalized coaching and advanced translation capabilities, making highly tailored trainings easy to access globally.

A global consumer goods company provides an illustration, having undertaken a two-year global digital transformation across its network of manufacturing plants and its supply chain.

Capability building formed the core of the transformation. Learning centers focused on innovation served as crucial support systems in building a company-wide academy that now leads everything from initial inspiration sessions to immersive capability building. The impact achieved was substantial: productivity increased by more than 15 percent across the network, for savings in the tens of millions of dollars. Additionally, the identification, sizing, and mapping of several hundred unique use cases paved the way for a comprehensive transformation road map. With

more than 2,000 learners upskilled across the entire production and supply chain network, the company is now well situated for further improvement.

Orchestrating the ecosystem

In his seminal 1937 book, *The Nature of the Firm*, Ronald Coase argued that large corporations emerged because they reduced transaction costs: getting things done internally was significantly cheaper than outsourcing or buying services or goods externally. When data and expertise were expensive, having a planning department that understood the organization and could access the right information made economic sense. Today, the data can sit in the cloud, easily accessible to anyone—as can sophisticated planning applications that can import the data at a mouse click and produce a plan.

Companies now have a generational opportunity to reexamine the boundaries of their organizations in answering the most fundamental question: What should we do, and what should we work with others to do? And as transaction costs keep falling—from faxes and the internet to social media and gen AI—where should the work take place? Understanding where the company creates the most value can reveal new opportunities not only to compete but also to collaborate more deeply, turning transactional relationships into genuine partnerships.

For a major utility network, the critical question was one of resilience, both operational and strategic: climate change is increasing stress on physical infrastructure even as the energy transition, new technologies, and geopolitical uncertainties are transforming how energy is created and distributed. Navigating these conflicting pressures led the company to realize that it would never be able to accumulate all the relevant expertise in-house: if it kept trying to do everything, it would do nothing well. At the same time, tapping into external services had never been more cost-effective.

This led the company to a major shift in mindsets. Rather than think of its suppliers as vendors to be given minimal information for maximum negotiating power, the company examined where data sharing would yield better-quality outcomes—and help the company focus its expertise. So, for example, careful sharing of pricing and cost data for types of distribution meant that suppliers could provide better economies of scale and delivery terms.

At the same time, entering a partnership means managing an inherent risk: overdependence. In many cases, this is linked to data access and ownership; conversely, keeping the right data can turn a potential vulnerability into a major strength. After all, Airbnb has data, but no beds; Google Maps has data, but no restaurants; and Uber has data, but no cars—yet each has disrupted an entire industry.

This data-centric model could help manufacturers tap into entirely new sources of growth, especially in industries where hardware may face diminishing returns. Rather than try to turn themselves into software providers, some manufacturers may generate more value under an app store model, with the physical product becoming more competitive because of the wider range of software it can support. This option requires resources—developing the store platform, identifying and protecting the most valuable data, and managing risk and compliance—but could be rewarding for manufacturers willing to commit.

Preparing for the eight shifts

The question for companies isn't whether these shifts are coming. They're already under way. What matters is to get started, focusing on five very concrete tasks:

- *Understand and shape your role in the ecosystem.* What do you do today better than anyone? That's your current role in the ecosystem. But how will that look in five years? What are your blind spots, and how do you evolve to meet them head-on?

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- **Develop visionary and courageous leaders.** What leadership profiles are currently thriving in your organization? What sets them apart from others? Are they the right ones to steer your company through the technological revolution? And how can you form a coalition with them?
- **Define and invest in your tech stack.** In five years, what technologies will you say you wish your organization had invested in today? Which ones will need integrating into your tech stack? Is your tech stack flexible—and are you ready to use that flexibility to accelerate innovation?
- **Assess capability needs.** Which skills of today are likely to remain relevant in the future? What new skills are coming, and how will your organization acquire them (upskill, hire, outsource)? How will capabilities affect your network footprint? Does your capability strategy incorporate the skills available in your ecosystem, not just on your payroll?
- **Work in teams, not in pyramids.** How are your teams set up today? How much of your work is dedicated to standard tasks to keep lines running, and how much is left for innovation and improvement? Where should the empowerment balance be between independence and prescriptiveness?

Individually, the actions companies face are not new. According to the *Oxford English Dictionary*, the title “chief executive officer” was first attested in 1914. Corporate training took hold in the late 19th century. Digital Equipment Corporation deployed a matrix organization in the early 1960s. The revolution is not in the individual steps: it’s in the questions that organizations must ask themselves as they consider how the eight shifts affect them. Successful leaders will shift from an evolutionary mindset to a revolutionary one and act now to fix their organizations so that technology can truly accelerate productivity growth.

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