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Operations Practice

COVID-19: An inflection point for Industry 4.0

Industry 4.0 technologies played a decisive role in the pandemic response at many companies, but the crisis is putting the future of digital operations under new pressure.

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In 2020, industrial digitization faced its biggest test to date. Confronted with the largest health and economic crisis in recent history, companies across sectors were forced into extraordinary measures to protect their people and maintain operations. While some contended with keeping the operations running in the face of shortages of workers or raw materials, others struggled to keep up with the sudden spike in demand. Did the technologies of the ongoing Fourth Industrial Revolution (or Industry 4.0) help those companies in their efforts?

Analysis of a new McKinsey survey's results suggests three outcomes: a win for companies that had already scaled digital technologies, a reality check for those that were still scaling, and a wake-up call for those that hadn't started on their Industry 4.0 journeys. Since 2017 , we have been tracking the progress of Industry 4.0 through our annual Industry 4.0 survey of global manufacturing companies, and our latest survey of more than 400 companies worldwide (Exhibit 1) provides a snapshot of leaders' perspectives six months into the coronavirus pandemic. Overall, 94 percent of respondents told us that Industry 4.0 had helped them to keep their operations running during the crisis, and 56 percent said these technologies had been critical to their crisis responses.

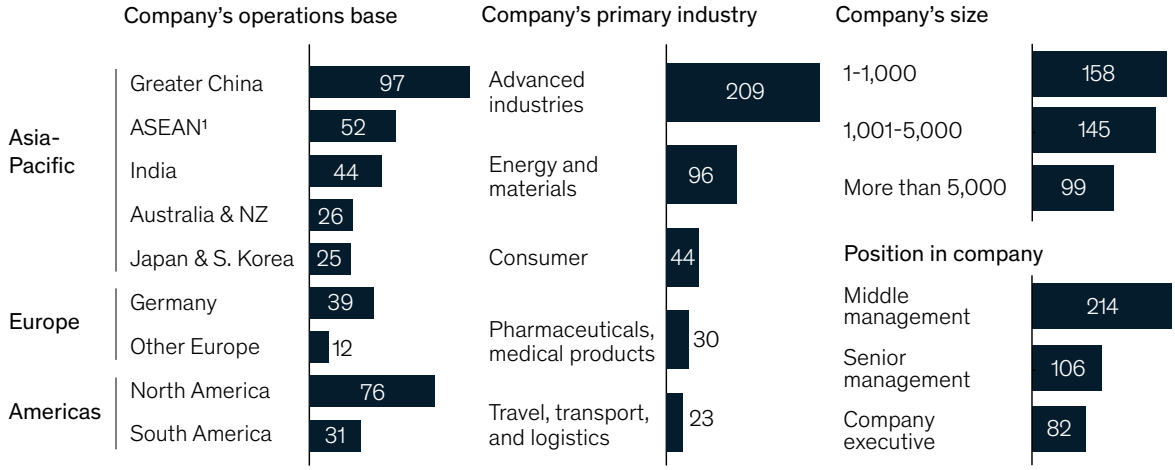
A win for early adopters

Companies that had scaled Industry 4.0 use cases prior to COVID-19 found themselves better positioned to respond to the crisis (Exhibit 2). A consumer packaged-goods (CPG) company in Asia had built a digital twin of its supply chain before COVID-19, for example. It was able to use that to run multiple scenarios during the pandemic, preparing itself for sudden shutdowns of manufacturing locations or disruptions in raw-material supply. On the opposite side of the globe, a personal-protective-equipment (PPE) manufacturer in North America, in the process of increasing its capacity by installing a new manufacturing line, was able to commission the line using augmented reality-based remote assistance for project execution.

Exhibit 1

Executives across countries and industries have reported on their organization's post-Covid-19 Industry 4.0 progress.

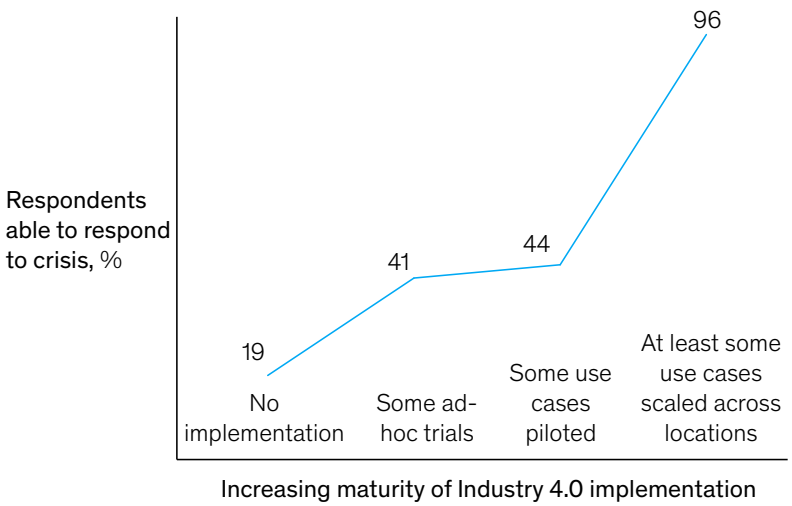
Respondents, #

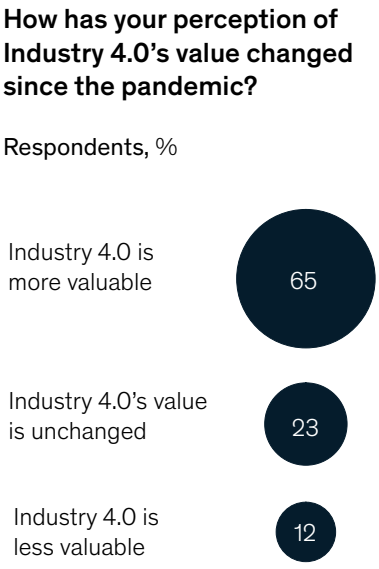


[1]Association of Southeast Asian Nations

Exhibit 2

Companies whose Industry 4.0 implementation is more mature report stronger ability to respond to crisis.





Those success stories and many others have driven a surge in excitement about the potential of Industry 4.0 technologies, ending a two-year plateau. Some 65 percent of respondents told us they were more optimistic about the prospects for digital technologies than a year ago.

Reality check

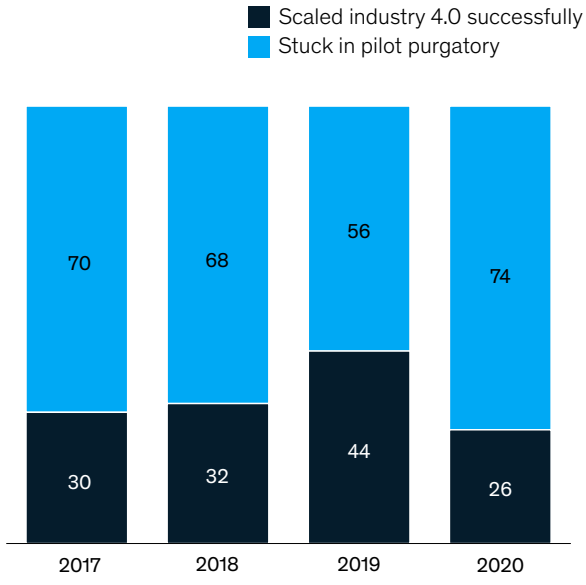
While Industry 4.0 technologies proved critical to early adopters in their crisis responses, the pandemic has also forced companies to reevaluate the progress of their own digital transformations. Compared to last year, our research reveals a significant drop in respondents' assessment of their organization's maturity. The number saying they had successfully scaled some or many Industry 4.0 use cases was down by more than 40 percent, to below the level we recorded in 2017 (Exhibit 3).

This change in perceived maturity has two likely causes. First, the bar for what "successful scaling" means has risen. Industry 4.0 technologies are no longer being measured for their ability to add value during business as usual; instead, they are also

Exhibit 3

Fewer respondents in 2020 claim to have successfully reached scale with Industry 4.0.

Respondents saying they successfully scaled Industry 4.0, %



expected to prove valuable during trying times such as the COVID-19 crisis. Second, battle-testing their Industry 4.0 platforms during the crisis may have shown companies that they have further to go than they thought before their implementations are truly fully scaled. In particular, many companies are finding that they can no longer ignore the limitations created by weaknesses in their underlying information technology/operational technology (IT/OT) infrastructure. The quest for speed in implementation led many organizations to work around their legacy IT and OT systems during the initial rollout of industry 4.0, but that approach is now reaching its limits.

A wake-up call

Companies that had not implemented Industry 4.0 prior to COVID-19 have had a wake-up call. Our latest survey indicates that not only did they find themselves struggling during COVID-19, but also the absence of past experience, lagging underlying IT/OT technology stacks, and COVID-19-driven cash constraints are making it difficult for them to catch up (Exhibit 4). In sum, 56 percent of respondents that hadn't implemented Industry 4.0 technologies prior to COVID-19 found themselves constrained in their ability to respond to COVID-19 in the absence of digital technologies to support them.

A tough road ahead

Most companies appear to be pushing on with their transformation plans despite the pandemic's challenges, with Industry 4.0 still a top-of-mind issue for many. But respondents tell us that progress has become more difficult. Companies that have paused Industry 4.0 projects since the onset of the pandemic cite a range of challenges, including access difficulties due to lockdowns and the introduction of remote working, cash constraints, and teams being diverted to other urgent issues. With the exception of China, where more than one-third of respondents say their operations have already fully recovered from the impact of the pandemic, almost one-third of the participants in our survey expect recovery to take a year or more (Exhibit 5).

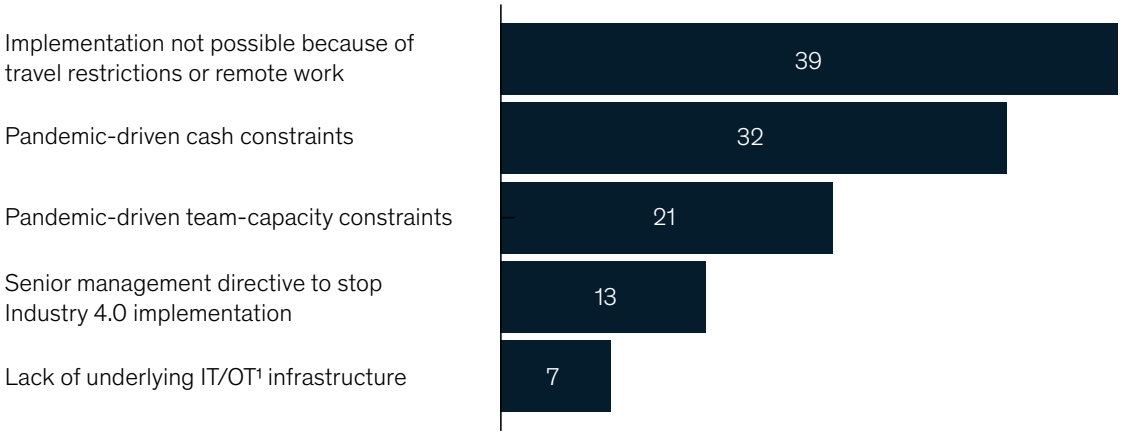
Overall, since our last survey in 2019, we have seen a shift in the perceived challenges facing all Industry 4.0 initiatives. Lack of funding is considered the biggest constraint, up from third

Exhibit 4

The crisis forced some companies to halt their Industry 4.0 investments.

Top two reasons our company is no longer implementing Industry 4.0

Respondents, %



[1]Information technology/operation technology

Exhibit 5

Half of respondents expect full recovery of manufacturing and supply chain will take at least 6 months.

What time frame do you expect for full recovery of your manufacturing and supply chain operations after the pandemic?

Respondents, %

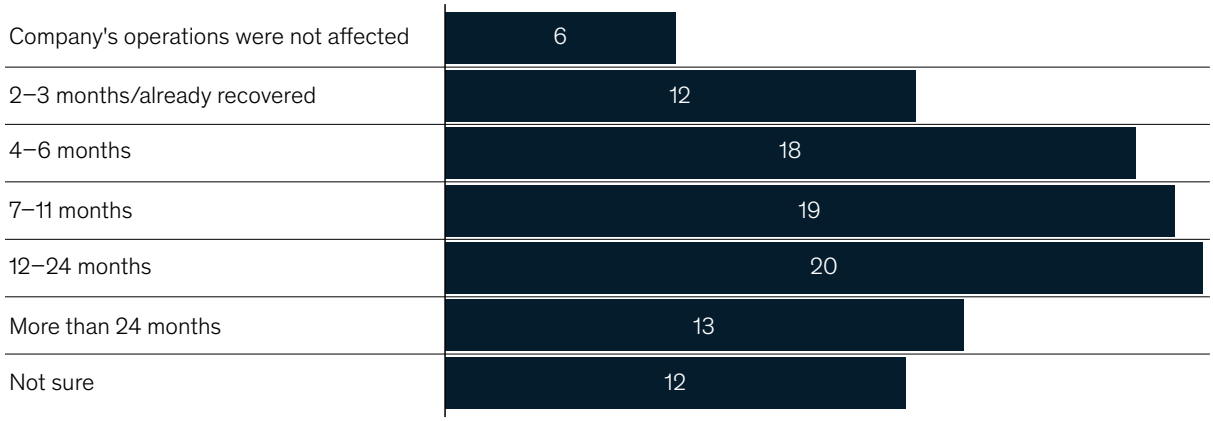
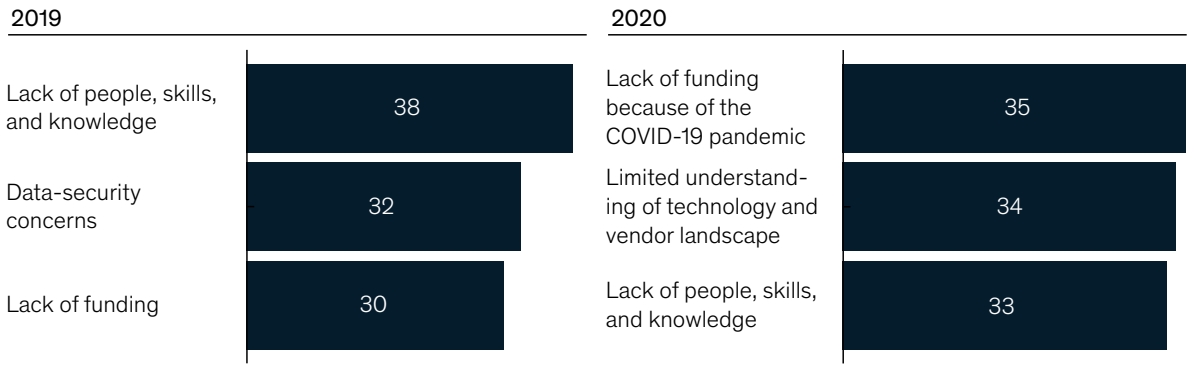


Exhibit 6

Funding problems now match people and knowledge constraints as barrier to Industry 4.0.

The 3 biggest challenges facing your company in implementing Industry 4.0 solutions in the current environment

Respondents, %



place last year, while lack of people, skills, and knowledge drops from the top spot to the third (Exhibit 6).

Changing priorities

The crisis is forcing companies to rethink the direction of their operational strategies, changing both the business issues they want to address, and the Industry 4.0 technologies they use to do so (see sidebar, "Three archetypes emerge"). Unsurprisingly, given the unique circumstances of the pandemic, agility and flexibility in operations have emerged as top strategic priorities above raising productivity and minimizing cost, which used to be the primary objective for most (Exhibit 7). Similarly, technologies that enable remote working and collaboration topped the list of priority Industry 4.0 use cases, with more than half of respondents working on projects in that area in that area (Exhibit 8). In second and third place came technologies to aid collaboration and visibility across the end-to-end supply chain, reflecting the need to manage volatile and disrupted supply networks.

As well as a shift in companies' Industry 4.0 priorities, these findings also suggest a

Three archetypes emerge

Our survey suggests three distinct post-COVID-19 archetypes of companies are emerging with a different approach towards Industry 4.0 (exhibit):

Accelerate. Around 20 percent of respondents say their organizations are doubling down on digital, with plans to accelerate the roll out of use cases on multiple fronts

Focus. In the largest cohort, around 60 percent of respondents are taking a more cautious approach, selectively implementing digital technologies to meet specific industry objectives

Pause. The remaining 20 percent or so say the pandemic has completely stalled their Industry 4.0 efforts, with no plans to restart in the next 6 months.

Exhibit

Majority of respondents will selectively implement Industry 4.0 solutions because of COVID-19 challenges.

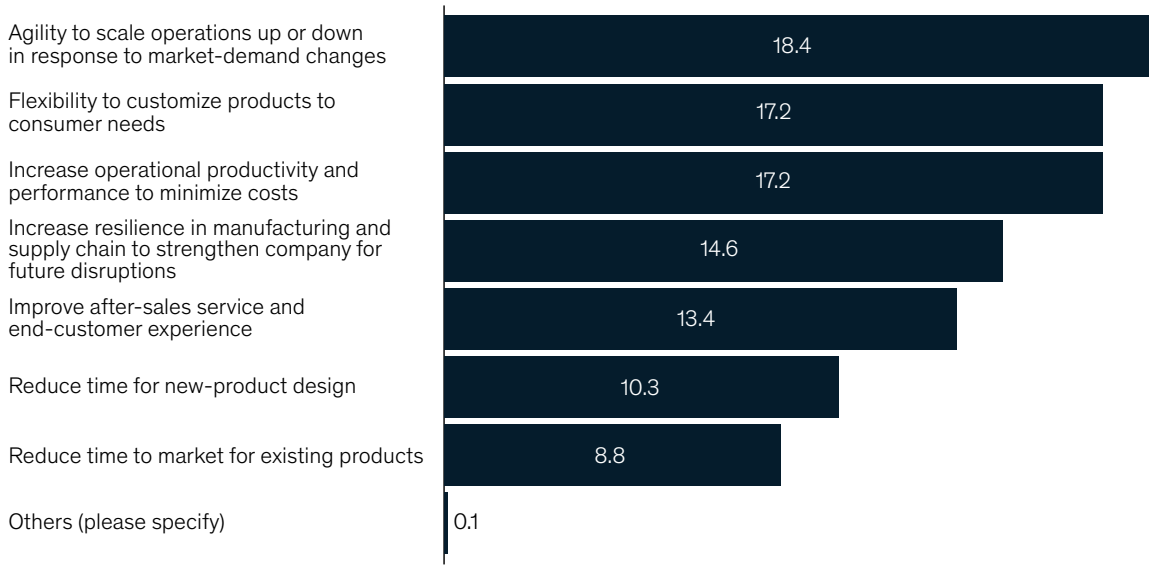
Respondents, %

Exhibit 7

Agility and flexibility are now higher strategic priorities than cost.

What are your company's most important strategic objectives for Industry 4.0 implementation?[1]

Respondents, %



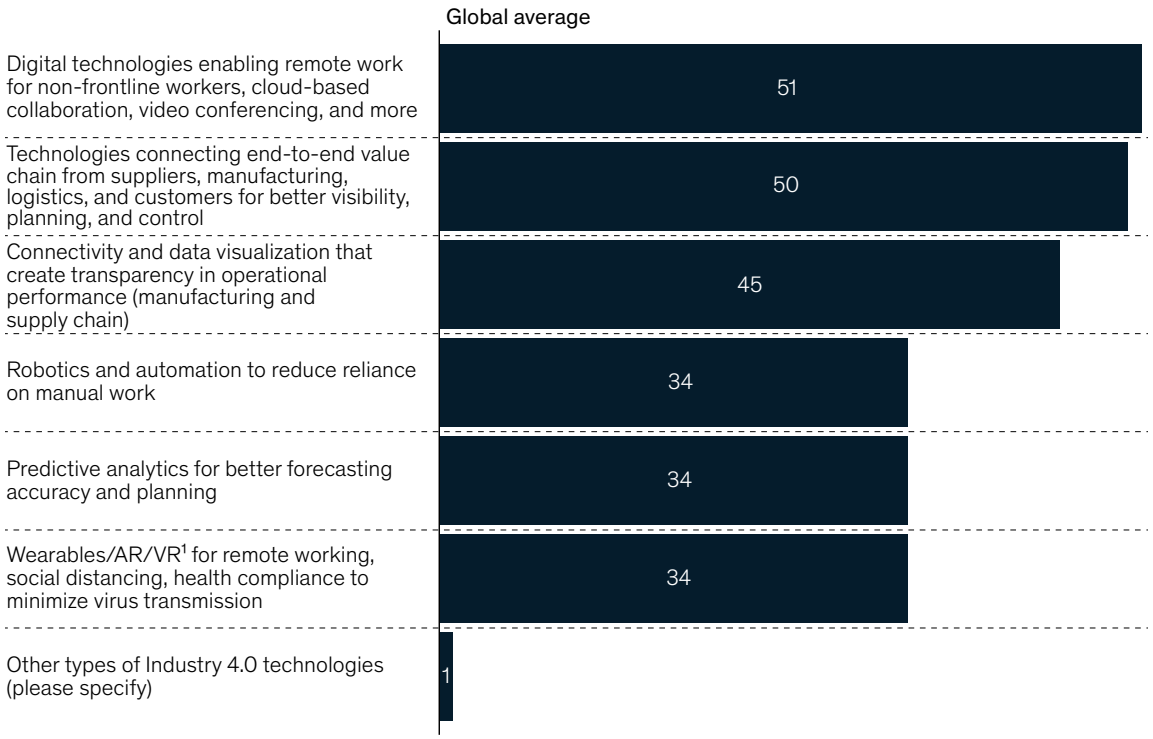
[1] Respondents could choose multiple answers

Exhibit 8

Remote work, supply-chain connectivity, and operational transparency are major focus areas for Industry 4.0 technologies.

Which technologies are you focusing on the most when implementing Industry 4.0 use cases?

Respondents, %



[1] Augmented reality/virtual reality

convergence between sectors. In our previous surveys, the top digitization drivers tended to vary by industry, but this year agility, flexibility, and manufacturing efficiency were common priorities for respondents from all sectors and geographies.

Their goals may have aligned, but significant sectoral differences in maturity remain. As in previous surveys, the respondents from the automotive sector report the greatest progress in the at-scale application of Industry 4.0 technologies, while energy and materials companies and CPG players report the least. Companies in the travel, transport, and logistics sector were the only group to report significant progress over the past year, with 17 percent saying they had successfully scaled multiple Industry 4.0 technologies, compared to only eight percent last year.

These findings reinforce the point that companies can look beyond their own industries for examples of digital best practice. With so much overlap between business objectives, a CPG player looking to improve its manufacturing flexibility might take inspiration from the efforts automotive suppliers, for example.

A next normal for Industry 4.0

For industry, the coronavirus crisis is changing the rules of the digital game. The pandemic has reinforced the value of industry 4.0, but it has also exposed the limitations of today's implementations and set a higher bar for success.

Moreover, the transition to a post-COVID-19 next normal has changed the context for many digital projects. Months of unexpected costs and dampened sales have left many businesses short of cash for technology investments. And the crisis has put more pressure on talent. Before the pandemic, 43 percent of executives were already reporting skills gaps in their organizations; now many must also struggle with new limits on labor mobility and access to workplaces.

The crisis is changing the strategic context too, affecting different sectors in widely differing ways. Some industries, such as aerospace, may be facing the prospect of a prolonged period of suppressed demand. Energy and materials players have seen both demand and prices fall, added to cost pressures. Other sectors, including CPG and medical products, are racing to manage high and volatile demand, with sales in some categories breaking records, while others remain well below historical averages. And in many sectors with extended supply chains, continued volatility and disruption is forcing companies to think as much about resilience and flexibility as they have about cost and efficiency.

The way forward

Against this background, a laser-focused approach to Industry 4.0 transformations seems the most realistic choice for most companies. Over the coming months, few organizations will have either the time or resources to support a scattergun approach to digital experimentation. Most will be better served by building a strategic roadmap for their Industry 4.0 ambitions, picking a handful of digital use cases that target their top one or two strategic objectives, and pursuing a rapid, agile process to refine, roll out, and aggressively scale these technologies.

Organizations will want to be ambitious but pragmatic. The pandemic has reinforced the message that digital solutions have the most impact when they extend beyond the walls of an organization and encompass more of its end-to-end value chain. At the same time, while lockdowns and travel restrictions remain in place in many regions, companies may be able to progress fastest with approaches that can be implemented remotely. Data analytics technologies, for example, may be easier to scale across multiple sites.

When it comes to the underlying technology backbone that supports Industry 4.0 use cases, companies will also need to think carefully about the trade-offs they make between speed and scalability. Quick fixes and

temporary workarounds can accelerate the early implementation of digital solutions, but projects that start this way often need time-consuming and expensive reengineering to work at scale later. These issues can be minimized by making smart technology choices early in the project lifecycle. The use of cloud-based solutions or standardized Internet of Things (IoT) platforms, for example, can accelerate the initial deployment of new solutions and support their large-scale application.

There are no easy fixes to talent and organization challenges, however. Companies will need the right people and the right processes in place to support their Industry 4.0 ambitions. The post-COVID-19 economic environment might make it easier to hire people with some of the critical skills companies will need in the coming years, such as in data science and IoT engineering. Players with significant long-term talent requirements may also consider stepping up their in-house capability-building efforts, especially for roles that require a combination of deep domain expertise and digital skills (examples include analytics translators and product owners). The imperative for rapid development and deployment of new solutions, meanwhile, will require companies to accelerate the adoption of agile ways of working, using small cross-functional teams and rapid, iterative processes.

As businesses across the world face a painful transition to the post-COVID-19 next normal, some companies may be tempted to slow, or even pause, their digital transformations. For most, that would be a mistake. Industry 4.0 leaders are already reaping the benefits of their pre-pandemic investments, creating the prospect of a widening gap between winners and losers. Instead, we believe the better option for most businesses is to focus their digital efforts, targeting the most strategically important opportunities and aiming to achieve real scale at an accelerated pace.

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