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McKinsey on Risk

Special edition: The COVID-19 crisis

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This special COVID-19 issue of *McKinsey on Risk* is written by experts and practitioners across McKinsey and prepared by the firm's Global Risk Practice. This publication offers readers insights into value-creating strategies and the translation of those strategies into company performance.

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Introduction

The word “unprecedented” comes easily to mind when we think of the COVID-19 pandemic, but it is worth recognizing that the world has been through far worse shocks. The 20th century was filled with horrendous trials, including a more-deadly pandemic coming on the heels of the First World War. For almost all of us, however, the present crisis *is* unprecedented. Whether you are 20 or 70, the past several months has brought health fears and economic uncertainty as never before. For too many, the virus has brought tragedy.

The pandemic is, above all, a humanitarian crisis. The great majority will survive the physical trial, but the society to which we are returning—much of it having been shuttered for the duration of the fight—will be in need of repair. Our companies and institutions face deep financial and business uncertainties. Hundreds of millions around the world are unemployed, most having lost their jobs suddenly as a growing economy was abruptly closed.

Leaders have had to keep employees and staff safe while making crucial decisions on operations and budgets. On the near-term horizon, a recession looms. Signals of its duration and depth remain partly obscured by the ongoing public-health struggle. An emerging characteristic, however, is that the shock has altered customer behavior and will work transformative changes into business models. To thrive in the next normal, organizations will adapt or decline.

Through the crisis, McKinsey has been working with the world’s leading organizations to sustain lives and rebuild livelihoods. As the public-health dimension of the crisis is addressed, the transition to the next economy, some contours of which were visible before the pandemic, is set to accelerate. McKinsey’s Risk Practice has been in the center of the strategic thinking needed to address the challenges. In this compendium, we present some of our most important discussions on the COVID-19 pandemic and its many adjacent issues.

We have arranged the discussions in four chapters. Articles in the first two (“Understanding the crisis” and “Resilience through the crisis”) delve into the nature of the crisis in its several dimensions and dissect what leaders must do to prepare for and operate in a dramatically changing environment. The underlying theme of resilience through the crisis and its aftermath unites considerations for boards and top management. The array of crisis-driven topics include workforce security, customer continuity, approaches to reopening, new questions of globalization, the role of government support, the balance between profits and cash flow, banking resilience, M&A, and cyberrisk.

The intersection of the crisis and the global economy has complex parameters, with effects varying in severity and differing in time, geography, and industry. The third chapter of our compendium ("Industry perspectives in the next normal") presents thinking by executives and risk professionals as they explore the complexities by industry and sector. Discussions delve into the areas of customer demand, research and innovation, and supply-chain disruption. One of the most pressing issues has emerged from how the crisis has driven the economy deeper into its digital pathways; the risks and opportunities of digital operations and automation are therefore addressed here as well.

Finally, important social themes have taken on a deeper urgency in the pandemic, which has put added stresses on human society. Some of these themes are addressed in our final chapter, "Social and environmental leadership in the next normal." The costs of ongoing gender imbalance, poverty and food insecurity, racial inequality, and climate change have become dearer. Together, they pose an unacceptable risk burden to our collective future. In consequence, our resolve to dismantle them must harden.

We are fully cognizant of the formidable challenges posed by the advanced solutions discussed in these articles. For this reason, our risk-based approaches incorporate the most practical methods for surmounting the challenges and achieving the deep changes called for in this crisis. In the current risk environment, we believe that there is no viable alternative. We hope this compendium will help you understand the crisis better and make better decisions in your responses to it.

Let us know what you think at McKinsey_Risk@McKinsey.com and on the McKinsey Insights app, and follow our ongoing coverage of the crisis on McKinsey.com.

Thomas Poppensieker
Chair, Global Risk Editorial Board

Chapter 1

Understanding the crisis

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Safeguarding our lives and our livelihoods: The imperative of our time

We must solve for the virus and the economy. It starts with battling the virus.

by Sven Smit, Martin Hirt, Kevin Buehler, Susan Lund, Ezra Greenberg, and Arvind Govindarajan

Everything has changed. Just a few weeks ago, all of us were living our usual busy lives. Now, things normally taken for granted—an evening with friends, the daily commute, a plane flight home—are no longer possible. Daily reports of increasing infections and deaths across the world raise our anxiety and, in cases of personal loss, plunge us into grief. There is uncertainty about tomorrow; about the health and safety of our families, friends, and loved ones; and about our ability to live the lives we love.

In addition to the immediate concern about the very real impact on human lives, there is fear about the severe economic downturn that may result from a prolonged battle with the novel coronavirus. Businesses are being shuttered and people are losing their jobs. We think and hope there is a different option from the ones posed in a recent *Wall Street Journal* editorial that suggests that we may soon face a dilemma, a terrible choice to either severely damage our livelihoods through extended lockdowns, or to sacrifice the lives of thousands, if not millions, to a fast-spreading virus. We disagree. Nobody wants to have to make this choice and we need to do everything possible to find solutions.

Why is this the imperative of our time? From multiple sources and our own analysis, the shock to our lives and livelihoods from the virus-suppression efforts could be the biggest in nearly a century. In Europe and in the United States, the required "lockdowns" of the population and other efforts to control the virus are likely to lead to the largest quarterly decline in economic activity since 1933. We have never in modern history suggested that people not work, that entire countries stay at home, and that we all keep a safe distance from one another. This is not about GDP or the economy: it is about our lives and livelihoods.

We see enormous energy invested in suppressing the virus, while many urge even faster and more rigorous measures. We also see enormous energy go into stabilizing the economy through public-policy responses. However, to avoid permanent damage to our livelihoods, we need to find ways to "timebox" this event: we must think about how to suppress the virus and shorten the duration of the economic shock (Exhibit 1). And we must do both now!

To solve for both the virus and the economy, we need to establish behaviors that stem the spread of the virus, and work towards a situation in which most people can return to work, to family duties, and to social lives.

To date, the only proven way of containing the virus, once community transmission is widespread, is by enforcing significant lockdowns; disciplined physical distancing; testing; and contact tracing. China, Japan, Singapore and South Korea have shown that these measures can stop the virus from spreading and enable economic activity to resume, at least to some extent. Everyone is closely following the developments in Italy and many other nations to find out whether the control measures there are sufficient to slow the growth of new infections and fatalities. Our common goal must be to implement the best possible response to stop this crisis.

At the same time, global and local leaders are also considering the economic impact of such measures. What will happen if many businesses stop operating or have to significantly reduce their activity? For how long can we do that? How deep an economic shock can we sustain without causing human suffering that our societies are unable or unwilling to bear?

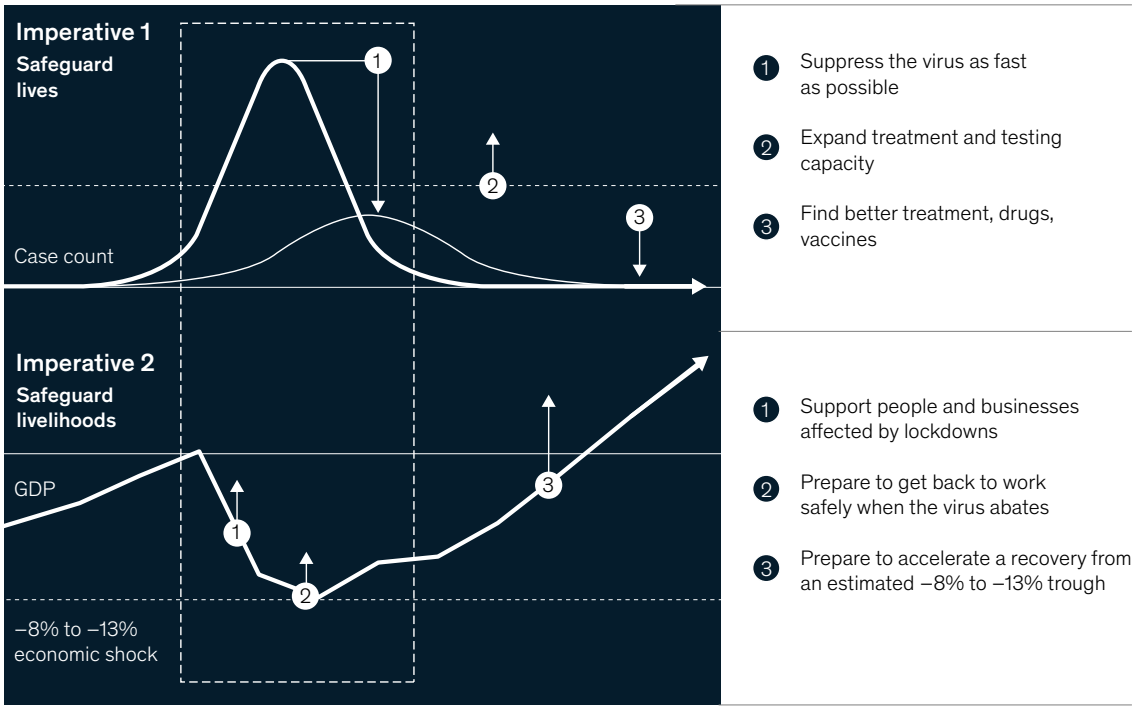
In the following sections, we offer ways to think about these pressing issues. (Please also see "Beyond coronavirus: The path to the next normal," by our colleagues Kevin Sneader and Shubham Singhal, which tries to imagine what the future might look like.)

Dealing with the uncertainty related to COVID-19

— *The spread of COVID-19.* How many new infections will we have? Is the mortality rate falling? Will the spread of the virus show any seasonality? Will a new strain of the virus evolve?

Exhibit 1

The imperative of our time



Source: McKinsey analysis in partnership with Oxford Economics

— *The public-health response in each country, state, municipality.* Will there be lockdowns? Will it still be possible to go to work? Will factories be allowed to operate? Do we need to submit to an official quarantine center upon arrival, or can we self-quarantine?

— *The impact on the economy and our livelihoods.* Will companies suffer and go bankrupt? Can the supply of essential goods and services be maintained? Will we have a job? How long will this last?

— *The consequences for our lives.* Will we be able to avoid infection? Are our loved ones safe? Can we still train for the sporting event we have been preparing for? Can we earn university degrees, now that many schools are closed and exams canceled?

These and a million more questions are racing through our minds, adding stress to the already challenging reality of living in the time of the coronavirus.

Two things are reasonably certain: If we do not stop the virus, many people will die. If our attempts to stop the pandemic severely damage our economies, it is hard to envision how there will not be even more suffering ahead.

The impact of lockdowns on consumption and economic activity

We are learning what happens during a lockdown of the kind implemented in China, Italy, and increasingly across Europe and the United States: economic activity drops more sharply than any of us

have experienced. People do not shop, other than for essentials; people do not travel; people do not buy cars.

We estimate that 40 to 50 percent of discretionary consumer spending might not occur. In every recession, people will cut back on purchases that can easily be postponed (such as cars and appliances), and increase precautionary saving in anticipation of a worsening crisis. What makes the coronavirus pandemic different is that people will also eliminate spending for restaurants, travel, and other services that usually fall but do not drop to zero.

A 40 to 50 percent drop in discretionary spending translates to a roughly 10 percent reduction in GDP—without considering the second- and third-order effects. That's not only unprecedented in modern history, it has been historically almost unimaginable—until now.

Already, we have some factual evidence for an economic shock on this scale, such as the COVID-19-related economic downturn in China, and early indications in US "high-frequency data" such as credit-card spending.

The longer a lockdown is in place, the worse the impact on our lives will get. To visualize what this means for people in lockdown areas, imagine cab drivers whose customers are not allowed to go onto the streets; professional chefs whose restaurants have been forced to close; and grounded flight attendants, their planes parked at the airports—for months. With 25 percent of US households living from paycheck to paycheck, and 40 percent of Americans unable to cover an unexpected expense of $400 without borrowing, the impact of extended lockdowns for many, many people will be nothing short of catastrophic.

The answer cannot be that we accept that the pandemic will overwhelm our healthcare system, and thousands, if not millions, will die. But can the answer be that we cause potentially even greater human suffering by permanently damaging our economy?

Bounding the uncertainty around this crisis

The worst and most typical reactions for humans when confronted with high uncertainty are to freeze, or to jump to a simple answer, such as "this problem will go away as quickly as it came, it is just like the annual flu." COVID-19 is particularly challenging in this regard because the majority of those infected will feel only minor symptoms, or none at all. It is an invisible but pernicious enemy. We must try to bound the uncertainty with reason and think about solutions within a limited number of scenarios that could evolve.

Next we describe the impact of COVID-19 on the world's economy along two dimensions which will primarily drive the outcomes of the crisis for all of us:

If we do not stop the virus, many people will die. If our attempts to stop the pandemic severely damage our economies, it is hard to envision how there will not be even more suffering ahead.

— The economic impact of the *Virus Spread*: the characteristics of the virus and its disease, such as transmission modes, rates, and mortality rates; and *Public-Health Response*, such as lockdowns, travel bans, physical distancing, comprehensive testing, contact tracing, health care provision capacity, the introduction of vaccines and better treatment methods

— The economic impact of the *Knock-on Effects* of the public-health responses, such as rising unemployment, shuttered businesses, corporate failures, credit defaults, falling asset prices, market volatility, and financial system vulnerabilities; and *Public-Policy Responses* to mitigate these knock-on effects, such as policies to prevent widespread bankruptcies, support incomes for furloughed workers, and protect the financial system and the viability of the most affected sectors.

In terms of *Virus Spread and Public-Health Response*, we currently see three "archetypes" of interventions and outcomes:

1. A strong public-health response succeeds in controlling the spread in each country within two to three months, and physical distancing can be phased out quickly (as seen in China, Taiwan, Korea, and Singapore).

2. Public-health response succeeds at first, but physical distancing has to continue (regionally) for several additional months to prevent viral recurrence.

3. Public-health response fails to control the spread of the virus for an extended period of time, perhaps until vaccines are available, or herd immunity is achieved.

In terms of *Knock-on Effects and Public-Policy Response*, we anticipate three potential levels of effectiveness:

— *Ineffective:* self-reinforcing recession dynamics kick in; widespread bankruptcies and credit defaults; potential banking crisis

— *Partially effective:* policy responses offset economic damage to some degree; a banking crisis is avoided; but high unemployment and business closures mute the recovery

— *Highly effective:* strong policy response prevents structural damage to the economy; a strong rebound after the virus is controlled returns the economy to pre-crisis levels and momentum, as justified by the economy's fundamentals.

If we combine these three archetypes of viral spread and three degrees of effectiveness of economic policy, we see nine scenarios for the next year or more (Exhibit 2).

We believe that many currently expect one of the shaded scenarios, A1–A4, to materialize. In each of these, the COVID-19 spread is eventually controlled, and catastrophic structural economic damage is avoided. These scenarios describe a global average, while scenarios will inevitably vary by country and region. But all four of these scenarios lead to V- or U-shaped recoveries.

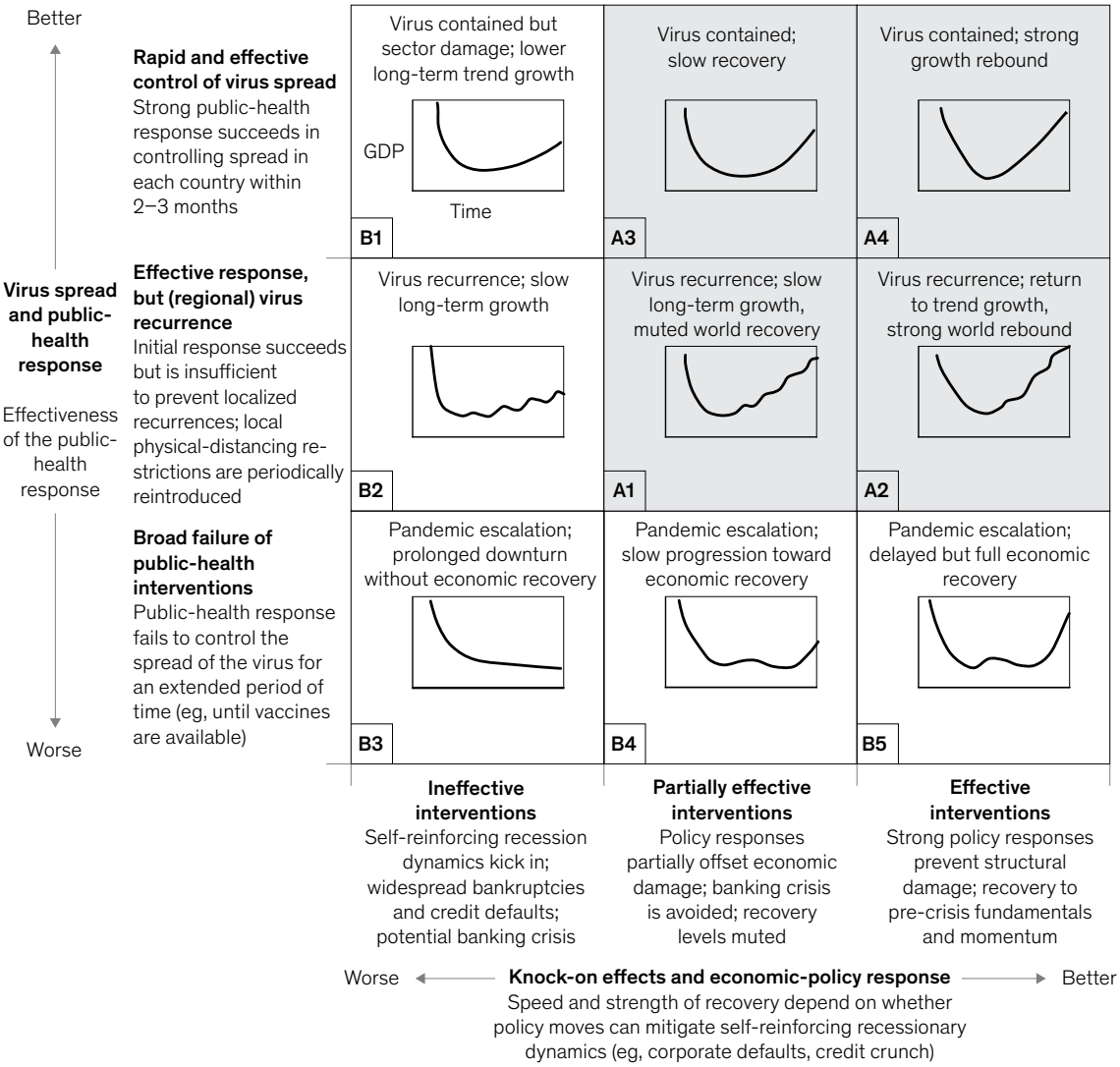
Other, more extreme scenarios can also be conceived, and some of them are already being discussed (B1–B5). One cannot exclude the possibility of a "black swan of black swans," with structural damage to the economy, caused by a year-long spread of the virus until a vaccine is widely available, combined with lack of policy response to prevent widescale bankruptcies, unemployment, and a financial crisis. This would result in a prolonged L- or W-shaped economic trajectory. With the number of new cases expanding exponentially in many countries in Europe and in the United States, we cannot exclude these more extreme scenarios for now.

However, as we still have little information about the probability of more extreme scenarios, we focus on the four that are more tangible for now. Within the next week, we will add breadth and depth to this view, working closely with Oxford Economics to develop several macroeconomic scenarios for each country, and for the world.

Exhibit 2

Scenarios for the economic impact of the COVID-19 crisis

GDP impact of COVID-19 spread, public-health response, and economic policies



Making it real: How this could unfold

With a little bit of luck, China will undergo a sharp but brief slowdown and relatively quickly rebound to pre-crisis levels of activity. While GDP is expected to drop sharply in Q2 2020, some signs of normal life are returning in Beijing, Shanghai, and most major cities outside Hubei. In this scenario, China's annual GDP growth for 2020 would end up roughly flat, wiping out the growth of 6 percent we expected just three months ago. Nevertheless, by 2021, China's economy would be on the way to regaining its pre-crisis trajectory, if not adversely affected by developments in the rest of the world.

In this scenario, the virus in Europe and the United States would be controlled effectively with between two to three months of economic shutdown. Monetary and fiscal policy would mitigate some

of the economic damage with some delays in transmission, so that a strong rebound could begin after the virus was contained at the end of Q2 2020. This would place Europe and the United States in scenario A3 (Exhibit 3).

Even in this optimistic scenario, however, all countries would experience sharp GDP declines in Q2, most of which would be unprecedented. Consumer spending in most advanced economies accounts for roughly two-thirds of the economy, and about half of that is consumer discretionary spending. Real-time data suggests that spending on durable goods including automobiles in areas affected by shutdowns could fall as much as 50 to 70 percent; spending on airline flights and transportation could fall by about 70 percent; and spending on services such as restaurants could decline in affected cities by 50 to 90 percent. Overall, as mentioned earlier, consumer discretionary spending could abruptly fall by as much as 50 percent in areas subject to shutdowns.

While increased government spending would help offset some of the economic impact, it is unlikely to offset rapidly enough nor in full. We estimate that the US could see a decline in GDP at an annualized pace of 25 to 30 percent in Q2 2020; major economies in the eurozone are expected to turn in similar numbers when all is said and done. To put this in perspective, the largest quarterly decline in GDP in the 2008–09 financial crisis occurred at an annualized pace of 8.4 percent in Q4 2008. The pace of decline would far outstrip any recession since the Second World War (Exhibit 4).

A darker picture of the future

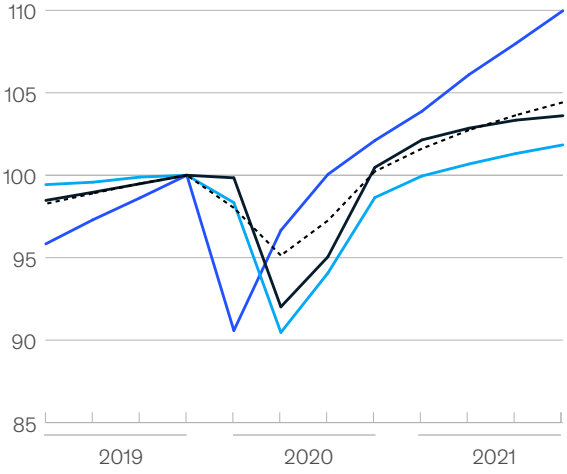
Of course, it is entirely possible that countries are not very effective in controlling the virus, or in mitigating the economic damage that results from efforts to control the virus spread. In this case, economic outcomes in 2020 and beyond would be even more severe.

In this more pessimistic scenario, China would recover more slowly and would perhaps need to clamp down on regional recurrences of the virus. It would also be hurt by falling exports to the rest of the world. Its economy could face a potentially unprecedented contraction.

Exhibit 3

Scenario A3: Virus contained

Real GDP growth: COVID-19 crisis, index (2019 Q4 = 100), local currency units



	Real GDP drop 2019 Q4 to 2020 Q2, % change	2020 GDP growth, % change	Return to pre-crisis level
China[1]	–3.3	–0.4	2020 Q3
US	–8.0	–2.4	2020 Q4
World	–4.9	–1.5	2020 Q4
Eurozone	–9.5	–4.4	2021 Q1

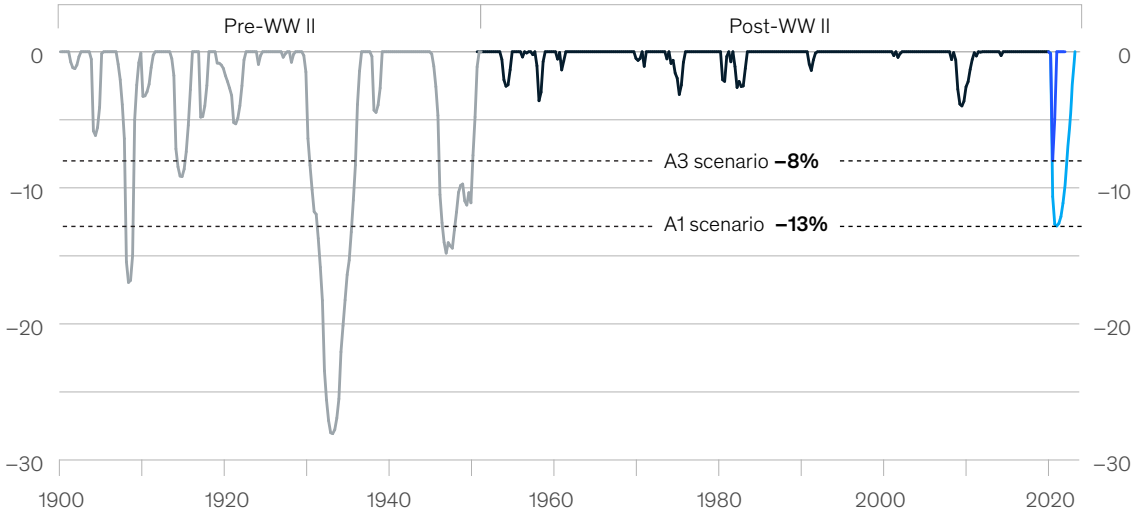
[1]Seasonally adjusted.

Source: McKinsey analysis in partnership with Oxford Economics

Exhibit 4

COVID-19 US impact could exceed anything since the end of WWII

US real GDP, %, total drawdown from previous peak



Source: Historical Statistics of the United States Vol 3, Bureau of Economic Analysis; McKinsey analysis, in partnership with Oxford Economics

The United States and Europe could also face more dire outcomes in this scenario. They could fail to contain the virus within one quarter and be forced to implement some form of physical distancing and quarantines throughout the summer. This could end up producing a decline in GDP at an annualized pace of 35 to 40 percent in Q2, with major economies in Europe registering similar performance. Economic policy would fail to prevent a huge spike in unemployment and business closures, creating a far slower recovery even after the virus is contained. In this darker scenario, it could take more than two years before GDP recovers to its pre-virus level, placing both Europe and the United States in scenario A1 (Exhibit 5).

The economic impact in these scenarios would be unprecedented for most people living today in advanced economies. Developing countries that have faced currency crises have some experience in events of this order of magnitude.

We are not writing to predict that this will happen but rather to issue a call to action: to take the measures needed to stop the spread of this virus and the damage to the economy as quickly as humanly possible. As we write this, countries in Europe and the United States have not yet taken the strong public-policy responses needed to effectively contain the virus. If we do not act to contain the virus quickly, then the scale of economic destruction that comes with extended lockdowns would become more likely, with severe consequences for our livelihoods.

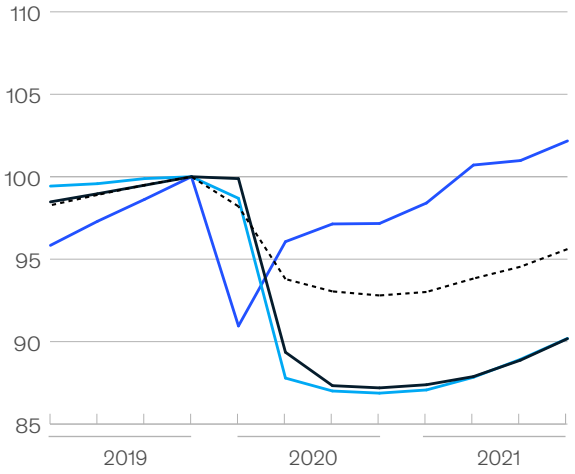
Safeguarding our lives and our livelihoods

To solve the conundrum of how to save lives without destroying our livelihoods, we must find ways to make lockdowns effective, such that they break the trajectory of the virus in as short a time as possible. The effectiveness of lockdowns will be measured in their ability to control the spread of COVID-19.

Exhibit 5

Scenario A1: Muted recovery

Real GDP growth: COVID-19 crisis, index (2019 Q4 = 100), local currency units



	Real GDP drop 2019 Q4 to 2020 Q2, % change	2020 GDP growth, % change	Return to pre-crisis level
China[1]	–3.9	–2.7	2021 Q2
US	–10.6	–8.4	2023 Q1
World	–6.2	–4.7	2022 Q3
Eurozone	–12.2	–9.7	2023 Q3

[1] Seasonally adjusted.

Source: McKinsey analysis in partnership with Oxford Economics

East Asian nations have shown this can be done through enforcing stringent lockdowns, surveillance, and monitoring of people's movements. As we write this, similar actions in most of Europe and the United States have so far been narrower, less vigorous, and not as effective. To be sure, these steps are challenging to enact in the West. But to break the momentum of the virus, we must act decisively.

The world's answer to breaking the conundrum will need to be robust, no matter whether we fully control the spread of the virus and prevent recurrence (ahead of vaccines or treatment innovations), or whether we cannot fully contain the virus and need to rely on continuing interventions for some time. In both cases we must find ways to protect lives and livelihoods.

We propose to move much faster in establishing comprehensive and clear Behavioral Protocols to allow authorities to safely release some parts of the blanket lockdown measures that choke our livelihoods today. These can only work if we also find Acceptable Enforcement Mechanisms for these protocols so that we do not run the risk of placing socially unacceptable demands on people.

Behavioral Protocols

These protocols are guidelines on how to operate businesses and provide government services under pandemic conditions. Some of these protocols are already in use. Could they be more widely adopted?

— Courageous healthcare professionals work in hospitals where the virus is rampant; they have strict rules regarding all aspects of their tasks, movements, and behaviors to keep them and their patients safe. Could your supermarket operate safely with these kinds of rules in place?

— In high-tech factories in China today, every person must have passed a COVID-19 test. Everybody. How would you feel about entering a plane today, if you knew that every passenger, crew member, and maintenance worker in

contact with the plane had tested negative for the virus?

— Some restaurants have already shifted entirely to home delivery, changing their business model and protocols to adapt to the virus. Could you operate your own service business safely by adopting new protocols?

These protocols cannot be static. Today, lockdowns are often implemented uniformly for everybody, everywhere, regardless of specific infection risks. Imagine a world in which, based on a deep understanding of infectious risks, tailored sets of protocols with different levels of rigor could be implemented for every city, every quarter, and suburban neighborhood.

Such dynamic protocols are technically possible. Modern technologies and data analytics can help track and predict infection threat levels to vulnerable population segments and areas; protocols and public-health interventions can be dynamically adjusted to provide protection when and where needed.

With such protocols, lockdown measures could be eased faster, for more people, in more places, while still maintaining the effectiveness of public-health interventions to control the virus. Much greater availability of personal protective equipment and test kits is also essential, of course.

Acceptable Enforcement Mechanisms

This is the harder part. How do we get everybody to accept the consequences of creating and implementing such behavioral protocols? The areas of sensitivity are many, including our personal freedoms, right to privacy, and fairness in access to services. There are no uniform answers to these issues. The level of sensitivity in each of these areas differs by country, and there also are huge differences in what is socially acceptable. In each country, people will have to work together to find ways to enforce behavioral protocols that fit their specific situation and circumstances. But make no mistake, the starting point will not be pre-COVID-19 social and societal norms—it will be the blanket lockdowns now in place across many countries.

In Hong Kong, the government has extended COVID-19 testing to all arriving passengers. It will allow asymptomatic travelers with the disease to self-quarantine at home. But because of the high risk of further transmission, Hong Kong requires these people to wear electronic wristbands to "geo-fence" them in their home. Compliance is enforced with the threat of long prison terms for violations.

We will need to develop and enforce protocols that allow us, as quickly as possible, to release some of the most stringent measures in appropriate places. And for that to happen, each government will need to find effective, yet socially acceptable ways of enforcing these measures and new protocols.

We need a plan to achieve both imperatives—now!

We will keep updating our scenarios, and we hope that in coming weeks we will have a better sense for which scenario the world is likely to follow. However, a few things are already clear:

— This could be the most abrupt shock to the global economy in modern history.

— There is a real risk for our lives and our livelihoods to suffer permanent and possibly irreversible damage from this crisis.

— While we must take actions to control the spread of the virus and save lives vigorously, we must also take action to protect our livelihoods.

— Behavioral protocols and dynamic interventions could help us release lockdowns earlier, get most people back to work, and get everybody's lives back on track.

As Angela Merkel said last week in an appeal to Germany, and others have echoed, our ability to come through this crisis will primarily depend on the behavior of each of us. The initial and immediate lockdowns are necessary to break the spread

of the virus and save lives. We believe that with the right protocols in place, and people following these protocols, the lockdown constraints can be gradually released sooner rather than later.

The question is: Can the world work fast enough on these protocols, and can we get societal acceptance to enforce them? If so, we should be able to control the virus, soften the inevitable economic crisis to sustainable levels, and safeguard our lives and livelihoods.

That is the imperative of our time.

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Getting ahead of the next stage of the coronavirus crisis

First the virus, now the economic fallout—you need to launch your plan-ahead team.

by Martin Hirt, Sven Smit, Chris Bradley, Robert Uhlaner, Mihir Mysore, Yuval Atsmon, and Nicholas Northcote

The COVID-19 pandemic is spreading at an extraordinary speed. You have put a crisis team in place and are doing all you can to keep your people safe, stay on top of your business, and deal with the uncertainty amid constantly changing conditions. However, that isn't likely to be good enough.

Close on the heels of the coronavirus outbreak, the next wave of disruption—the biggest economic shock since World War II—is headed our way. And it isn't just an economic shock: it is a shock to customer behaviors and business models too. The challenges associated with it will be orders of magnitude bigger than what we are used to dealing with. To handle them, you need to adopt an operating model that accommodates the extreme level of uncertainty facing your business.

Most companies will be very vulnerable to the economic fallout of extended public- and employee-isolation measures. As the number of issues your business is facing will likely rapidly escalate, there are two practical steps you can take to help stay ahead:

1. Launch a PLAN-AHEAD TEAM to get ahead of the next stage of the crisis.

2. Direct that team to work across *multiple time horizons*, using *five frames*.

The plan-ahead team will help elevate your view above the day-to-day response that your crisis team is managing. Its objective is to enable modular, scalable thinking that any CEO needs to navigate this unprecedented and rapidly evolving situation. The plan-ahead team will deliver a STRATEGIC CRISIS-ACTION PLAN to guide and accelerate your decision making.

Launch a plan-ahead team

Military organizations, which specialize in dealing with large-scale crises, often establish granular structures accountable for highly specific tasks, such as operations, communication, and intelligence gathering. However, they all use plan-ahead teams for key decision makers to leverage when dealing with complex and escalating sets of issues.

Your plan-ahead team should be charged with collecting forward-looking intelligence, developing scenarios, and identifying the options and actions needed to act tactically and strategically. Unlike a typical strategy team, it will have to plan across all time horizons (two, four, and seven days; two and four weeks; one and two quarters; one and two years; and the next normal) to enable you to stay on top of escalating issues and the decisions that you need to make in this time of high uncertainty.

A plan-ahead team delivers scenarios, recommendations for actions, and trigger points to the CEO and the management team so that they can decide on the right course of action. The decisions will be communicated to the crisis team or other parts of the organization for execution. If further clarification is necessary, the plan-ahead team will do another turn, collecting further information to reduce uncertainty.

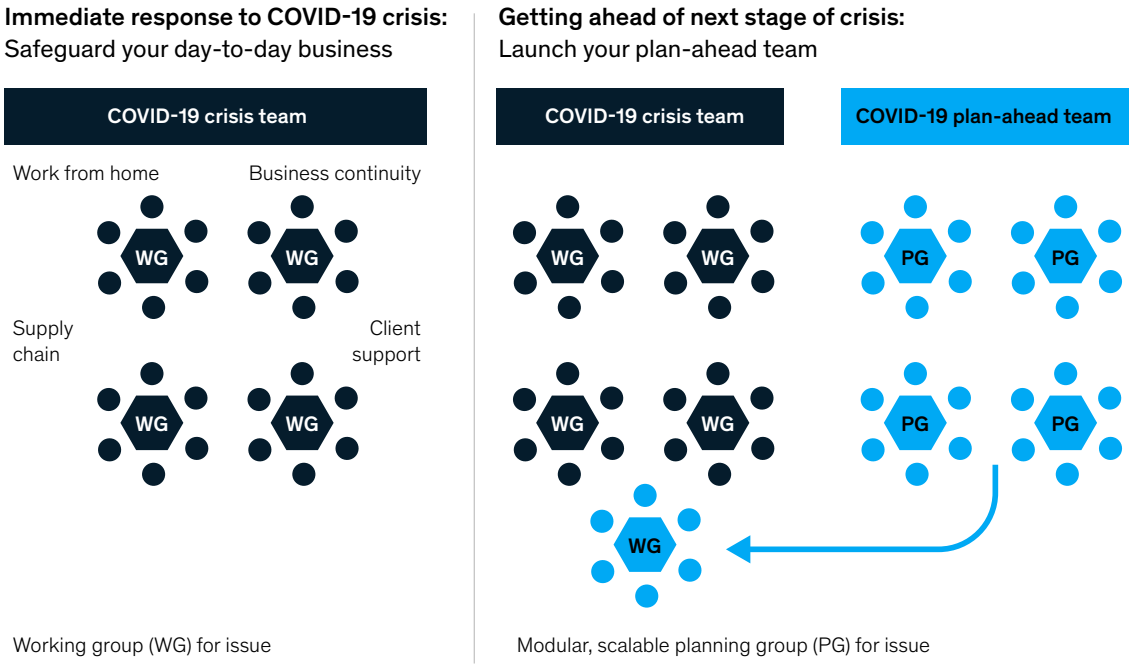
Importantly, the structure of the plan-ahead team is modular, with individual cells focusing on specific issues across time horizons. As new issues come up or time horizons expand, you may need to add new cells. This will enable the team to scale in line with the magnitude of the crisis (Exhibit 1).

While staff from a regular strategy group may form part of a plan-ahead team, the team's responsibilities are far from the strategy function's usual purview. Planning ahead today requires a dedicated effort, with a full-time senior executive leading and accountable for a team of ring-fenced high-potential employees located "next door" to the CEO.

As a first task, the team needs to develop a day-one version of a strategic crisis-action plan by working through the five frames outlined in the next section of this article. Speed is of the essence, and waiting for perfect answers can be counterproductive: you need to deal with

Exhibit 1

A plan-ahead team is modular, with cells focusing on specific issues across time horizons.



uncertainty, not let it bottleneck your decision making. Your plan-ahead team will need to update and improve plans continually by integrating new intelligence as it becomes available.

Work across multiple time horizons using five frames

The best response to navigating through the COVID-19 crisis and the subsequent recovery will differ based on a company's circumstances. For some, simply staying calm and carrying on will be the optimal approach. Others may need to undertake radical restructuring of their cost bases and business models immediately.

Even as you assess the best course forward, the one thing you shouldn't do is rely on what we frequently see in regular strategic-planning processes: ducking uncertainty altogether or relegating it to a risk analysis at the back of the presentation deck.

You can use a strategic crisis-action plan to guide your response through the next stages of the crisis as events unfold (Exhibit 2).

To produce this plan, you need to confront uncertainty head on. Your plan-ahead team needs to work through the following five frames:

1. Gain a realistic view of your *starting position*.
2. Develop *scenarios* for multiple versions of your future.
3. Establish your posture and *broad direction of travel*.
4. Determine actions and *strategic moves* that are robust across scenarios.
5. *Set trigger* points that drive your organization to act at the right time.

Exhibit 2

A strategic crisis-action plan guides responses to a crisis's unfolding stages.

Starting position (baseline and crisis context)

This week	2–4 weeks	1–2 quarters	1–2 years	Next normal
Zoom will run out of capacity	Capacity running out	Liquidity position	Growth likely to return	Business challenged postcrisis (eg, cruise ship)
Need to increase ventilator production 4-fold	Supply-chain instability			Business demand greater postcrisis (eg, home delivery)
Exports 40% down				
Government bailouts offered				

Scenarios (issues and opportunities)

This week	2–4 weeks	1–2 quarters	1–2 years	Next normal
All exports shut down	Access and nonaccess	Nationalization	Still not recovered	Business returns to normal because of testing (eg, hotels)
Share buyback unwise	Claims on production	M&A wave	Quarantine still needed	Drug approvals much faster
Need for/consequences of accepting government bailout	Collaboration across players	Market rebound ahead of fundamentals	Surveillance government	Pace of all delivery expected to stay at crisis-level pace
		No revenues		
		Price controls		

Posture and broad direction of travel

This week	2–4 weeks	1–2 quarters	1–2 years	Next normal
Back to normal in 8 weeks	Lean into government crisis response to get access	Through cycle, with good balance sheet	Back to business as normal or reset	Will now be model of 21st-century cooperation
Back to normal in 6 months		Mothballing		Resilience over profit; more working capital
Independence				

Strategic moves (options, safety nets, and no-regrets moves)

This week	2–4 weeks	1–2 quarters	1–2 years	Next normal
Scale capacity now	Push for critical-product funding	Test tourism to get back to work	Keep certain projects; stop others	Prioritize investments now based on what what will be necessary in future
Ship last supplies	Work to reopen exports safely to get supply	Massive testing		
Split workforce	Support clients and suppliers in critical areas	50-50 workforce quarantine		
Accept partial bailout				

Trigger points

This week	2–4 weeks	1–2 quarters	1–2 years	Next normal
Availability of machines	Analyze tier ≥3 suppliers to reveal critical-supplier exposure/extended shutdowns because of crisis	Analyze 13-week cash flow for liquidity challenges across scenarios	50% of geographic market regions facing demand drawdowns after Q4 2019	Significantly lower number of new-project opportunities because of market-segment shift
Government-bailout deadline				

We can't stress the idea enough: speed is of the essence. Your plan-ahead team must move fast, give you the day-one answer tomorrow, and iterate at high velocity. If new issues or opportunities come up, add modules for your plan-ahead team; don't slow down. The next few weeks and months will shape the future of your company—and possibly, your industry.

1. Gain a realistic view of your starting position

In times of extreme uncertainty, you should start by developing a clear baseline of your company's last-known position. Think of it as doing a "system restore" back to January. You don't have time for a cleansheet exercise; your existing strategy can be an anchor to use in systematically assessing what has changed.

Your plan-ahead team should take stock in three main areas: your financial assumptions, your ongoing initiatives, and your big strategic choices. Referring to a three-year plan and cataloging the planning assumptions made in that document will help determine what drives the financial performance of the company. Those factors should be sorted into three buckets: those that still seem about right, those that are wrong, and those about which you are unsure. If possible, do a quick sensitivity analysis to assess which assumptions matter most.

The next task is to list the big ongoing initiatives, starting with major projects on the capital-expenditure list, and organize them into the same bucket categories. The final step is to list the big strategic choices that underpin your company's business model—for example, sustain a price premium, keep investing in a physical network, and invest faster than the competition. Sort those into the three buckets too. You have now clarified the starting picture and brought the critical issues to the foreground.

2. Develop scenarios for multiple versions of your future

The traditional approach to strategic planning too often either adopts a head-in-the-sand position (assuming away uncertainty) or suffers from "deer in the headlights" syndrome (being paralyzed by unpredictability).[1] Now more than ever, you can't get rid of uncertainty; you have to confront it. A good way of doing this is to build scenarios, and McKinsey's global COVID-19 scenarios are a useful starting point (Exhibit 3).[2]

We took the two biggest uncertainties associated with the crisis—the virus spread (and the associated health response) and the economic knock-on effects (along with the public-policy response)—and combined them into potential macroeconomic outcomes.

The aim isn't to debate which scenarios are more likely but rather to explore what is possible—and to ready yourself for anything that looks plausible. Chopping off "the tails" to eliminate the most extreme eventualities is where scenario analyses often fail, resulting in mere variants of a base

We can't stress the idea enough: speed is of the essence.

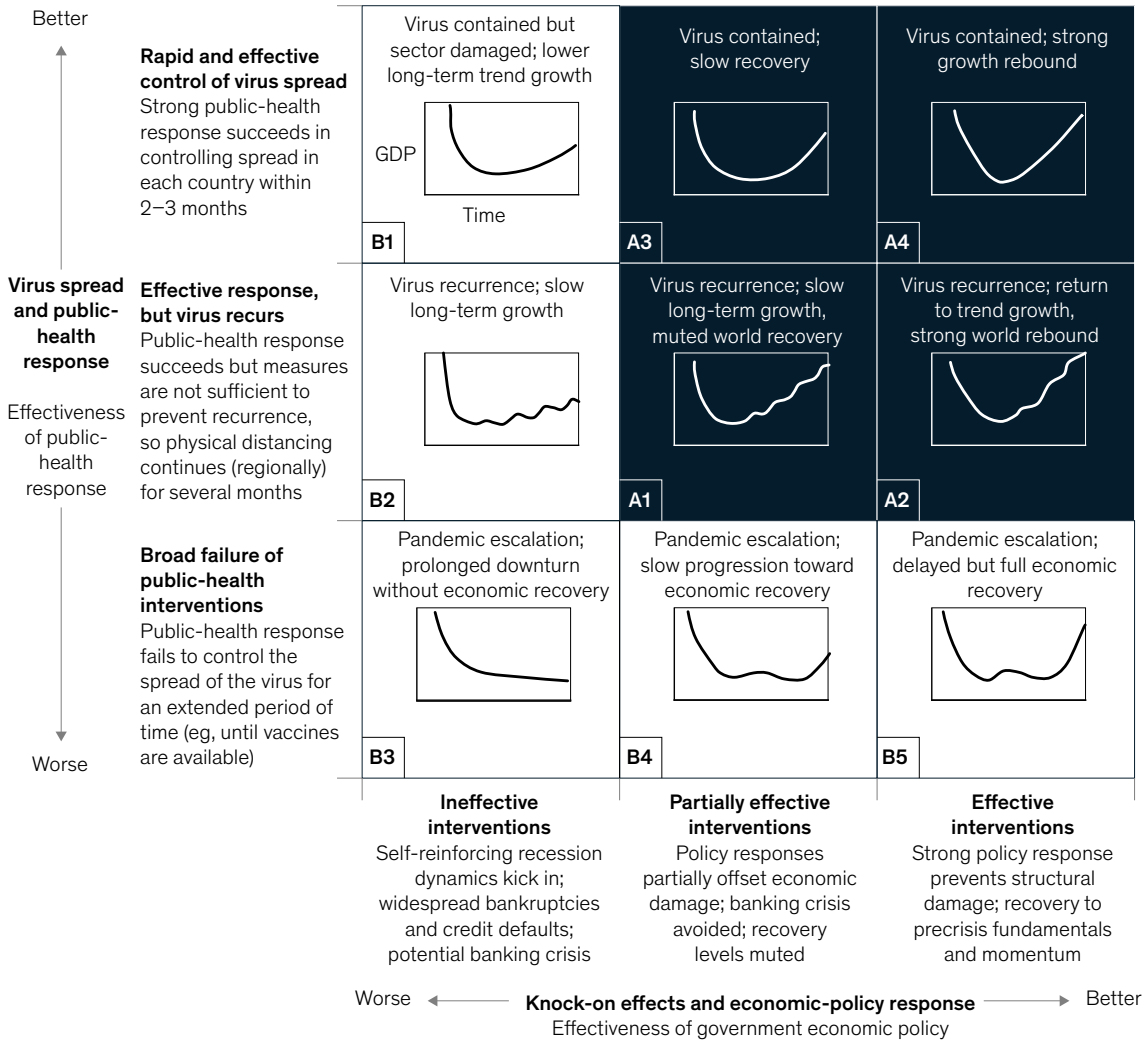
[1] Hugh Courtney, Jane Kirkland, and Patrick Viguerie, "Strategy under uncertainty," *Harvard Business Review*, November–December 1997, pp. 66–81, hbr.org.

[2] Kevin Buehler, Ezra Greenberg, Arvind Govindarajan, Martin Hirt, Susan Lund, and Sven Smit, "Safeguarding our lives and our livelihoods: The imperative of our time," March 2020, McKinsey.com.

Exhibit 3

Scenarios for the economic impact of the COVID-19 crisis are useful as starting points.

GDP impact of COVID-19 spread, public-health response, and economic policies



case. While some scenarios may seem too awful to contemplate, that doesn't mean they should be disregarded. Your plan-ahead team should develop at least four scenarios. If you only have three, it is all too tempting to default to a middle option as the base case.[3]

Next, your plan-ahead team should stress-test your company's performance and strategy against each scenario by translating them into modeled business outcomes. Identify where your business is most at risk and where it is most resilient; estimate your capital "headroom" (or shortfall) in the worst-case scenario. Then assess your current slate of strategic initiatives against each scenario, determining whether each initiative should continue as planned, accelerate, or stop.

Developing scenarios brings immediate benefits. It allows you to bound uncertainty into manageable

[3] For more on scenario building, see Charles Roxburgh, "The use and abuse of scenarios," November 2009, McKinsey.com.

In a world full of uncertainty, you have to stand for a goal that will matter above all else.

and measurable boxes, reducing confusion, and to sort out what is truly unknown and what really matters. You can identify, with confidence, the no-regret moves with which you should promptly proceed while creating a clear structure to use when working through options to handle a range of possible outcomes. Finally, it enables you to identify the signals that will be early markers that a scenario is coming to pass.

It is extremely important that a plan-ahead team considers multiple scenarios as input and converts them to tangible ideas for action. However, it is also important that the team has a set of planning assumptions provided as an input to delivery teams. If the plan-ahead team believes that the company needs to operate under an assumption of an 8 percent drop in GDP, then the team that is constructing the financial portfolio can't make an assumption that is different than that.

One approach we have found useful is to start by developing a clear view on how the primary threat or opportunity that you face (for example, macrolevel and industry trends, operations, and regulation) could evolve. Then think through how the evolution of that threat or opportunity could affect your business performance. Running this loop a few times helps you acquire a nuanced view of how the environment is likely to change.

A plan-ahead team is in the best position to define the inputs that are necessary for an organization's scenario-development and decision-making processes because it is the team responsible for gathering pertinent, high-quality information for the organization. The reason is simple: gathering high-quality information about the environment is a costly exercise that usually requires a lot of nuance and judgment. It is far more involved than a simple exercise of analyzing positive and negative sentiments on Twitter.

3. Establish your posture and broad direction of travel

One of the key responsibilities of a plan-ahead team is to determine the best response to an evolving situation based on the company's circumstances after the immediate crisis passes. While some companies may need to enter a long and difficult period of slow rebuilding, others will find near-term opportunities in big, strategic moves and innovations. The point isn't to develop detailed plans but rather to figure out your broad direction of travel—the big thematic idea around which you can form a strategic response. In a world full of uncertainty, you have to stand for a goal that will matter above all else. This big idea will bring coherence and determination to your evolving tactical response.

In a disruption of the magnitude of the COVID-19 pandemic, a point of view on what has changed permanently is essential. It helps you avoid a hedging approach to the future in which you spread your resources like peanut butter across a range of opportunities without really taking a clear stance. Many successful companies have confronted these moments when they have had to commit to a vision of the future. In the 1980s, for example, Bill Gates didn't know which operating system would emerge as dominant, but he did know that, in all scenarios, personal computing would be the next big thing and computers would run on graphical user

interfaces. He also knew that it was likely that the winners would take all. This led Microsoft to adopt a clear posture of trying to win the race for the PC operating system.

Coming out of developing your scenarios, you will have thought through how the dual shocks to your demand and your business model might play out. You might see a few possible versions of the next normal. While you are staying open to multiple possibilities, it might help to consider in which direction you need to establish your broad direction of travel (Exhibit 4).

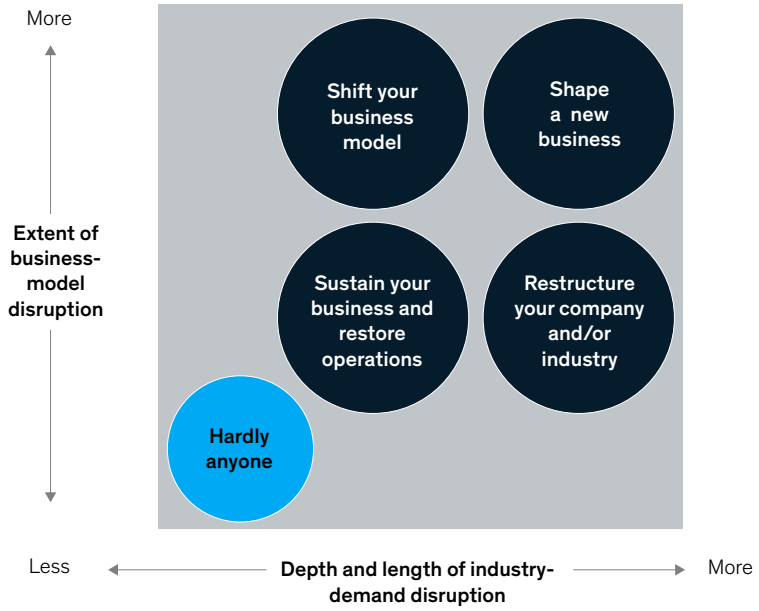
With the COVID-19 crisis, hardly anyone will be in the bottom corner of the map shown in Exhibit 4, as the challenge is so ubiquitous. Some businesses will have a dominant imperative to sustain, as they will return in similar form but at different recovery speeds (for example, with essential subscription services, such as core consumer telephony and electricity retailing). Others will primarily orient to restructure to match a much leaner demand environment (for example, the cases of airlines and cruise ships). Other companies will have less severe demand shocks but will face radically different customer behaviors. They will have to shift their business models. Yet other companies and industries will find themselves in a completely different territory on both the axes shown in Exhibit 4, and they will have to shape entirely new businesses.

One notable feature of the COVID-19 crisis is a radical shift to distance business models. In a matter of days, people massively stepped up their use of technologies that enable remote learning, working, services, and consumption. Will that adoption recede postcrisis, or will we move to a new status quo? As a result, should you now accelerate your investments in a digital business model? Do you need to scale back your capital-investment plans focused on increasing your physical footprint and instead secure bandwidth to host your virtualized business? Given the level of uncertainty, you can't put all your eggs in one basket or bet on hope. The critical output of this frame is to establish conviction on future themes before defining any initiatives.

Exhibit 4

Choose a strategic direction based on shifting disruption and options.

Broad direction of travel toward next normal



4. Determine actions and strategic moves that are robust across scenarios

In a world of extreme uncertainty, a rigid, deterministic plan won't be right for very long. But making everything flexible can be an expensive path to nowhere. Rather, you need to think about building a portfolio of strategic moves that will perform relatively well as a collective across all likely scenarios, even if every move isn't a winner on its own.

A tried-and-tested approach is to work through one scenario at a time, defining the optimal set of moves you would make if you knew for sure that the scenario would pan out. Start with your list of existing initiatives—those that were on the slate before the crisis—then scan widely for opportunities and threats before deciding which initiatives to cull and which new ones to add. Then check for the big commonalities and differences among the scenario-specific strategies.

Some initiatives will make sense in all scenarios; those are no-regret moves with which you can proceed with confidence. Others will pay off big in some scenarios but may hurt in others; those are big bets, and the key here is to gather as much information as possible before making a go/no-go decision. If possible, you should try to break them down into smaller parts, investing in phases to reduce the risk associated with a large, one-off investment under high uncertainty.

Other moves are about buying the right to act preferentially later—real options. Options are worth a lot more money when volatility is high, so now is a good time to create optionality where you can. Companies in oil and gas exploration and movie studios, for instance, do this as part of everyday business, but real options can be everywhere in your business when you look for them. Finally, there are moves you could consider that mostly protect you from the downside. You can't avoid risk, but these safety nets help you make sure your risk exposure is smart and offers a good upside, with a protected downside.

The outcome of this frame needs to be a portfolio of several dozen strategic moves, ranging from no-regret moves to point-of-no-return moves that can irreversibly alter the future of a company. Ensure that the moves on each topic are thoroughly syndicated with major decision makers and stakeholders, inside and outside the organization. Ideally, you do this through tabletop exercises or workshops that force decision makers to engage on the very real possibility of pulling the trigger on moves that may appear unlikely at the moment.

5. Set trigger points that drive your organization to act at the right time

In an environment as uncertain as the one with COVID-19, the passing of time will make a rigid plan rapidly outdated. The world is going to evolve fast. You don't yet know which scenario we are approaching. But you need to try to be the best learner (the first to know where the world is going) and the best adapter (the one making the best decisions and iterating the plan). It isn't about starting with the perfect plan: it's about being on the fastest improvement trajectory. In a fast-moving world, that will matter most, as even a great plan will become obsolete.

As discussed, the majority of the moves we describe will only make sense to make under a certain set of circumstances. However, many companies that face disruption only start to debate those moves once the circumstances clearly present themselves. This, together with high emotive and potentially consensus-driven decision making, is the root of the delayed or lack of action that befalls many management teams.

To avoid such an issue, it is extremely important to ensure that every move comes with a clearly articulated set of trigger points for when the organization should begin detailed planning and execution for that move. That point, or the trip wire, is the time at which the probability of that move being necessary has increased and it makes sense to invest a team in ensuring that the organization can act quickly. Making a decision on when trigger points

have been reached—and when detailed planning and execution should commence—is a key role of the CEO, in conjunction with the plan-ahead team.

Stay ahead in the race against time

In times like these, being on the fastest trajectory matters more than having a great plan because plans quickly become outdated. Staying ahead in the race against time means making the following moves:

— Convert your actions and portfolio of moves into a *strategic crisis-action plan*, ideally syndicated and "decision primed" through a tabletop simulation.

— Roll back all initiatives in the plan to *near-term goals and decision points*. That will give you visibility and allow you to direct the action in real time.

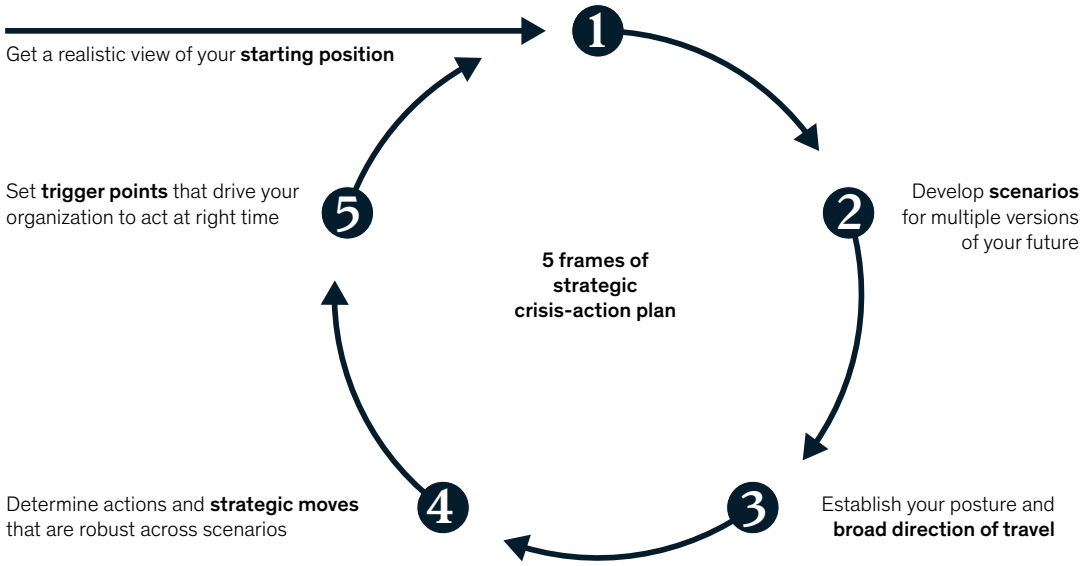
— Create a set of indicators aggregated into a *control tower* that serves as an early-warning system to signal which scenario is emerging. Your job isn't to know the unknowable but to be the first to know and the fastest to act. This requires a sentinel that can see the signals first, combined with a plan that is flexible and ready to act on the trigger points.

Additionally, a reality of many of the companies we are speaking to is that their current budgets are dead in the water and they have no credible way of setting new budgets. This will force a much more agile, real-time approach to resource allocation, perhaps one of working in quarterly sprints. Funding will be stage gated and released, and there will also need to be trigger points for disinvestment or further cutbacks. You might have to demolish the long-held divide between strategy and finance functions swiftly.

That all might feel like a lot, and you most likely don't have the bandwidth to manage it on your own. That's why, even as your crisis team is busy keeping the business afloat, you should have your modular, scalable plan-ahead team at your side to support your iterative planning cycle throughout the crisis—no matter how overwhelming the issues seem to become (Exhibit 5).

Exhibit 5

An agile plan-ahead team can offer quick responses to rapidly changing circumstances, using five frames.



Under high levels of uncertainty, you need to operate at high speeds. You will need to cycle through the playbook regularly. Bias toward speed rather than perfection; and the sooner you start, the better. Accept that the first pass won't be 100 percent right but that you are going to get better answers after each iteration. Scenarios will be refined and refreshed, and more information will surface as time unfolds. Some things will drop out; others will be accelerated. Evolve your way to a more sophisticated answer.

When an escalating set of issues triggered by the next wave of the COVID-19 crisis hits you, your plan-ahead team will be what keeps your sights above the fray and what helps you win the race against time. *To get ahead of the next stage of the crisis, launch your plan-ahead team now*.

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Leadership in the time of the coronavirus: COVID-19 response and implications for banks

As the effects of the COVID-19 pandemic continue to reverberate, banks have a role to play as systemic stabilizers.

by Kevin Buehler, Olivia Conjeaud, Vito Giudici, Hamid Samandari, Lorenzo Serino, Marco Vettori, Laura Webanck, and Olivia White

The profound humanitarian fallout of the COVID-19 crisis carries with it the potential equally disruptive economic fallout. The path ahead is hence a precarious one, driven by epidemiological uncertainty, the unique blend of resulting shocks to both supply and demand, and "preexisting conditions" in the global macroeconomy.

At this writing, Europe has become the prime epicenter of the crisis, with nearly 75 percent of new cases reported globally on March 18. In Italy, years of low growth and high government debt are colliding with the rapid spread of the disease in an elderly population. Spain and France, face similar prospects, as do many countries in Asia. Thailand, for example, is similarly reliant on exports and tourism receipts and already has one of the highest debt burdens in the region at around 75 percent GDP. The particular characteristics of the US economy may make it susceptible to the impacts of COVID-19, despite its general strength before the virus' arrival. A high number of households and businesses are vulnerable to the impact of disease-containment measures, because of their high-debt burden.

At the same time, yield chasing over the past several years may exacerbate the potential for market illiquidity. The Fed and the European Central Bank (ECB) have already cut rates to zero; historically low rates limit the tool kit of other central banks, and several global regions are probably already in recession as many economists and the latest data from China suggests. Addressing the situation will require further global action and public–private coordination. Banks around the globe will play a critical role in this as systemic stabilizers for their customers, their employees, and for their economies at large. Cash and deposit services, credit extension, payment facilitation, and market making are all essential services.

This memo lays out our initial recommendations for actions that banks should take now, beyond what common business continuity plans or crisis response checklists suggest. In their immediate response, we believe institutions should plan for an acute period of multiple months, spanning their entire footprint, and with a view of all stakeholders—not the more constrained circumstances that business continuity plans typically address. At the same time, banks may begin to stress test their capabilities and financials, laying the groundwork for identifying long-term strategic implications and ensuring a smooth bridge between the present and future.

Immediate response

Banks have already taken a series of actions in reaction to the spread of COVID-19. Common steps we've seen include establishing a central task force, curtailing travel, suspending large-scale gatherings, segregating teams, making arrangements for teleworking, and refreshing external-vendor-interaction policies.

Beyond these immediate and basic actions, banks should prioritize three measures tailored to the particular combination of biological and market stresses and how they affect the market. These points draw on the experience of China, Italy, and several other countries, acknowledging that differences exist in economic and political structures, healthcare systems, and social and cultural norms among these countries.

1. Normalize workforce measures for multimonth sustainability

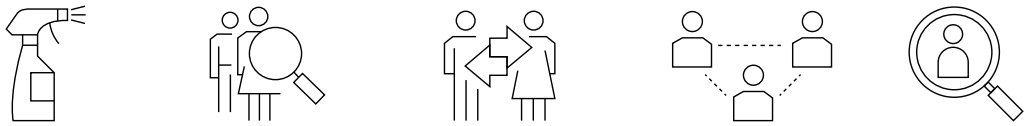
As a top priority, nearly all firms have already taken proactive measures to protect their people and to contain the spread of COVID-19 (Exhibit 1). These include restricting travel and taking other prevention-oriented policies, emphasizing workplace hygiene, offering alternative ways of working, and initiating proactive communication.

However, health measures to contain propagation may take months, not days or weeks, as we've seen in China. Therefore, banks will need to make sure the measures they have put in place are sustainable—and designed to get the best out of their people, while preserving their mental

Exhibit 1

For banks that choose to maintain branches, certain tangible actions can help manage operations while monitoring risks.

Checklist for banks that maintain branches



☐ Clean	☐ Identify	☐ Alter processes	☐ Control	☐ Monitor
Ensure cleanliness and deep clean all branches and customer-interaction locations to give employees and customers comfort	Heighten monitoring of physical channels to quickly identify the ones affected (confirmed and potential) and develop a playbook for addressing contamination	Identify and alter physical process requirements—to ensure continuity on main services even with branch closure or staff reduction[1]	Ensure appropriate controls in altered workplace setting and that trade-offs between contingency measures and risk appetite are well-considered	Monitor customer-service capacity against need and reduce operations if customer need is not evident

[1]For example, review ATM and branch limits on receipts and payments; identify alternatives to in-person sign-offs; leverage branches with remote advisory installed capabilities).

and financial well-being over such a period. Further, specific consideration will be required for contingent and contract workers, who might be most immediately impacted.

Because banks are providers of essential services to customers and communities, and the markets more broadly, they will need to adopt a carefully segmented approach to workforce management, informed by service criticality and exposure risk (Exhibit 2). Particularly careful attention is required for those in the workforce who provide critical services that are either customer facing or that require infrastructure only available at work premises. These include, for example, branch employees, some call-center support, sales and trading personnel, employees in the Treasury function, as well as some facilities and custodial staff. Korea's Shinhan bank directed 150 of its call-center staff to work remotely, to handle activities that do not require access to customer information, such as queries on financial products. More detailed requests they forward to colleagues who continued working in the office.

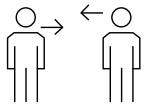
One case in point: trading activities are central for market functioning but cannot easily be executed remotely because of technology and compliance requirements. Most banks have already taken a number of actions including segregating team members and activating business continuity plan (BCP) sites for parts of the sales team. Furthermore, BCP sites may have insufficient capacity to support a split-team model, requiring banks to consider alternatives in the event of a prolonged crisis. Since the virus reaches across all major financial centers, the potential for simultaneous infection across sites rises as the disease spreads. Institutions should maintain and test backup plans in case this occurs and establish clear triggers for putting such plans in place, such as a case of infection at or in the vicinity of one site. Backup plans might include the potential to move immediately to a work-from-home model, for which regulatory clearance and robust technical testing should occur preemptively.

For those segments of employees for whom remote work is possible (a group that may well have to be larger than initially envisaged), banks should

Exhibit 2

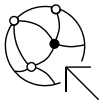
As COVID-19 cases grow, there is a range of actions emerging across banks to protect and communicate with clients.

Checklist for client engagement



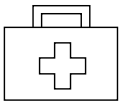
☐ **Engage clients**

Proactively reach out to clients encouraging proactive exchange on upcoming financial challenges and offer advice on how to weather negative impact. This will require training bankers to engage clients and coach them through the crises



☐ **Identify risk**

Review and sharpen risk identification, monitoring and measurement to identify clients with higher vulnerability to primary and secondary effects of the outbreak, and anticipate, as much as possible, detection of creditworthiness deterioration



☐ **Support vulnerable clients**

At a high level, clients that may need more support will be small businesses within affected sectors, individuals who are self-employed or working in affected industries, especially those with higher debt levels. On the other hand, larger companies may be less affected, along with those at the forefront of the humanitarian response

☐ **Mitigate risk**

Adjust potential credit-risk-mitigating actions for pre-delinquency, early delinquency, and nonperforming exposures, in light of specific implications of COVID-19 on clients, eg, temporary vs long-term nature of business disruption, value-chain considerations

review policies, practices, and controls and tailor them to the new working environment. "Work-at-home" organizations and routines, output-based performance management, and technological capabilities should be a particular focus. In parallel, banks should make sure both employee relations and internal technical support are sufficiently staffed and trained to accommodate potentially new and elevated levels of requests. Critically, institutions will need to ensure that appropriate controls are in place in all altered workplace settings and that trade-offs between contingency measures and risk appetite are well-considered. Key considerations include data security, fraud, cybersecurity, and privacy, especially safeguarding personally identifiable information. Bank managers should also pressure test and update business-continuity and disaster-recovery plans as needed for these new working conditions.

2. Provide essential banking services to retail consumers

People will continue to need essential banking services through these trying times. Banks should continue branch and ATM operations with the appropriate safeguards, while encouraging widespread use of remote services. This approach will account for needs and preferences across all consumer segments, including the older part of the population that is both more vulnerable to COVID-19 and less likely to adopt digital channels.

Institutions can continually monitor and assess consumer demand for in-person services to adjust capacity and minimize risks. For example, in some areas of China, banks observed limited demand for services other than ATM access and so were able to close most of their branch locations without disrupting customer service. Banks in several regions, including Hong Kong, Italy, and Germany, have also closed (some) branches or moved to restrict staffing and hours when the risk to the public and employees was deemed to outweigh the need to maintain the branch. In Korea, which has adopted aggressive virus testing, branches have tended to remain open unless active cases are detected.

Physical locations that adopt rigorous yet consumer friendly approaches to disease containment both safeguard health and inspire confidence in the system. Examples borne from experience include evident deep cleaning of all branches

and ATMs, alternatives to in-person sign-offs, and further leveraging branches with remote advisory capabilities.

At the same time, banks should encourage and support customers to use digital and other virtual channels, wherever possible. To encourage customers to use remote channels and digital products, institutions can launch positive and safety-oriented messaging aimed at reducing reliance on branches for services that are digitally available—while also providing tutorials online and by phone and increasing remote support options. Banks can also enhance their current digital offerings, identifying key functionalities that can be improved quickly; for example, they can increase the limit for online activities, and they can simplify the procedure to reset passwords. Institutions in both Italy and China have found that many people readily used remote channels and digital offerings (see sidebar "Digital shift in China: Digital offerings can provide necessary services while supporting employee and community safety").

Regrettably, increased fraud and information security risk are likely. Opportunists and threat actors may exploit confusion and vulnerabilities stemming from changes in ways of working and serving customers. Banks should include risk professionals on agile-product-development teams and run controls tests in parallel. However, they may also need adjust their risk appetite upward and should make this explicit. Recent regulatory communications seem to indicate that such an adjustment, if well-examined and well-communicated, would be positively received.

3. Fulfill social mission to support households and businesses with credit

A majority of households and businesses will be negatively affected by the unprecedented nature and extent of the current health and safety measures. For example, in the United States, 74 percent of workers say they are living from paycheck to paycheck, while 58 percent are paid by the hour. For them, financial impact of quarantine measures and lack of employment—due to reduced sector activity, such as travel—will be particularly difficult. The stress will be especially acute for those who are already in debt. These individuals will likely need further support from banks to support day-to-day liquidity needs through credit. Even in places where household savings rates are high, such as in some Asian countries, a greater connection to global markets means more households and businesses are likely to be affected.

Among businesses, the impact will vary significantly by sector and by company. It seems quite likely at this point that travel and tourism, entertainment, automotive, oil and gas, and healthcare industries will be most affected due to disruptions in supply

Digital shift in China: Digital offerings can provide necessary services while supporting employee and community safety.

On average, the Chinese population spent around seven hours per day on their phones before the virus struck, mainly on entertainment, social media, and gaming as well as ordering food and essential products for delivery.

Banks that were integrated into this ecosystem or were able to roll out new solutions to interact with new behavior (for example, with the ability to make payments online or by having credit solutions online) were the most successful in driving customers to digital channels—and to ones that protect the customer as well as the employee. The increased use of digital alternatives during the crisis has changed company expectations for future digital offerings.

and demand. Within these sectors, smaller businesses, such as those that cannot shift to remote work and online delivery and those catering to the most vulnerable segments, are likely to be more affected.

From a credit perspective, banks should rapidly identify most affected sectors and customers to understand how they can be most supportive to their clients and community. Some are already considering relaxed payment schedules and availability of credit, and the media is already monitoring hardship requests. In doing so, banks might draw on lessons learned in Italy and elsewhere (see sidebar "Client response in Italy: Segmenting the client base can maximize the effectiveness of bank support."). This will include proactively engaging with clients to understand their situation, segmenting portfolios based on expected needs, developing an internal view of where support measures will be the most effective, and adjusting risk-mitigation actions for early delinquencies and for nonperforming exposures. While banks have taken some of these relief measures as part of natural-disaster response in the past, this situation will require a much broader geographical scope. Supporting clients in these critical times will deepen customer relationships and reaffirm the role of banks as key enablers of the economy.

Regulators around the globe understand the challenge and are already relaxing rules for banks. For example, the ECB announced on March 12 that banks can fully use their capital and liquidity buffers. Banks will be allowed to operate temporarily below the level of capital defined by the Pillar 2 Guidance, the capital conservation buffer, and the liquidity coverage ratio. The ECB also suggested that national authorities relax their required countercyclical capital buffers. In Asia, the Bank of Japan has loosened the monetary policy through conducting various operations including purchases of Japanese government bonds, US dollar funds-supplying operations, exchange-traded funds, and real estate investment trusts. In the United States, regulators have expressed support for firms that choose to use their capital and liquidity buffers to lend and undertake other supportive actions in a safe and sound manner, saying that these buffers were designed to support the economy in an adverse situation; this will also allow banks to continue to serve households and businesses.

From a liquidity perspective, the simultaneous supply and demand shock has stressed companies across industries, pushing them to draw on credit lines to support working capital and stockpile cash. Additional drawdowns in commercial as well as retail lines of credit are also to be expected, in combination with a "flight to quality" toward deposits of certain customer segments, such as wealth-management clients. Strong internal liquidity-management practices will be required for banks to be maximally effective in supporting market liquidity and changing customer borrowing needs. The severity of the crisis is likely to lead to larger-than-expected drawings on credit lines. High market volatility will also elevate margin calls for derivatives. The liquidity coverage ratio as a measure of outflows over a one-month period may not be enough to capture all the risks to liquidity from a longer period contagion. Banks will need to upgrade their risk models and mobilize collateral for refinancing at central banks.

Banks should remain vigilant about liquidity measures to support their customers and confirm that telling indicators, such as corporate-deposit rates and interbank lending, are monitored with the right level of attention and escalation. Select leaders should ensure proactive communication and clear, deliberate signaling. It is even possible that US banks may be faced with the question of whether to pass on negative interest rates as banks have done in many European countries in recent years.

Stress testing financials to plan for the future

We anticipate that financial-institution performance will be hit across all dimensions—fees, interest revenue, losses, and expenses. However, variances will be substantial by sector and customer segment, with details depending significantly on the scenario that ultimately unfolds. While the exact financial impact of the COVID-19 crisis remains highly uncertain and will be bank dependent, we anticipate the following:

Client response in Italy: Segmenting the client base can maximize the effectiveness of bank support.

In addition to the government-mandated payment holiday on mortgages, some Italian banks are developing frameworks to assess which proactive actions may have the more effective outcome on clients, including considerations such as the following:

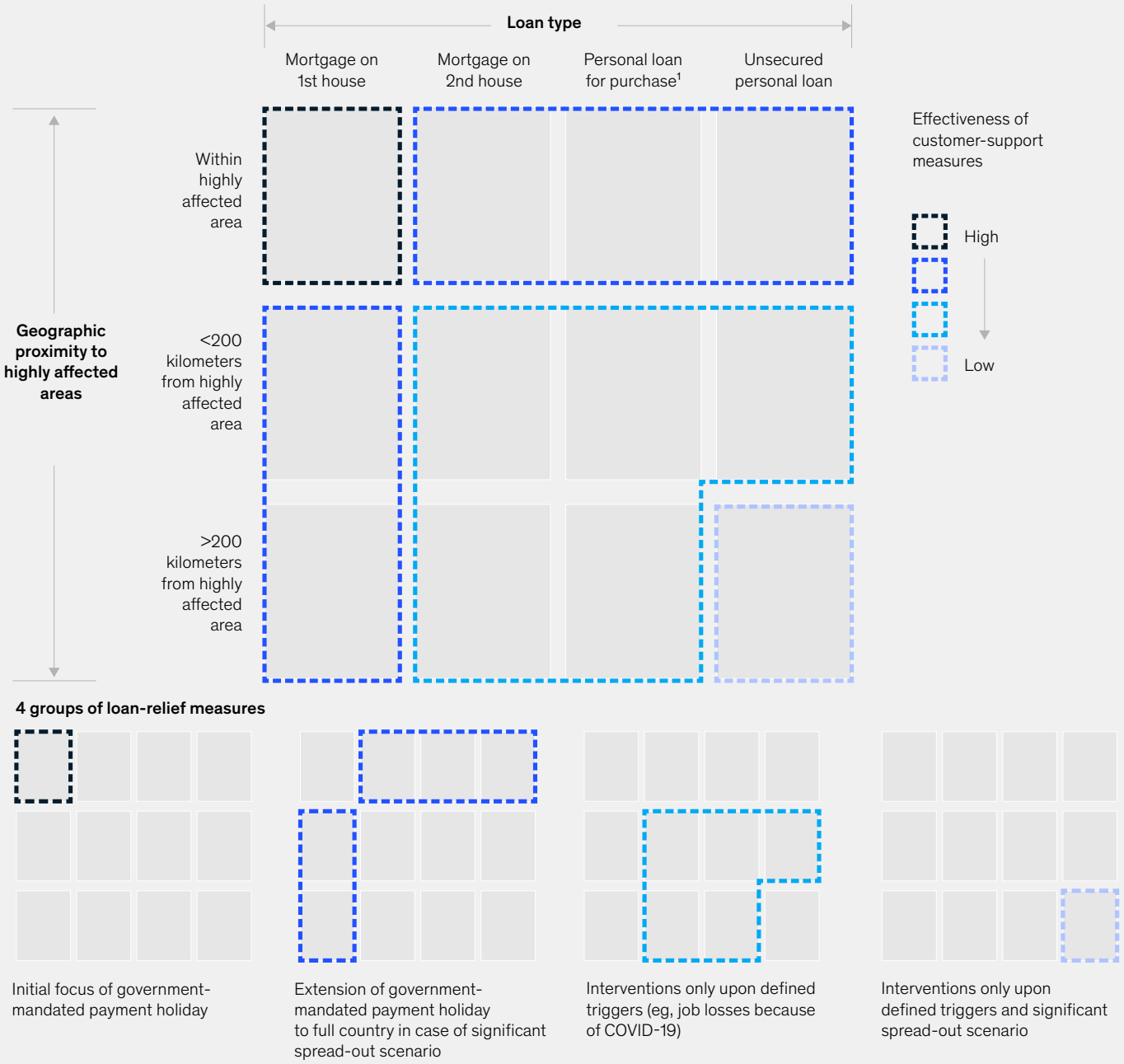
- *level of COVID-19 impact,* for example, geographical areas most affected by the virus
- *type of loan,* for example, primary-home mortgages, secondary-home mortgages, unsecured personal loan
- *client delinquency stage*

This segmentation allows the effective prioritization of cases based on their criticality. For example, clients that are most affected by COVID-19 and have a primary-house mortgage will be supported with the highest priority in case of need (exhibit).

Exhibit

Some Italian banks are prioritizing support for customers, based on proximity to the outbreak and type of loan.

Effectiveness of loan-relief measures, including impact on P&L and capital



[1] Such as for a car or home renovation.

— *Fee income likely will fall,* driven by lower consumer spending in retail businesses, decreased assets under management in asset-management divisions, as well as slowdown in investment-banking activity. Some sales and trading businesses may be an exception: fixed-income flow volumes may increase, and high volatility will translate to elevated bid–ask spreads and potential mark-to-market gains.

— *Net interest margins will remain compressed,* as rates remain low or fall slightly further. Any increase in borrowing volumes, for example, from drawdowns on lines of credit, may be offset by losses in credit portfolios.

— *Credit losses will be elevated across most sectors,* across small businesses and in certain retail segments (for example, self-employed workers, hourly-wage earners, uncollateralized products). Within commercial banking, travel, tourism, and entertainment segments will be the hardest hit. Oil and gas lending may also be challenged, with ultimate outcomes depending heavily on geopolitical factors affecting oil production and price. Across all industries, smaller and less efficient businesses will be hit disproportionally.

— *Remote work may increase costs* for setup, and may cascade to lost wages normally paid to hourly workersy and contingent staff. Operational losses due to fraud are also likely to increase.

To understand the impact on their own portfolio under rapidly evolving scenarios, banks need to apply testing tools, complemented by close continued monitoring. To do so, they can leverage their existing stress testing frameworks, such as the capital adequacy infrastructure developed as part of Comprehensive Capital Analysis and Review (CCAR) in the United States. To maintain safety and soundness and limit impact on financials, banks should maintain an up-to-date and scenario-based view of expected financial impact across businesses. In doing so, however, we believe five key imperatives should be borne in mind:

1. *Prioritize and iterate.* Unlike regulatory stress testing, this is not a hypothetical exercise. Stress-test results have direct implications for decisions banks are making in real time. Banks will need to identify which industries and segments are in most imminent danger and quickly analyze and monitor data for early warning signals. That base will allow them to build a fuller view of the economic landscape iteratively, as the pandemic evolves.

2. *Reverse stress test to identify worst-impact scenarios.* Regulatory stress testing, as well as most banks' supplemental stress testing, lay out specific hypothetical scenarios to assess their potential impact. In today's world, banks should look immediately to understand the outer limits of possible actions to support borrowers and markets during the trough.

3. *Build scenarios based around potential virus spread and human reaction.* Building mere macroeconomic scenarios will not be helpful as these would be divorced from the underlying drivers of the crisis. Instead, scenarios should be built around the spread of the virus. This will require developing a range of expectations for the progression of the disease, government response, and supply and demand shifts, and only then looking at macroeconomic changes. Analyzing the interaction between supply and demand and associated impact on macroeconomic factors will be particularly complex, as there is no direct historical precedent. Historically linked variables, such as income and employment, may decouple. Typically decoupled variables may become more correlated, such as when multiple business-continuity-plan scenarios occur simultaneously across the globe. Also consider "knock-on" operational risk-like scenarios, for example, the impacts of food shortages.

4. *Examine performance assumptions built into existing models.* Because the situation is unprecedented, assumptions built into models may not hold. For example, assumptions common in some treasury models have already

been broken in this past week's US Treasury price movements. As another example, collections-efficiency assumptions are unlikely to hold because of situation-dependent decisions on when and whether to collect at all.

5. *Incorporate implications of near-term actions, including on expenses.* Most institutions have appropriately acted quickly to try and contain virus spread and protect their employees' and customers' health. If these measures remain in place for several months—consistent with China's experience—their implications may be nontrivial and will need to be better understood.

As deposit gatherers, credit grantors, and payment facilitators, banks play a vital role in the functioning of the economy. They are not simply commercial enterprises but provide important services to individuals and communities. Their health, and that of their workforce, the continuity of their operations, and their safety and soundness are therefore critical. The last financial crisis led to much emphasis on the systemic risks posed by banks; the current one, which has entirely originated from outside the banking system, provides the opportunity for banks to prove their role as systemic stabilizers, delivering services at least in part for social good. Needless to say, this will require very careful thinking and trade-offs among various short- and medium-term options.

In doing so, bank leaders should bear in mind that this crisis is likely to reinforce, in direct proportion to its extent and duration and maybe even more, a number of existing trends. Workplace dynamics and talent management, already evolving in a digitizing world, may be durably changed after an extended period of remote working. As they settle into their new routines over the next weeks or months, banks should consider this as a testing ground for what does and does not work and draw implications for their HR, organizational, governance and culture transformations. Likewise, customer routines and expectations may also shift further in meaningful proportions, both in terms of digital adaptation and the expectation for proactive communication and care. Operational resilience is also bound to remain critical with mounting risks of pandemics, societal and geopolitical tensions, and climate change. Banks should carefully draw on the lessons that the current situation offers and use them to inform their digital transformation, while building a much higher degree of both operational and financial resilience.

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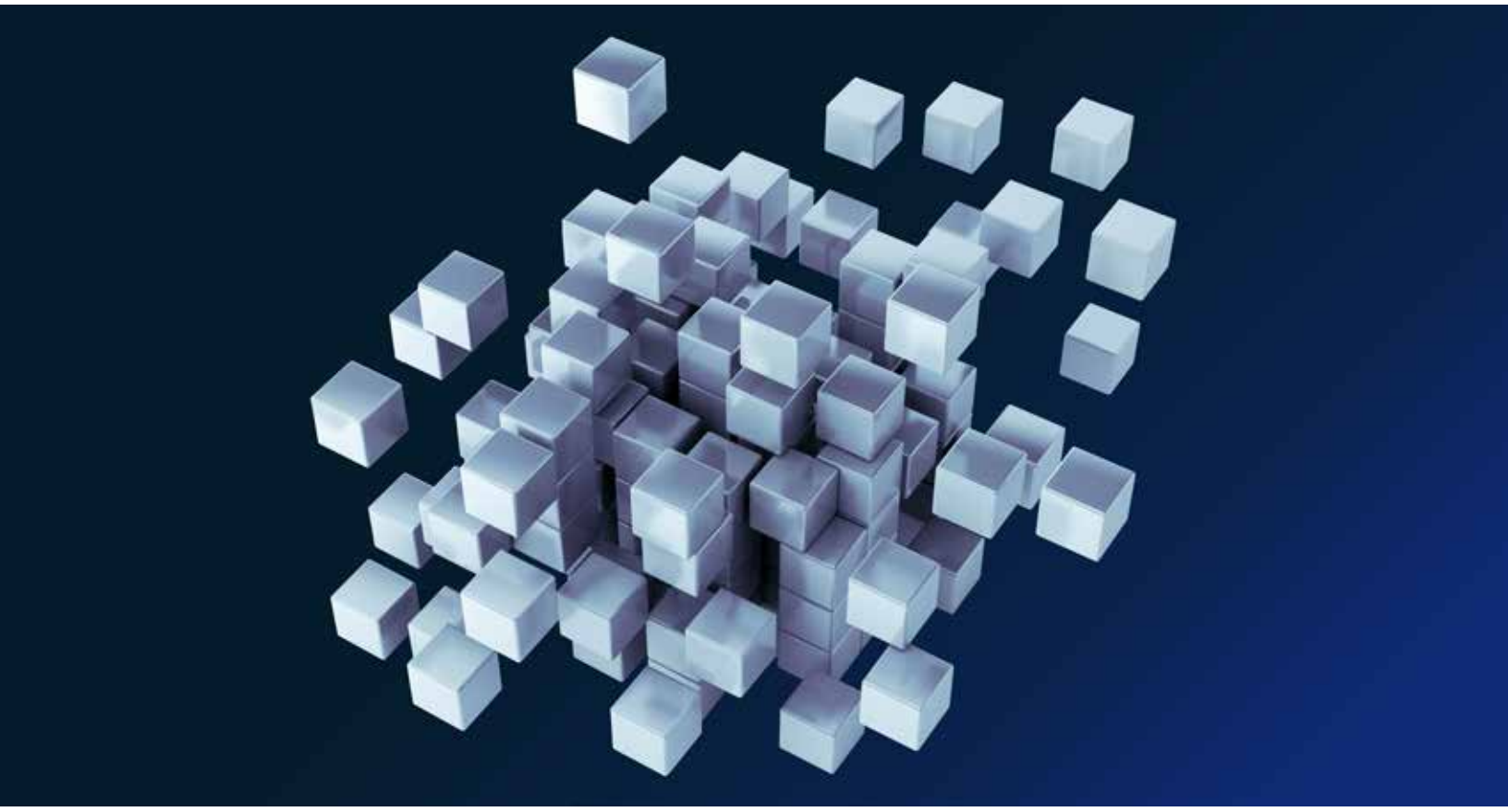
Coronavirus: 15 emerging themes for boards and executive teams

Board directors and executives can pool their wisdom to help companies grapple with the challenge of a lifetime.

by Cindy Levy, Jean-Christophe Mieszala, Mihir Mysore, and Hamid Samandari



As Winston Churchill said, "Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning." We are seeing some faint signs of progress in the struggle to contain the pandemic. But the risk of resurgence is real, and if the virus does prove to be seasonal, the effect will probably be muted. It is likely never more important than now for boards of directors and executive management teams to tackle the right questions and jointly guide their organizations toward the next normal.[1]

Recently, we spoke with a group of leading non-executive chairs and directors at companies around the world who serve on the McKinsey Resilience Advisory Council, a group of external advisers that acts as a sounding board and inspiration for our latest thinking on risk and resilience. They generously shared the personal insights and experiences gained from their organizations' efforts to manage through the crisis and resume work. The 15 themes that emerged offer a guide to boards and executive teams everywhere. Together, they can debate these issues and set an effective context for the difficult decisions now coming up as companies plan their return to full activity.

Managing through the crisis

1. *Boards must strike the right balance between hope for the future and the realism that organizations need to hear.* There are many prognostications on what comes after COVID-19. Many will be helpful. Some will be right. Boards and managers may have some hopes and dreams of their own. Creating value and finding pockets of growth are possible. It is important to have these aspirations, because they form the core of an inner optimism and confidence that organizations need. However, leaders should not conflate aspirations with a prescience about the future.

2. *The unknown portion of the crisis may be beyond anything we've seen in our professional lives.* Boards and managers feel like they might be grappling with only 5 percent of the issues, while the vast majority are still lurking, unknown. Executives are incredibly busy, fighting fires in cash management and other areas. But boards need to add to their burden and ask them to prepare for a "next normal"[2] strategy discussion. Managers need to do their best to find out what these issues are, and then work with boards to ensure that the organization can navigate them. The point isn't to have a better answer. The point is to build the organizational capability to learn quickly why your answer is wrong, and pivot faster than your peers do. Resilience comes through speed. This may be a new capability[3] that very few organizations have now, and they will likely need to spend real time building it.

3. *Beware of a gulf between executives and the rank and file.* Top managers are easily adapting to working from home and to flexible, ill-defined processes and ways of working, and they see it as being very effective and also the wave of the future. Many people in the trenches think it is the worst thing to happen to them (even those that are used to working remotely). Remote working is raising the divide between elites and the common man and woman. There is a real risk of serious tension in the social fabric of organizations and in local and national communities.

4. *Don't overlook the risks faced by self-employed professionals, informal workers, and small businesses.* These groups are often not receiving sufficient support. But their role in the economy is vital, and they may be noticed only later, when it is too late.

5. *Certain industries and sectors are truly struggling and require support.* Several disrupted industries and many organizations in higher education, the arts, and sports are severely struggling and require support to safeguard their survival.

[1] Martin Hirt, Celia Huber, Frithjof Lund, and Nina Spielmann, "Boards in the time of coronavirus," April 2020, McKinsey.com.
[2] Yuval Atsmon, Chris Bradley, Martin Hirt, Mihir Mysore, Nicholas Northcote, Sven Smit, and Robert Uhlaner, "Getting ahead of the next stage of the coronavirus crisis," April 2020, Mckinsey.com.
[3] Mihir Mysore, Bob Sternfels, and Matt Wilson, "Return: A new muscle, not just a plan," May 2020, McKinsey.com.

More than ever, a bias to action is essential, which will frequently mean getting comfortable with disagreement.

Return to work—the path ahead

6. *Mid- to long-term implications and scenarios vary considerably.* It's important to differentiate between industries and regions. Some industries may never come back to pre-COVID-19 levels.

7. *What went wrong?* Boards and executives, but also academics, need to debate the question. Where should we have been focusing? Take three examples. Why did companies ignore the issue of inadequate resilience in their supply chain? The risks of single sourcing were well known and transparent. Also, why did we move headlong toward greater specialization in the workforce, when we knew that no single skill was permanently valuable? Finally, why did we refuse to evolve our business models, although we knew that technology and shifts in societal preferences were forcing us down a treadmill of ever decreasing value-creation potential?

8. *How can we prevent a backlash to globalization?* The tendency toward nationalism was already strong and is growing during the crisis. The ramifications will be challenging. For example, in pharmaceutical development, residents of the country where a pharma company has its headquarters may expect to get the drug first. Global companies, despite their experience, may find it harder to address and engage directly with diverse, volatile, and potentially conflicting stakeholders. In such times, societies may need someone to mediate between the private sector and some of these stakeholders.

9. *Companies need help with government relations.* Strong government interventions are occurring on the back of a serious loss of confidence in free-market mechanisms. There is little question that different governments will land on different answers to the debate around how free markets really ought to be structured. The corporate community has been thrust into a new relationship with government, and it is struggling. The government landscape is fragmented, with highly varied approaches and competencies. Companies are looking for a playbook; no one has an infrastructure to manage this complexity.

10. *Where will the equity come from, and with what strings attached?* Governments are propping up various sectors with new capital. What will they receive in return? Will they distort markets? How can companies manage this process carefully to emerge from the crisis with a stronger balance sheet? Further, much more capital is likely needed; presumably some of it will come from the private sector. Will capital markets be effective and trusted in such times? Who governs this overall process, and what role should the government play? Is it the time for more state funds?

11. *The balance between profits and cash flow is tricky, and essential to get right.* Many companies are caught right now and are sacrificing their bottom line in order to pay for their financing. That's not sustainable; companies will need guidance on how to balance the two.[4]

[4] Sarah Keohane Williamson and Tim Koller, "Navigating COVID-19: Advice from long-term investors," April 2020, McKinsey.com.

12. *It may be time for responsible acquisitions,* including to help restructure certain industries. Many "resilients"[5] have "kept their powder dry," and are now ready to acquire. But they need to be sensitive and allow sellers a good path to exit. We need guidelines for responsible acquisitions.

13. *Cyberrisk is growing.* Remote working increases the "attack surface" for criminals and state actors. Both are more active. Chief information officers and chief information security officers are grappling with the over-whelming demand for work-from-home tech-nology and the need for stringent cybersecurity.[6]

14. *Innovation may never have been so important.* Innovation has always been essential to solving big problems. The world is looking not just for new things but also for new ways of doing things (especially on the people side, where we need new behaviors, long-term rather than short-term), capabilities, and work ethics.

15. *The path ahead will surely have ups and downs and will require resilience.* As lockdowns are relaxed, and segments of the economy reopen, viral resurgences and unforeseen events will keep growth from being a straight line going up. It will likely be a lengthy process of preserving "lives and livelihoods"[7] over several months, if not years. The reality is that many or even most business leaders made choices over the past decades that traded resilience for a perceived increase in shareholder value. Now may be the moment to consider that the era of chipping away at organizational resilience in the name of greater efficiency may have reached its limits.

This is not to say that there are no efficiencies to be sought or found, but more that the trade-off between efficiency and resilience needs to be defined far more clearly than it has been in recent years.

It is the board's responsibility to coach and advise its management team, especially when the terrain is trickier than usual. However, boards should not mistake the need for vigorous debate with the need for consensus. More than ever, a bias to action is essential, which will frequently mean getting comfortable with disagreement. Apart from all the operational focus needed for the return to work, it is even more important that boards and management teams take a step back to reflect upon these 15 core themes. In summary:

1. Take the time to recognize how the people who (directly or indirectly) depend on the company feel.

2. Have aspirations about the post-COVID world, but build the resilience to make them a reality.

3. Strengthen your capability to engage and work with regulators and the government.

4. Watch out for non-COVID risks, and make sure to carve out time to dedicate to familiar risks that have never gone away.

5. Find out what went wrong, and answer the uncomfortable truths that investi-gation uncovers.

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The authors wish to thank members of the McKinsey Resilience Advisory Council, Kevin Buehler, Nina Spielmann, and Matt Wilson for their contributions to this article.

[5] Martin Hirt, Kevin Laczkowski, and Mihir Mysore, "Bubbles pop, downturns stop," May 2019, McKinsey.com.
[6] Jim Boehm, James Kaplan, and Nathan Sportsman, "Cybersecurity's dual mission during the coronavirus crisis," March 2020, McKinsey.com.
[7] Kevin Buehler, Arvind Govindarajan, Ezra Greenberg, Martin Hirt, Susan Lund, and Sven Smit, "Safeguarding our lives and our livelihoods: The imperative of our time," March 2020, McKinsey.com.

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Return: A new muscle, not just a plan

Return is not a phase; it's a way of operating. A nerve center can help build the capabilities that businesses need in the "next normal."

by Mihir Mysore, Bob Sternfels, and Matt Wilson

In less than four months, COVID-19 has upended almost all expectations for 2020. Beyond the loss of life and the fear caused by the pandemic, businesses around the world have faced disruptions at a speed and scale unprecedented in the modern era.

Companies everywhere are now wrestling with the question of how to reach the next normal safely. Many talk about a return to the workplace as a plan that needs to be implemented: a series of systematic steps to reach some kind of stable operating model, in a world where vaccines are adequately available or herd immunity has been reached. In many cases, these plans suggest a return to some relatable version of the past.

Yet the intrinsic uncertainties that might scupper such plans continue to mount. Executives readily admit, for instance, that it is tough to write a deterministic return plan because of the likelihood of a resurgence, discoveries about how the virus is transmitted and whom it affects, the nature and duration of immunity, and continued changes in the quality and availability of testing and contact tracing. The best possible plan today is merely a strawman that will need near-continuous recalibration and change.

Another critical uncertainty is the future of remote work. Some feel that recent events have driven a real productivity gain they do not want to lose. However, they recognize that a wholesale shift to remote work has had many false dawns. Silicon Valley has experimented with it most extensively, but after many attempts to implement telecommuting, our research found that at 15 top firms, only 8 percent of the employees work remotely. These companies do not want to try this again only to roll it back in a few years.

Customer behavior is a third unknown. Companies see the clear shift to digital among consumers and its inevitable impact: online shopping has expanded by up to 60 percent in some categories, and up to 20 percent of online consumers in the United States have switched at least some brands recently. But it's unclear whether once the pandemic recedes, these customers will return to their old ways or if the pandemic will create new types of consumers.

Given these and other uncertainties and the need for experimentation and fast learning to navigate through them effectively, we believe that the next step in the response of businesses cannot be thought of as a phase at all. It will be open ended rather than fixed in time. A better mental model is to think about developing a new "muscle": an enterprise-wide ability to absorb uncertainty and incorporate lessons into the operating model quickly. The muscle has to be a "fast-twitch" one, characterized by a willingness to change plans and base decisions on hypotheses about the future—supported by continually refreshed microdata about what's happening, for example, in each retail location. And the muscle also needs some "slow-twitch" fibers to set long-term plans and manage through structural shifts.

Many companies are trying to hang on until a full reopening, perhaps made possible by a vaccine or herd immunity. Meanwhile, they are configuring their resources to be ready by then. That's risky; despite promising news from early clinical trials, a full reopening could be many months away—months when companies must adapt to reality if they are to survive. Already, signs of viral resurgence in Asia are causing companies fixated on plans to rewrite them hurriedly.

In this article, we will outline four forces whose uncertain outcomes will shape the years to come, as well as the steps needed to build the return muscle to grapple with these forces—especially the nerve center that powers the muscle. Once the center has been built and incorporated into a new operating model across the organization, muscular companies will be ready for a new era of competition. We won't say that this work will make companies future proof; the pandemic has exposed the folly of that idea. But we argue that building a return muscle is the right discipline for these times.

With tens of millions of jobs lost, and more to come, the workforce is absorbing the brunt of the economic blow.

Four forces that will mold the next normal

Out of the chaos of the first few months of COVID-19, four forces that could shape the next era in business are emerging.

The metamorphosis of demand

No one has failed to notice how the pandemic has shifted demand online. Twice as many consumers now shop online for groceries. Across categories, the number of consumers who now use digital channels has increased by an average of about 20 to 25 percent. And first-time digital consumers account for almost 40 percent of the growth in digital goods and services. As consumers shift to digital, loyalties are also in play: some 15 to 20 percent of US shoppers have switched websites since COVID-19 started.

Yet the shift to digital is by no means universal. In banking, recent McKinsey surveys find that 13 percent of retail customers expect to use mobile banking services more, 7 percent to use them less.[1]

Planning for demand is extraordinarily challenging. Many macroeconomic recovery scenarios are on the table, from late 2020 to beyond 2023. Each sector has its own particular effects from the pandemic and the government response. That translates into wide variations in the timing and strength of a recovery in demand. Overall consumption has fallen not only as a result of this greater economic uncertainty but also continuing concerns about personal health and an increased preference for simpler connections with family rather than expensive items or experiences. The economic recovery in China has been one of the world's fastest—yet its consumption is still more than 20 percent lower than before the outbreak.

Rapid changes in the workforce

With tens of millions of jobs lost, and more to come, the workforce is absorbing the brunt of the economic blow. A new McKinsey Global Institute study finds that up to one-third of US jobs may be vulnerable to furloughs, pay cuts, and layoffs. Low-income workers hold 80 percent of those jobs.[2] The single biggest challenge facing employers may be deciding how and when to add workers to the payroll.

Strangely, with so many sidelined, some industries are experiencing shortages. Many people cannot return to their jobs because of health-related issues, including workers who are ill, quarantined, caregivers, or vulnerable to infection. But employers are also finding that newly needed skill sets are in short supply, such as digital sales skills in B2B field sales forces, productivity-based management techniques at a time when productivity is tougher to measure, and many others.

[1] Kevin Buehler, Miklós Dietz, Marie-Claude Nadeau, Fritz Nauck, Lorenzo Serino, and Olivia White, "Stability in the storm: US banks in the pandemic and the next normal," May 2020, McKinsey.com.
[2] Susan Lund, Kweilin Ellingrud, Bryan Hancock, James Manyika, and André Dua, "Lives and livelihoods: Assessing the near-term impact of COVID-19 on US workers," April 2020, McKinsey.com.

Other changes are roiling the workforce. Among white-collar workers, remote work has become the new norm. Some are thrilled about their greater productivity and flexibility, as well as the time and sanity reclaimed from long, stressful commutes. Others cannot wait to get back to the office: for them, the lack of a home-office setup and the inability to separate work from life are major sources of stress. Dual-career couples have additional stresses, which may increase if schools cannot open in a few months. Finally, as companies try new models of remote and on-site work, novel challenges may arise, such as widely different subcultures for these two groups of workers—with very different norms, expectations from employers, and team health.

Shifts in regulation

Regulators and governments around the world are using varied philosophies of public health; Sweden, for example, is focusing on achieving herd immunity. Many countries do not have consistent national health standards; for instance, 13 US states today ban all gatherings, 24 ban gatherings of over ten people, ten or so let about 20 to 50 people gather. The rest have completely lifted their bans or have taken no action. Variation among cities and counties is even starker. A wide range of societal beliefs, economic realities, and political challenges underlie these choices.

For leaders whose businesses span multiple geographies, ensuring consistency is highly challenging. Business leaders are understandably anxious to protect their employees while ensuring compliance. They know that they need to establish some level of productivity to preserve the future of their companies.

Increasing information about protocols for safety

The gargantuan medical and scientific effort focused on COVID-19 has already produced important insights that directly affect how companies respond. For instance, newer studies have suggested that the point of highest transmissibility is the day before symptoms begin to show; at that point, some form of aerosolization expands the reach of the virus.[3] Other studies point to the prevalence of asymptomatic patients. And the sharing of major transmission events affords another window of learning from the virus. A recent case involved an unwitting COVID-19 carrier in a restaurant who sneezed into an air-conditioning duct and spread the infection to everyone there.

Other critical recent findings focus on seasonality. Hopes for a rapid fall in COVID-19 cases as summer approaches in the Northern Hemisphere have subsided: in Asia the resurgent virus is once again taking hold, despite the onset of summer, and its transmission is increasing in warmer climates around the world. More economic activity and reduced physical distancing have also driven a resurgence of the virus. These developments have important lessons for companies: any regime of interventions that they set up cannot ignore presymptomatic and asymptomatic patients. There should be a real focus on facilities and how they are configured.

Early concerns about significant bottlenecks in testing are, slowly but surely, starting to ease. This welcome news is coinciding with the arrival of a broader range of testing options. Testing will be a critical question in coming weeks and months as increasing numbers of employers try to ensure a safe return to the workplace—the core task—by looking to new polymerase chain-reaction (PCR) tests, more informative serological tests (current versions have known issues), and other new developments. All the new information should help companies set distancing guidelines, stagger shifts, develop new hybrid on-site/remote models, and so on. Every move will have to be evaluated immediately and refined as necessary—a tough task, but one that the nerve center can accept in stride.

Building the muscle for response — and resilience

Most companies have already established "war rooms" to coordinate the recovery and the return

[3] Xi He et al, "Temporal dynamics in viral shedding and transmissibility of COVID-19," Nature Medicine, April 15, 2020, nature.com.

from the pandemic. But these are not sufficient, because they focus, for example, on tactical plans to get people back into offices, to reopen their retail stores once the lockdown is lifted, or to get their sales reps back on the road. Instead, companies should expand their war rooms into fully fledged return nerve centers.

Such a nerve center is a flexible structure that concentrates crucial leadership skills and organizational capabilities and gives leaders the best chance of getting ahead of events rather than reacting to them. It has enterprise-wide authority and enables leaders and experts to test approaches quickly, to preserve and deepen the most effective solutions, and to move on ahead of the changing environment.[4] In the following, we sketch out what the nerve center does, how it works, the technology it requires, and some of the benefits.

Anticipation: How the nerve center sees around corners

Nerve centers will probably be in place for the next 12 to 18 months. Their core mission is to listen closely for the signals emitted by the four forces. Consider the shifting sands of consumer demand. As contradictory signals emerge, companies need to know, for example, if they face sandbars up ahead, where the channels are, and where the open ocean is. To plot a course, executives have to monitor the signals of a digital shift and decide how deeply their categories are affected.

Other signals might emerge from brand loyalty: the propensity of consumers for some brands versus others can provide clues about which digital and physical journeys people are starting to choose. As stores reopen, microdata can provide granular information on footfall at specific sites and on spending there. These data can inform decisions about reopening retail locations and ideas for improving the digital experience.

Companies also need some way of understanding the capability gaps of their sales forces (such as digital sales, for reps who work primarily in the field). They should then address these gaps quickly through virtual training, mentoring, and other levers. There is no established playbook on effective sales in a pandemic. Companies will need to experiment, see what works, and then disseminate the findings on their learning platforms. To deliver what customers want, companies will need to build smooth digital and contactless customer experiences, which might require updates to the underlying IT architecture.

Two teams

Nerve centers can realize these needs through two core teams. First, a delivery team works toward a clearly defined objective and then learns from it. That's different from the typical approach: crafting a supposedly perfect plan and then trying to execute it. Second, a plan-ahead team learns from the experience of the delivery team (especially the failures) and complements this with fast lessons from other sources. A critical role for the plan-ahead team involves basing medium-term strategic moves on clear trigger points and pushing the organization to implement these ideas more quickly than might

Companies will need to experiment, see what works, and then disseminate the findings on their learning platforms.

[4] Mihir Mysore and Ophelia Usher, "Responding to coronavirus: The minimum viable nerve center," March 2020, McKinsey.com.

normally feel comfortable. Examples could include standing up new sales channels, accelerating new-product launches, creating new business models, or M&A.

The plan-ahead team can also stress-test core parts of the enterprise operating model by focusing on the supply chain's resilience, liquidity, assumptions about customer demand, and the robustness of the operating model.

Processing the signals: The data platform

To function well, nerve centers will need to collect data from a wide range of sources (not only their own operations but also public-health agencies, policy announcements, and economic indicators), synthesize this information in real time, and translate it into action. A nerve center with a nimble information system can help a company to keep up with rapid change in the virus's spread; to answer questions about, for example, what holiday shopping will look like without a vaccine; or to cope with a resurgence in the fall. Companies need an information platform that captures such data, flags them if certain thresholds are breached, and helps generate responses to problems. Many companies have most of what's needed; they can organize these resources to form an agile technology capability in a few weeks—not months or years.

The reward is resilience

Getting the return muscle right will be the key to building resilience throughout the organization. Today, for instance, investors and companies are asking increasingly probing questions about whether their business partners can truly deliver in the more extreme circumstances that seem possible over the next few years. Genuine investments in resilience may be an essential part of survival for many businesses, providing the cushion required by further setbacks that might be in store over the next year or two.

Many companies are sweating the details of their return plans rather than building the capabilities needed for a return. They are running spreadsheets to see how many people spaced six feet apart will fit in an office, planning one-way paths through the workplace, and figuring out adaptations to rest rooms, lunch rooms, and entrances. All of those are critical tasks, but they are not enough. The ability of top leaders to refocus on the task of building sustainable capabilities will define the companies that emerge intact from the pandemic over the next two years.

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Reopening safely: Sample practices from essential businesses

The safety protocols of hospitals, grocery stores, and other establishments that stayed open during the COVID-19 pandemic can offer ideas for businesses preparing to welcome employees and customers back.

by Suzanne Rivera, Kate Robu, Virginia Simmons, and Shubham Singhal

After weeks of shutdowns and remote working, businesses around the world are gradually resuming on-site operations. Of course, some businesses—those considered essential—kept their doors open and operated at full capacity, even at the height of the COVID-19 pandemic. While the list of essential businesses varies by jurisdiction, in most cases it includes healthcare facilities, pharmacies, grocery stores, convenience stores, banks, and gas stations, as well as delivery, sanitation, plumbing, and electrical-repair services. Those businesses offer valuable lessons for companies in any sector considering reopening: How does a business stay operational while keeping employees and customers safe and preventing new COVID-19 outbreaks?

Work environments differ vastly from each other, and there are no one-size-fits-all solutions. That said, as we studied the safety practices of essential businesses during the pandemic, two principles clearly stood out as effective: tailoring safety measures to the unique business environment and implementing them across the full range of business activities (not just on-site operations). This article describes several practices that essential businesses have adopted, some of which are applicable in other sectors as well. These practices are well worth considering as the business world charts a path toward the next normal.[1]

Different workplaces, different risks

Some workplace environments are easier to control than others. Exhibit 1 illustrates six types of work environments based on the proximity of exposure (how closely and how long people interact with each other in person) and the extent of exposure (how many other people an individual tends to encounter in a typical workday). Some businesses may operate in more than one of these work environments—for instance, a retail chain has stores but might also have warehouses and offer delivery services. Businesses must adjust safety measures to fit the specific environments in which they operate.

In addition, businesses must implement safety measures across the full range of activities associated with their operations, including activities that take place outside the work environment. Businesses must also define protocols and policies for pre-entry, travel to and from work locations, use

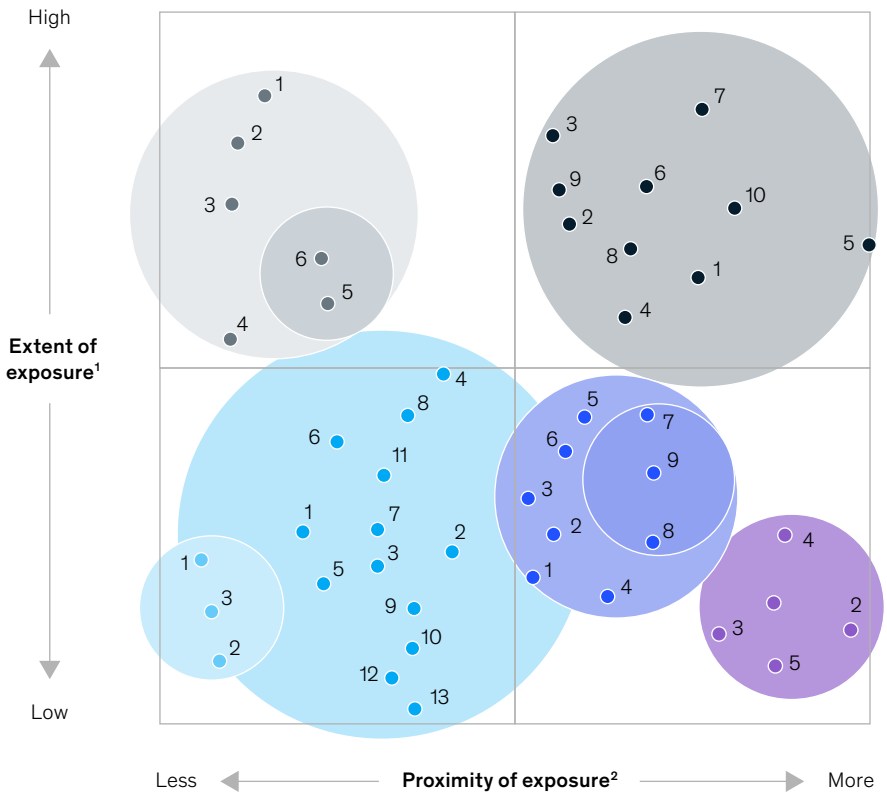
Businesses must define protocols and policies for pre-entry, travel to and from work locations, use of common spaces, and post-infection.

[1] Shubham Singhal and Kevin Sneader, "From thinking about the next normal to making it work: What to stop, start, and accelerate," May 15, 2020, McKinsey.com.

Exhibit 1

Risk levels vary across different types of work environments.

Proximity and extent of exposure in select work environments



Significant public interaction
1 Airports
2 Banks
3 Grocery stores
4 Gyms and fitness studios
5 Hospitals
6 Hotels
7 Public transit
8 Restaurants
9 Retail stores
10 Stadiums and theme parks

Physical contact required
1 Barbershops and hair salons
2 Nursing homes
3 Performing-arts venues
4 Physical-therapy offices
5 Spas

Large confined spaces
1 Engineering labs
2 Factories
3 Schools (K–12)
4 Sports arenas
5 Universities
6 Warehouses

Large confined spaces (low compliance)
7 Day-care centers
8 Mental-care facilities
9 Preschools

Professional working spaces
1 Call centers
2 Large offices
3 Public-service functions
4 Small offices

Professional working spaces (physical presence required)
5 Air-traffic-control towers
6 Research labs

Isolated
1 Artisanal work
2 Construction
3 Farming
4 Firefighting
5 Landscaping
6 Mail delivery
7 Moving services
8 Police
9 Real estate
10 Repair services
11 Sanitation
12 Trucking
13 Waste management

Solo
1 Fine arts
2 Graphic design
3 Programming

[1] Number of unique contacts in a typical workday.
[2] How closely and how long people interact in person within the work environment.

of common spaces, and post-infection. Exhibit 2 can provide guidance for business leaders as to the levels of risk associated with work-related activities and the types of safety measures to implement.

Actions to consider

Based on our recent research and our work with leading companies around the world, we have compiled a list of some of the safety measures that essential businesses across a range of industries have put in place. This list of practices could be helpful to business owners and operators as they seek to reopen their workspaces.

Pre-entry

Before reopening, employers can take measures to educate employees on new protocols, identify at-risk individuals, and provide additional resources to make the return-to-work experience safe and orderly. The following issues merit consideration:

— *Shift to remote work.* The most obvious risk-mitigation measure is to continue remote work where possible. Even at businesses where much of the work cannot be done remotely (such as grocery stores), company leaders have made significant efforts toward contactless services. For instance, grocery chains introduced contactless pickup in their parking lots. Manufacturers moved functions that don't require access to on-site equipment (functions such as finance, procurement, and marketing) to a remote model. Physical therapists are leveraging telehealth and at-home, virtual exercise routines.

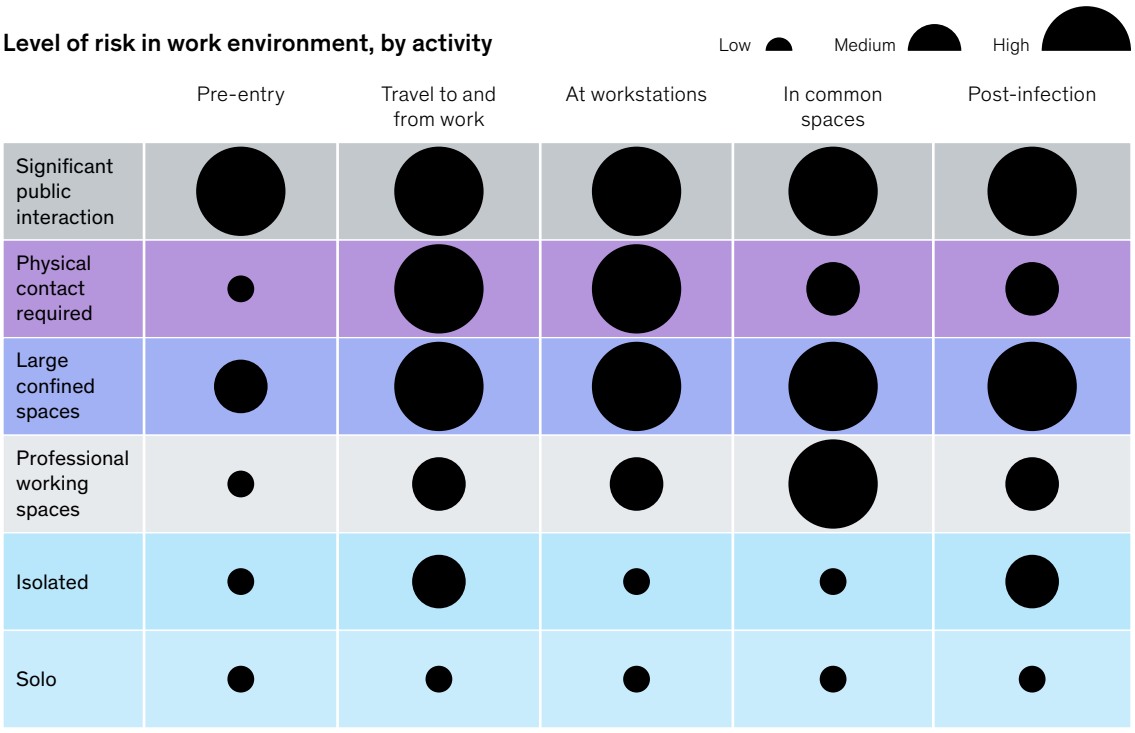
— *At-scale testing.* In places where COVID-19 testing is widely available, companies have found it a highly effective way of protecting employees' health.[2] Electronics manufacturer Foxconn, with more than one million workers across Asia, has tested more than 50,000 employees.

[2] Mohammed Behnam, Li Han, Pooja Kumar, and Shubham Singhal, "Major challenges remain in COVID-19 testing," May 1, 2020, McKinsey.com.

Exhibit 2

Businesses must implement safety measures across the full range of work-related activities.

Level of risk in work environment, by activity



E-commerce giant Amazon has pledged to test all of its employees and build its own COVID-19 test center.

— *Symptom assessment.* In places where tests haven't been available, businesses have used various forms of symptom assessment to screen for high-risk employees, who they then prohibit from coming to work. For example, Alibaba employees must fill out a daily health questionnaire on an internal app before they travel to the company's headquarters office; they must then present the color-coded results to get past building security. Similarly, several companies in South Korea are requiring employees to fill out online health self-assessment surveys every Sunday before coming to work the following day. A US ad agency segmented its employees into three risk levels and staggered its return-to-work plan accordingly: level-one employees, those who have tested positive for COVID-19 antibodies, can return to work right away. Level-two employees, those younger than 65 and without any health conditions, are in the next wave allowed back into their offices. Finally, the return of level-three employees—those who are immunocompromised or aged 65 or older—has been deferred until further notice.

— *Training and education.* The experience of essential businesses suggests that softer safety measures, such as training and education, played a significant role in instilling new habits among employees and customers. Several US companies have developed online training and education modules to familiarize employees with the new safety and hygiene protocols before they return to work. In China, some corporate offices are going as far as denying workplace access to those who haven't completed the training; they're also requiring employees to pass an app-based test on the new safety measures. Internet giant Tencent produced a video for employees to watch before coming back to their workplaces. The video covers basic information on COVID-19 and explains the company's return-to-work process in detail.

— *Childcare.* Challenges related to childcare have been among the biggest impediments to the availability and productivity of essential workers during the pandemic. Childcare is therefore a major focus area for both employers and local authorities. Some hospitals arranged for medical students to provide childcare for essential employees; caregivers kept children in the same groups every day to minimize potential exposure. Companies and local governments have been offering childcare subsidies or reimbursing workers for virtual babysitting services: remote babysitters entertain children with virtual activities for up to 90 minutes, giving their parents time to get some work done. A few governments have also granted emergency licenses for day-care facilities. The licenses allow day-care centers, subject to specific safety measures, to care for the children of essential workers during the pandemic.

— *Mental health.* Businesses are helping employees take care of not just their physical safety and well-being but also their mental health. Companies are starting to provide mental-health tools—providing free subscriptions to meditation apps, for instance. Many universities and businesses are offering on-demand video counseling to employees and constituents.

Travel to and from work

Businesses should account for the various modes of transportation that employees use to travel to and from their workplaces. The mix typically includes public transportation, private or individual transport (such as cars, bikes, and walking), and, for some companies, employer-sponsored transportation. Equally important, businesses must introduce new safety measures for entry into and exit from the workplace. The following are some issues to consider:

— *Transportation.* To minimize the risk of employees' exposure to infection during transit, some New York City hospitals have arranged for organized transportation (such as shuttle buses), encouraged carpooling, or subsidized ride sharing

The experience of essential businesses suggests that softer safety measures, such as training and education, played a significant role in instilling new habits among employees and customers.

for staff. Healthcare facilities with more operational flexibility, such as dental offices and primary-care physicians' offices, have adjusted their working days and hours to minimize the employee commute during rush hours.

— *Temperature checks.* Many establishments in China and in the US states that have reopened are requiring temperature checks for all employees and customers upon entry. Some are stationing employees at the entrance and equipping them with contactless thermometers; others have adopted automated temperature checks. Taipei Rapid Transit has set up infrared thermometers in its most crowded stations. Passengers with temperatures higher than 38°C are prohibited from entering the station.

— *Staggered entry and exit.* To minimize crowding at entrances and exits, some factories in China have established staggered start times for each workday: employees arrive in waves every ten or 20 minutes. Many US grocery stores are restricting the number of shoppers they allow in stores at one time and have created decals on the sidewalks leading up to the store to guide customers in lining up six feet apart. Similarly, some small and medium-size businesses are limiting the number of people inside their facilities by seeing customers only by appointment (no walk-ins) and asking customers to wait in their cars or outside the facility until they receive a text inviting them to come in. US amusement parks have replaced physical queuing with virtual waiting areas in digital apps. To limit close contact among children, parents, and staff members, US day-care centers have set staggered curbside drop-off/pickup times, allowing only one parent or guardian—who is required to wear a face covering—to drop off or pick up each child.

— *New cleaning protocols.* Businesses must significantly enhance their cleaning protocols. For example, grocers and other retailers are now routinely making hand sanitizer or disinfecting wipes available at store entrances. Nail spas and salons are requiring customers to wash their hands before and after appointments.

— *Protective equipment.* Entry into and exit from a workplace are opportunities to remind individuals about safety protocols and enforce the wearing of personal protective equipment (PPE). At one Chinese retailer, customers are greeted by employees carrying signs encouraging shoppers to wear masks. Many business establishments across the globe don't allow customers to enter unless they're wearing face coverings. Medical facilities have created strict rules regarding PPE, with dedicated rooms for healthcare workers to change their clothing at the start and end of their workdays.

At work

Enforcing physical-distancing protocols is easier in some work environments than in others. Essential businesses have had to adapt quickly during the pandemic to keep their employees safe at work. Here are some of the ways they've done it:

— *Ongoing reminders and conditional service.* Many US grocers have created signage for one-way aisles; floor decals indicate where shoppers should stand when lining up for checkout. Kroger has been making in-store loudspeaker announcements about healthy habits and urging shoppers to keep their distance. Some companies have been sending their employees reminders to sanitize workstations every few hours. A real-estate company in New York, RXR Realty, is launching an app that tracks whether an employee is at least six feet away from another person. The intent is to incentivize positive behavior among employees and to monitor compliance with physical-distancing rules. Meanwhile, restaurants in China have introduced a range of new conditions for serving customers, including spacing tables farther apart to adhere to local distancing guidelines, using conveyor belts to transport food to customers, and requiring customers to wear masks when not eating or drinking.

— *Enhanced hygiene protocols.* In work environments where people are required to be in close physical proximity to each other, the focus has been on dramatically enhancing cleaning protocols. Several companies have installed hand-washing stations in high-traffic areas at their facilities. Grocers are assigning employees to sanitize shopping carts after each use; gyms and hotels are doing the same with fitness equipment. Other companies have upgraded their air-filtration systems. Deep cleaning is particularly important in facilities where individuals may have trouble following a set of safety guidelines, such as day-care centers, schools with young children, and institutions caring for people with disabilities. For example, the US Centers for Disease Control and Prevention (CDC) recommends that day-care centers keep the same groups of children and care providers in the same rooms every day. In addition, the CDC recommends separating those who are at higher risk of exposure—such as children of first responders or healthcare workers—into their own classrooms; spacing out mats and placing children head to toe during naptime to reduce high-risk contact; discarding toys that can't be disinfected; and creating soiled-toy bins filled with soapy water for toys that have been placed in a child's mouth.

— *Workspace redesign.* Many US grocers and convenience stores—as well as manufacturing plants where workers are required to stand close together on an assembly line—have installed plexiglass partitions at checkouts or workstations. At telecom company BT, call-center workers now sit two meters apart and walkways have been designated to be one way. Cushman & Wakefield, a global commercial real-estate-services company, has designed the 6 Feet Office concept, which it has implemented in its Amsterdam headquarters and across offices in China. The design includes barriers between desks, bold circles on the carpets around desks indicating where people can stand, and increased signage—all to encourage physical distancing.

— *Working in consistent teams.* Chinese food-delivery company Meituan divided employees into three teams, allowing only one team in the office each day. Several US health systems have separated staff working in COVID-19 zones from staff working in non-COVID-19 zones, and have made changes to their care models (such as batching activities or using mobile devices to conduct hospital rounds), to minimize the risk of virus spread and of nurse and physician shortages. In Denmark, primary schools adjusted their operating model by splitting up children into groups of about a dozen, with each group taught by the same teacher every school day. Each group has assigned start and end times and holds separate classes, mealtimes, and playground activities.

In common spaces

Businesses have been taking measures to eliminate or at least minimize gatherings in common spaces. US grocery stores have closed down high-contact parts of their stores, such as food courts and self-serve food stations. At the Pentagon, strategy meetings regularly attended by 40 to 50 people take place across three rooms, with video-conferencing in each room. Such an arrangement allows individuals to address all attendees and collaborate in smaller groups, without crowding into

a single conference room. Petrochemical group Sinochem in Beijing delivers food to employees' desks to prevent crowding in lunchrooms. At a Foxconn factory in China, workers eat at cafeteria tables separated by tall dividers. Some Chinese manufacturers have staggered lunch breaks and on-site meal offerings. Others, including electronics manufacturer TCL, require employees to scan QR codes upon entering common spaces, such as cafeterias, thus facilitating contact tracing in case of an infection. Corporate offices throughout Asia are installing motion-control doors and removing shared appliances from office kitchens and pantries.

Post-infection

Given the high transmission rates of the coronavirus, every business must have plans and processes in place in the event that an employee or customer gets infected. It's critical that a business clearly communicates its post-infection processes to all levels of the organization.

— *Contact tracing.* The capabilities for contact tracing—whether through the use of technology, a team of human contact tracers, or both—have been important for sustaining safe working environments for essential businesses.[3] Some telecom companies in Asia are supporting their governments in contact tracing. When a confirmed COVID-19 case is identified, the infected person's location history is tracked, and the government sends SMS alerts to people who may have come in contact with that person. In San Francisco, a joint partnership of the city Department of Public Health; the city government; the University of California, San Francisco; and mobile-technology provider Dimagi has recruited more than 250 public-health workers to help with contact tracing. Those workers conduct interviews with individuals who have been infected and help trace and notify contacts. Each location should choose contact-tracing solutions consistent with local privacy norms and standards.

— *Clear triggers for returning to work.* Businesses have defined clear activation triggers and protocols for handling an infection or outbreak. For example, hospitals seal off and deep clean areas that may have had virus exposure; individuals who may be infected are placed in isolation. Some US businesses have defined return-to-work triggers for infected employees. Common triggers include multiple negative tests for COVID-19, a positive antibody test, and a two-week period of self-quarantine during which the person shows no symptoms.

As businesses prepare to reopen, setting up a plan-ahead team to guide and accelerate decision making may be appropriate.[4] The team's responsibilities will include critically evaluating all return-to-work policies and protocols, stress-testing workforce safety interventions, and reviewing and refining processes after implementation. Because every day brings new developments in the fight against COVID-19, a plan-ahead team can help a company adapt and react quickly—and, ultimately, be better positioned to protect the health and safety of employees and customers alike.

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The authors wish to thank Lindsey Barrison and Maria Mosolova for their contributions to this article.

[3] Molly Bode, Matt Craven, Markus Leopoldseder, Paul Rutten, and Matt Wilson, "Contact tracing for COVID-19: New considerations for its practical application," May 8, 2020, McKinsey.com.
[4] Yuval Atsmon, Chris Bradley, Martin Hirt, Mihir Mysore, Nicholas Northcote, Sven Smit, and Robert Uhlaner, "Getting ahead of the next stage of the coronavirus crisis," April 2020, McKinsey.com.

Banking system resilience in the time of COVID-19

Capital cushions at European, UK, and US banks look adequate in most scenarios—and challenged in others. In either case, they must be rebuilt, and that will require some difficult decisions.

This article is a collaborative effort by Kevin Buehler, Miklós Dietz, Federico Fumagalli, Cindy Levy, Susan Lund, Olivia White, and Eckart Windhagen, representing views from McKinsey's Banking and Risk practices.

The recession of 2008–10 was triggered by a shock in the banking system. In fact, many economic downturns in the past 50 years, such as stock-market crashes and debt defaults, had financial-system origins. The current recession is different: it was triggered by a global pandemic, governmental and societal responses to it, and the resulting shocks to supply and demand.

But that does not mean that banking is not affected. The industry has already felt massive effects from the crisis, with more to come. And, as our colleagues have written recently, the banking systems in both Europe[1] and the United States[2] have roles to play in getting the economy back on track—for example, by providing loans to businesses that have suffered.

How effective a bank-supported economic recovery will be, however, depends on banks' resilience and health. Losses from loan defaults and increases in risk-weighted assets will deplete banks' capital. The extent will depend on the spread of COVID-19 and the effectiveness of the public-health response and mitigating interventions. Our new research considers three scenarios that business executives around the world consider most likely. We find that in two milder scenarios, in which GDP does not recover to its previrus level until 2021 or 2023, $100 billion to $400 billion in common equity tier-1 (CET1) capital would be wiped out in Europe, the United Kingdom, and the United States.

The good news is that the European and US banking systems in aggregate can withstand damage on that scale, though individual banks may not fare so well. Entering the crisis, CET1 ratios[3] were 13 percent in Europe, 14 percent in the United Kingdom, and 12 percent in the United States. Should one of the two milder scenarios prevail, those ratios would fall to 8.5 to 10.0 percent in Europe, 11 to 13 percent in the United Kingdom, and 8.0 to 10.5 percent in the United States, all above regulatory minimums (standards that have seen some recent flexibility from regulators). Some institutions would slip below the minimums, perhaps to a level that threatens their viability, but the systems themselves would survive. In either of these scenarios, the prudential regulation of the past ten years will have succeeded—an achievement worth celebrating.

However, the milder scenarios are by no means a sure thing. Banks are taking massive provisions, and offering negative guidance for coming quarters. Should the more-pessimistic scenario take place, bank capital could fall by as much as an additional two to three percentage points, bringing the CET1 landing point close to 5 to 6 percent.

In any scenario, banking executives must prepare for the next normal to be very different from that of the past ten years. Banks in mature economies have built significant capital buffers and operate in what we call the "cushion zone." In coming months and years, banks might pass into the "caution zone" and need to significantly change the actions they take to preserve and raise capital, and decisions about dividends and buybacks, compensation, and cost structures need to be reexamined. The level and type of support that banks are able to provide to the real economy would also come under scrutiny, given their tighter capital positions.

One of several expensive lessons of the global financial crisis is that building banks' capital is not optional but a requirement. Other lessons include the speed at which the financial system's plumbing can become clogged, the rapidity with which liquidity can disappear, and the difficulty of selling assets in a plunging market.

In this article, we share our research on capital losses; explain the actions that banks might consider taking to rebuild capital as they move from the cushion to the caution zone, and possibly even into the "danger zone," in which a bank's viability is in jeopardy; outline the ways that government can team up with banks to jointly propel the economic recovery; and offer some guidelines for executives to help navigate banking's next normal.

[1] Matthieu Lemerle, Debasish Patnaik, Ildiko Ring, Hiro Sayama, and Marcus Sieberer, "No going back: New imperatives for European banking," May 18, 2020, McKinsey.com.
[2] Kevin Buehler, Miklós Dietz, Marie-Claude Nadeau, Fritz Nauck, Lorenzo Serino, and Olivia White, "Stability in the storm: US banks in the pandemic and the next normal," May 13, 2020, McKinsey.com.
[3] Common equity tier-1 capital/risk-weighted assets.

This article is the first in a series designed to provide a broad perspective on the economic impact of COVID-19 on banks, companies, financial markets, and policy makers.

Capital losses will likely be severe but sustainable

We have surveyed a panel of 2,000 global executives monthly about the potential scenarios that they deemed most likely (Exhibit 1).[4]

Here, we focus on three scenarios that executives said are likely. Scenario A1, considered the most likely, entails a muted world recovery by 2023. Scenario A3 reflects more optimism about the virus's spread and the public-health response, foresees recovery by 2021 (this scenario may still be possible for parts of Europe, but appears highly unlikely for the United States). Scenario B2 reflects greater pessimism about the effectiveness of the public-health response.

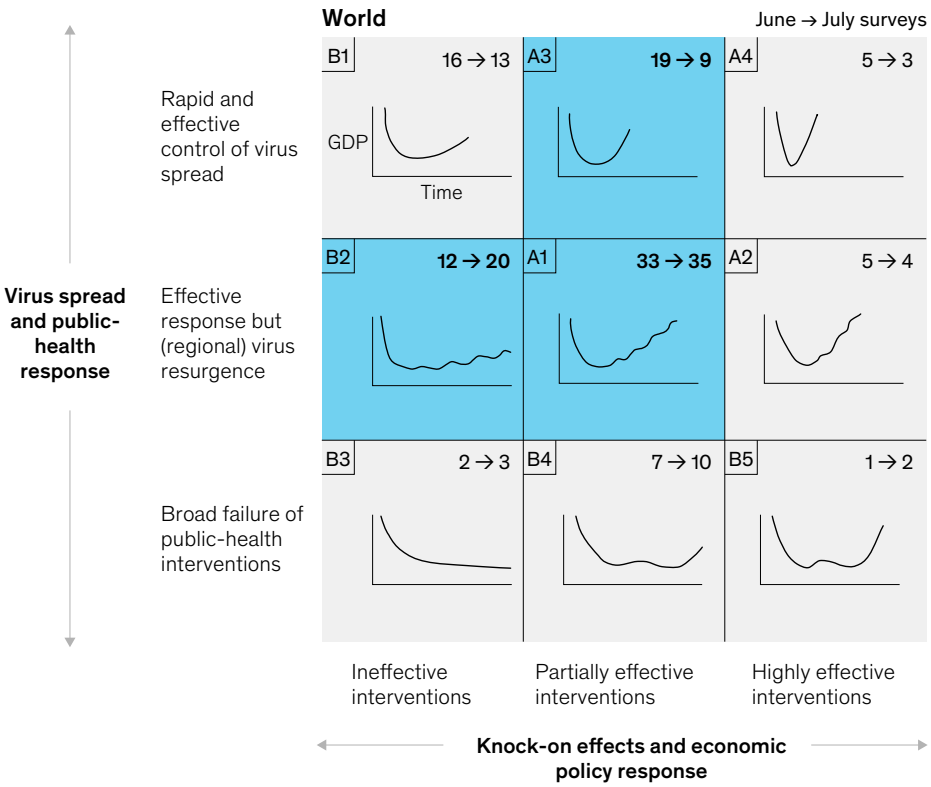
Consider first the two milder scenarios, A1 and A3. (Not all regions will necessarily experience the same scenario.) In mature economies, we expect reductions in CET1 ratios of one to five percentage points, depending on the scenario and geography (Exhibit 2). Loan-loss provisions and increased risk-weighted assets are the primary sources of loss. These figures represent a significant reduction of current capital buffers, with potentially severe

[4] "The coronavirus effect on global economic sentiment," July 27, 2020, McKinsey.com.

Exhibit 1

Global executives indicate three likely scenarios.

Likelihood of scenarios for the global economy, % of total respondents[1]

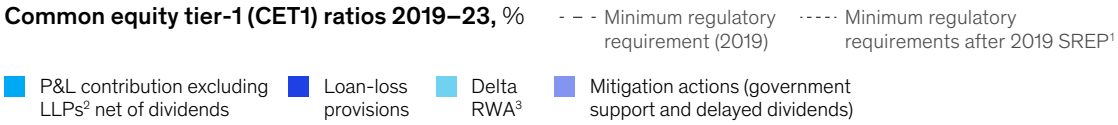


[1] Monthly McKinsey surveys: June 2020, n = 2,174; July 2020, n = 2,071.

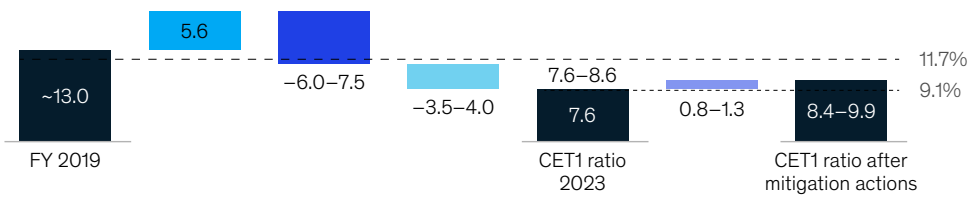
Exhibit 2

In the moderate and mild scenarios (A1 and A3), capitalization looks adequate.

Common equity tier-1 (CET1) ratios 2019–23, %



Europe (France, Germany, Italy, Spain)

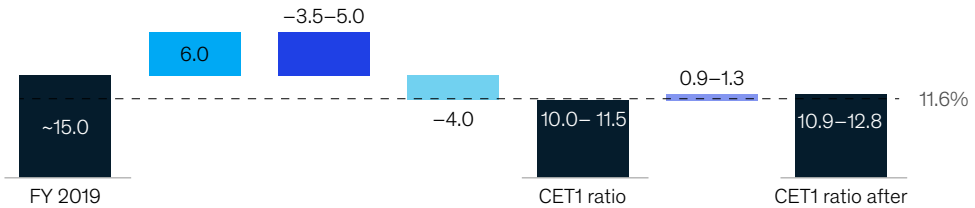


Annual impact, %	1.4	−1.5–1.9	−1.3–1.5		0.2–0.3	

2023
Year of lowest capital level

3–5
Capital depletion, pp[4]

United Kingdom

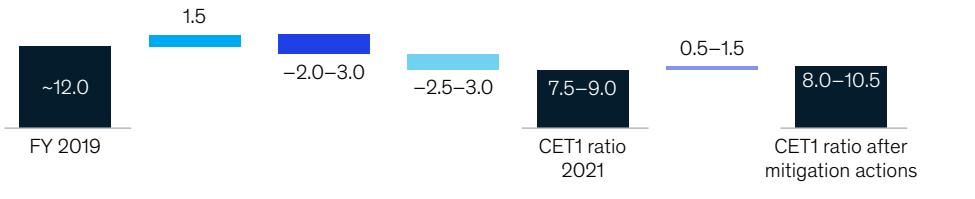


Annual impact, %	2.0	−1.2–1.6	−1.3		0.3–0.4	

2021
Year of lowest capital level

2–4
Capital depletion, pp[4]

United States



Annual impact, %	0.75	−1.0–1.5	−1.3–1.5		0.3–0.8	

2021
Year of lowest capital level

1–4
Capital depletion, pp[4]

[1] The 2019 Supervisory Review and Evaluation Process provided some flexibility and relief in capital requirements.
[2] Loan-loss provisions.
[3] Risk-weighted assets.
[4] Percentage points.

US banks' capital will be hit sooner but will recover faster. On the other hand, European banks' losses will be distributed over time.

consequences (see sidebar "Two precedents: Greece and Italy after 2008"), but the capital reduction we estimate in these two scenarios will not generate major problems of sustainability for the European and US banking systems, though they will be affected differently.

If, instead, scenario B2 materializes, the impact would be much greater, as the recession would last until 2025 or later (see sidebar "Prepare for the worst: How bank systems could enter the danger zone"). The CET1 ratio in the banking system of mature economies could be reduced by an additional two to three percentage points. This would result in system-wide capital well below regulatory minimums. It would require significant and immediate reductions in costs and compensation and a suspension of dividends and share repurchases (a step the Federal Reserve already took for big US banks in the third quarter of 2020)—and possibly additional capital raising.

European, UK, and US financial systems differ in critical ways, which makes comparing their capitalization levels difficult. Their social-safety nets and accounting practices differ quite a bit as well; many EU countries have more-comprehensive systems, while US banks tend to reserve for losses faster than their European peers do. Put those factors together and, in our view, US banks' capital will be hit sooner but will recover faster. Their capital reserves will reach a low point in 2021, according to our estimates. On the other hand, European banks' losses will be distributed over time; in our estimate, their capital reserves will not reach its nadir until 2023 or 2024. The United Kingdom sits in the middle, reaching the low point in 2022.

In any scenario, several factors could influence the impact. First, actual economic developments could be worse than those currently expected. Unemployment in the United States, for example, already seems to have exceeded initial expectations. Another factor is the effective default rates of companies, given the unprecedented nature of this crisis. A third factor: our estimates consider only the governmental measures that benefit the banking system directly (such as moratoria, credit guarantees, and capital-relief measures). But it can certainly be argued that many other measures benefit banks indirectly, and it is possible that governments and supranational institutions would take additional steps to further alleviate the extent of the shock on the real economy.

What if a banking system moves from cushion to caution?

Entering the global financial crisis, CET1 ratios were 6 to 8 percent in Europe, the United Kingdom, and the United States. In that light, the projected landing points under scenarios A1 and A3 of 8.5 to 10.0 percent in the European Union, 11 to 13 percent in the United Kingdom, and 8.0 to 10.5 percent in

Two precedents: Greece and Italy after 2008

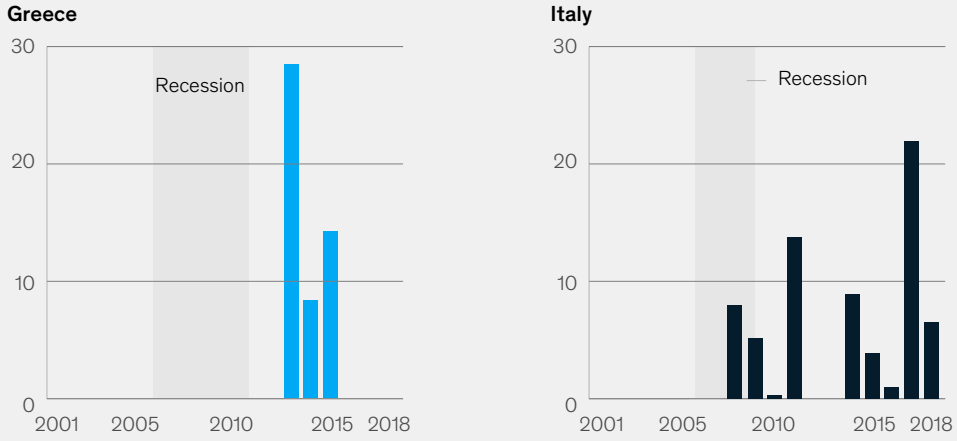
What will the capital shortfalls we anticipate in the milder scenarios mean? For comparison, consider the equity injected into Italian financial institutions after the global financial crisis, as GDP growth fell more than five percentage points. Public and private sources added about €65 billion, equivalent to two to three percentage points of common equity tier-1 (CET1) ratio. Similarly, after the prolonged recession in Greece, more than €50 billion of equity, the equivalent of eight percentage points of the CET1 ratio, was injected (exhibit).

Stabilizing the banking system was deemed one of several steps needed to restart growth. But even the substantial capital injections made after 2008 were not enough to revive growth. To this day, GDP growth in Greece has not returned to the level in 2008. More than a decade of growth has been lost. The current crisis could have a comparable impact on the entire European, UK, and US banking industries.

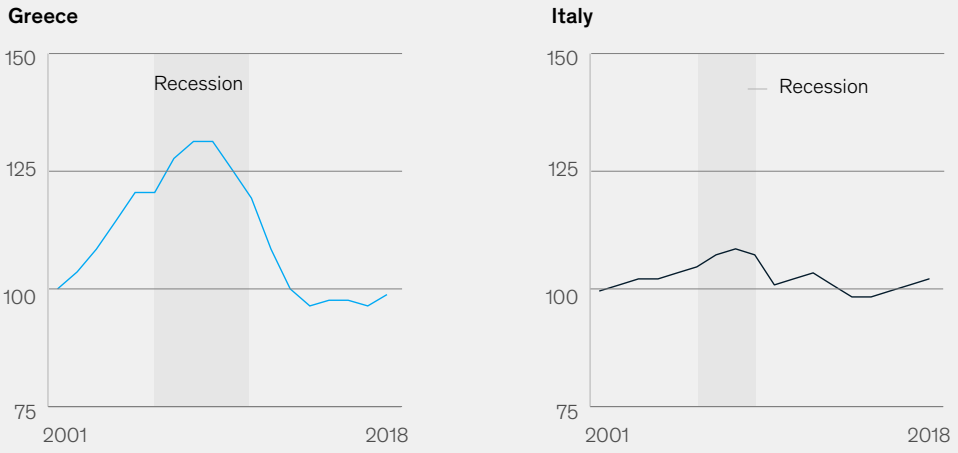
Exhibit

Italy and Greece recapitalized their banks after 2008.

Equity injection in financial institutions, $ billion



Real GDP, index (100 = 2001)



Source: Capital IQ; OECD

the United States demonstrate the resilience that the global banking system has built (Exhibit 3). But they may also mark the end of a ten-year journey in a cushion zone, in which banks have held a comfortable level of capital. In scenario A1, more than $400 billion in capital accumulated by European and US banks over the past ten years would be wiped out.

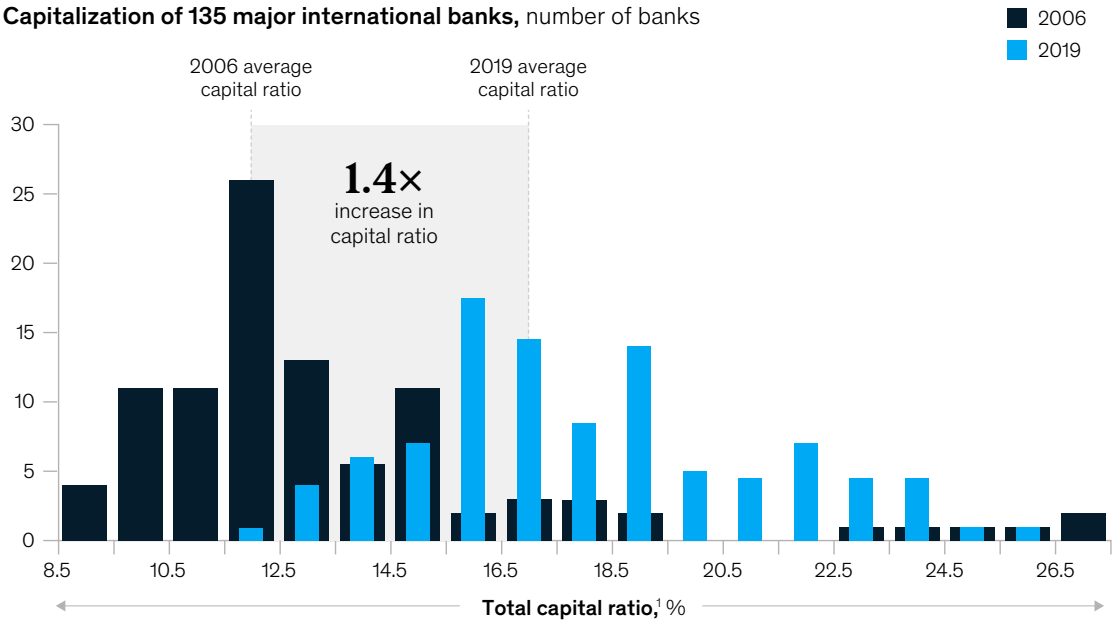
As the pandemic continues, the banking system may enter what we call a caution zone, with a CET1 ratio of about 8 to 10 percent, in which banks must start to rebuild their cushions and take other steps as well (Exhibit 4). And, while the overall banking system seems sufficiently resilient, individual banks and possibly entire regional systems could enter a danger zone, reached at a CET1 ratio of about 5.5 percent.

In the caution zone, banks will first need to understand exactly where they stand, through monthly or even weekly stress tests. Many will find that they need to improve their health, starting with rebuilding at least part of their capital buffer. Not only does the buffer provide resilience, as the COVID-19 crisis is proving, but markets have become increasingly aware of the importance of a capital cushion to withstanding external shocks. Capital formation won't be easy, of course, with falling revenues and profits. Our research shows that capital formation from retained earnings will drop from a level equivalent to 0.5 to one percentage point of CET1 yearly to only 0.2 to 0.5 percentage point, thus making organic recapitalization much slower. Raising private capital will also be difficult. Banks should therefore consider taking a series of actions, some tactical and others structural.

Given the scarcity of available capital, banks will most likely need to reduce their dividend payouts and stock buybacks and introduce compensation caps. They also will likely need to tighten their credit policies. Depending on target CET1 ratios and dividend policies, banks could have capital to support between $1 trillion and $5 trillion of additional loans,

Exhibit 3

Capital ratios have increased 1.4 times since the mid-2000s.

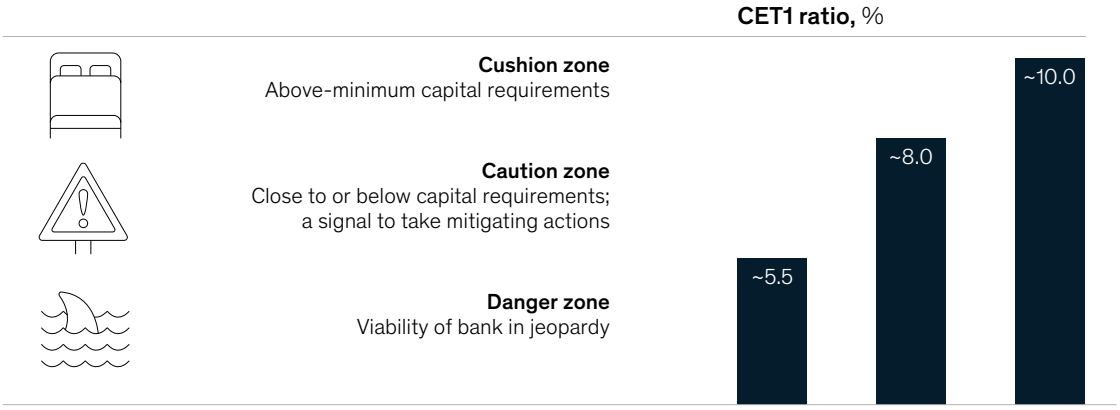


[1] Total capital ratio = own funds over total risk-weighted assets, with own funds = common equity tier-1 capital + alternative tier-1 capital + tier-2 capital.

Source: *BIS Bulletin*, No. 11, May 2020; FitchConnect

Exhibit 4

The common equity tier-1 (CET1) ratio places a bank in one of three zones.



Note: Cushion, caution, and danger zones depend on the capital requirements of individual banks or banking systems.

according to a study by the Bank for International Settlements.[5] That may not be enough to meet their local economies' needs and could generate a new credit crunch.

Banks might reduce exposure to noncore activities that absorb considerable capital—for example, by exiting some businesses such as investment banking, limiting international expansion, or reducing exposure to sovereign debt.

While most banks have already run substantial cost-cutting programs, some may look to achieve further cost efficiencies by, for example, shutting brick-and-mortar branches and migrating customers to other service channels. Banks must take care, however, not to jeopardize long-term relationships with their customers.

With differences in banks' health and capital positions becoming starker, M&A will likely increase, depending on regulatory approval. Tie-ups within the United States and especially within the European Union will become attractive, accelerating the consolidation of the industry. Some cross-border mergers might make sense (as will divestitures for some banks in the danger and caution zones). A would-be acquirer should build a business case on its ability to supply credit to the weaker bank's customers, thus preserving productive output in the real economy. M&A will also involve cutting costs, an important second-order effect that must be communicated to regulators. The merged bank might not be as large as the original pair, but it will be more economically powerful.

Will banks enter the danger zone?

Even in the milder scenarios we have considered, some individual banks could enter the danger zone, in which their viability is at issue. And should one of the more-pessimistic scenarios, such as B2, take hold, many more banks would follow. Our research suggests that even in the milder scenarios, about 1 percent of banks in mature economies might enter the danger zone, and up to 65 percent might drop into the caution zone.

The situation will likely differ for European and US banks. On one hand, a larger share of European

[5] Ulf Lewrick, Christian Schmieder, Jhuvesh Sobrun, and Előd Takáts, "Releasing bank buffers to cushion the crisis—a quantitative assessment," Bank for International Settlements, *BIS Bulletin,* Number 11, May 5, 2020, bis.org.

banks entered this crisis with a sizable capital buffer that will keep them in the cushion zone (Exhibit 5). And, as mentioned, the impact in the United States will be front-loaded and fully realized by 2021, in our estimate, while European banks will distribute the impact over three to four years.

On the other hand, US banks are also likely to recover more quickly, and not only because they take loan losses sooner. US banks are more profitable than their European peers and will be able to retain a greater share of their earnings to rebuild their cushions. In fact, the profitability gap might increase if Europe's monetary responses and economic recovery are less effective than those of the United States. Indeed, the prospects for return on equity (ROE) differ between the two geographies, in our estimate, with European banks' ROE staying well below cost of capital until 2025 and US banks returning to precrisis levels of ROE by 2023.

Which measures should governments consider?

In the dark days after the 2008 crisis, national and supranational regulators took stock of the system and imposed stringent new capital requirements, stress tests, and other means of building resilience. Many bank leaders grumbled about the new rules at the time, but no one is complaining now. The macroprudential reregulation of the banking system has succeeded, and, in our estimate, looks like it will be sufficient for most outcomes of the COVID-19 crisis.

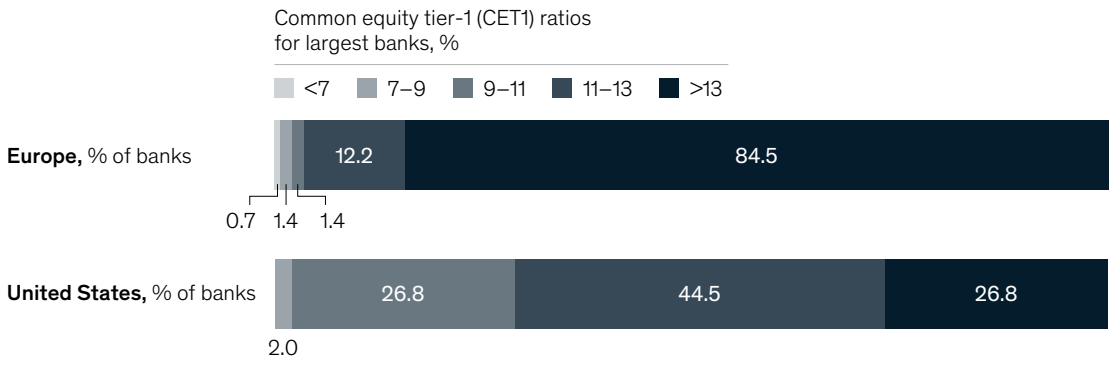
Now, with bank capital reserves falling, even more such cooperation is needed (for the range of moves that banks, governments, and central banks might consider, see sidebar "A playbook to navigate the different capital scenarios"). Banks and governments have already come together in certain ways; for example, US banks are delivering government relief funds through the Paycheck Protection Program. But both banks and governments could benefit by becoming more tightly integrated, particularly to deal with the problems of lending in a pandemic.

Even if a credit crunch can be avoided, banks will tend to allocate their limited capital to only the most profitable loans. As a consequence, governments may want to consider providing banks with incentives to support specific segments of clients and sectors (such as vulnerable members of society, small businesses, and sectors like sustainable energy) that are not necessarily those that banks would support from a pure risk-return point of view. Incentives can only go so far, but they may be a relevant

Exhibit 5

More of Europe's largest banks are well capitalized.

Capital ratio distribution for largest European and US banks by assets[1]



[1] Figures may not sum to 100%, because of rounding.

Source: Capital IQ

Prepare for the worst: How bank systems could enter the danger zone

Many executives favor a relatively optimistic scenario, in which GDP recovers to its precrisis level by 2023. However, nearly 60 percent of global business executives who responded to our survey believe that a more dire scenario is most likely. This could happen, for instance, if an effective vaccine is not developed or widely available in 2021 or 2022. Skeptics point out that there is still no effective vaccine for HIV—30 years after that pandemic began. Repeated resurgences of the novel coronavirus that require prolonged and widespread stay-at-home measures could turn temporary furloughs into permanent layoffs, hitting household income and sending more companies into bankruptcy. Many bank assets would deteriorate and their risk weights rise. And subdued economic demand across sectors would reduce banks' income.

Scenario B2 describes many of those possibilities (other "B" scenarios also envision pessimistic outcomes; see Exhibit 1 on page 3). If scenario B2 materializes, the impact on the banking system would be widespread and severe. In this scenario, eurozone and US GDP would not recover to previrus levels until after 2025. The CET1 ratio in the European and US banking systems would be reduced by four to seven percentage points. In both regions, system-wide capital would fall well below regulatory minimums and enter the danger zone. A significant portion of individual banks would likely see their capital wiped out, requiring either government intervention or bankruptcy. This is particularly true for smaller banks with heavy exposure to commercial real estate or other unsecured lending. For all banks, this scenario would require immediate and large reductions in costs (including layoffs and compensation), an end to dividends and buybacks, and additional capital raising. Should these problems become widespread, a banking crisis could follow.

For now, banking systems are stable, thanks in large part to the $13.5 trillion that governments have committed to households and businesses in the form of pandemic relief—with more on the way, as seen in the European Union's €750 billion stimulus package, announced July 21, 2020. But if consumer spending and investment remain in the doldrums for many more months, the ability of governments to prop up incomes will end and a wave of defaults will ensue. An adverse scenario like B2 would likely end the ability of banks to support economic recovery; indeed, they could become an additional major source of distress.

This last aspect is crucial, and something that governments could aim to influence directly. As one of the key transmission chains of government support to the real economy, banks have been asked to play an unprecedented social role in the pandemic, and the effectiveness of this mechanism will be a core determinant of the speed and extent of government stimulus success.

At the time of writing, this dire scenario is not the most likely outcome for Europe, the United Kingdom, or the United States—but its probability is not zero. Banks and governments should be creating a playbook to manage this outcome and watching a dashboard of both public-health and economic indicators to look for early warning signs.

tool to boost economic growth. In practice, they would require setting up a governance mechanism whereby banks and governments work closely to share the most up-to-date intelligence and data on how different sectors of an economy are faring and the amount of productive capacity that still merits support.

Another area of collaboration is the capital cushion. Given the impact of COVID-19, governments and central banks may want to take steps, as they did in the last crisis, to keep banks from slipping into the danger zone. For example, governments could consider supporting industry-wide "bad banks," which would absorb banks' worst-performing assets, and keep the originating institutions focused on supporting the future productive output of the real economy.

A third area is M&A regulation, which governments and regulators will be rightly cautious about, of course. They can play a role in shaping the direction of the industry by encouraging strong banks to acquire weaker ones, making tough choices on failing banks' resolution mechanisms, and so on.

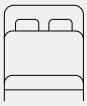
Finally, governments and banks can come together to understand some of the unwanted effects of

A playbook to navigate the different capital scenarios

Depending on the scenario that materializes, and on banks' institutional resilience, they could end up in any of the three zones: cushion, caution, or danger. In each zone, banks, governments, and central banks and regulators could launch a series of actions to navigate effectively (exhibit). Several of these steps result from lessons learned from the 2008 global financial crisis.

Exhibit

The actions of banks, governments, and regulators will depend on the zone banks are in.

	Banks	Governments	Central banks and regulators
Cushion zone 	• Increase market share, taking advantage of market turmoil • Consider M&A opportunities • Preserve and possibly further strengthen capital buffer	• Evaluate degree of support for market consolidation • Continuously evaluate effectiveness of support measures	• Assess, using system-wide and bank-specific stress tests, resilience of the system as the COVID-19 situation evolves • Periodically reassess adequacy of the expected eased regulatory rules
Caution zone 	• Reduce dividend payouts and stock buybacks • Achieve cost efficiency and introduce compensation caps • Tighten credit policies • Evaluate reduction of exposure to noncore activities	• Introduce or strengthen incentives for banks to support specific segments and sectors • Promptly identify plan for banks to get close to minimum capital requirements	• Support the regular functioning of financial markets (eg, liquidity, bond purchases) • Tightly monitor evolution of the economic situation and resilience of the banking system • Evaluate further easing of regulations
Danger zone 	• Trigger bank-specific recovery plans • Manage possible liquidity shocks • Immediately reduce costs and compensation • End dividends and buybacks • Evaluate conversion of debt into capital and additional capital raising	• Build systemically bad banks to absorb banks' worst-performing assets • Trigger contingency plans to support ailing banks	• Ensure financial-market continuity through further liquidity support and possible capital support options • Closely monitor banks' execution of recovery and, possibly, resolution plans

Note: Banks may be in one zone and their financial systems in another.

monetary policy. In recent years, EU banks (and many others) have put on the so-called carry trade by borrowing domestically, often at zero percent or below, and investing in bonds of other countries that provide some yield and have no regulatory-risk weight. Persistent low rates (with the possibility of even lower ones) might spur more such carry trades and an increase in government debt on banks' balance sheets. On one hand, governments have an incentive to support this carry trade, as it lowers their own borrowing costs. On the other hand, it also would reduce the bank capital that would be available to support the real economy.

A banking system outside the cushion zone will have decisions to make

The cushions that banks have built since 2007 have worked well. In our estimate, capital buffers will allow the banking system in mature markets to withstand the COVID-19 crisis under the most likely scenarios, A1 and A3. But the system will be damaged and must be repaired. As banks slip from cushion to caution, and even into danger, they must answer these questions, in concert with governments and financial regulators:

— *Is it better for national economies to accept the caution-zone approach outlined in this article, which many banks will likely follow if not provided different incentives?* Or would economies be better off if banks continue to lend, depleting their capital further? It is a fine line, one that must be walked carefully to avoid the danger zone, and to keep alive the potential for banks to attract private capital.

— *When is the right time to return to the cushion zone?* Banks are serving as a shock absorber for the economy; continuing to serve that function would mean putting off a return to the cushion zone. However, banking-system buffers must be restored quickly enough to be ready for the next recession. Bearing in mind that it took ten years to build the current cushion, countries cannot risk waiting too long, lest they enter the next recession with a weak banking system.

— *How big should the new cushion be?* Regulators have used stress tests in the past to determine minimum capital requirements. Banks entered this crisis with a further buffer on top of this, and yet some banks in mature economies will use up most of these ample buffers and stray close to the danger zone. Is the current crisis the new baseline for economic shock? Or is it a tail event, one that is highly unlikely to recur? Finding the right size for new capital requirements will require answers to questions such as these: Should banks be required to withstand shocks of this magnitude? Or is this task better performed by governments and central banks?

— *Will governments need to take a more active role in financial markets?* It's possible to imagine a future when governments adopt a more extensive policy-making role—for example, by defining when a company needs loans as opposed to equity. Such a role would require working closely with banks to jointly support the economy; for example, banks could provide information on sectors, and governments could provide policies that identify which sectors to support and when to support them.

The economic impact of the COVID-19 pandemic has already been tremendous, and it will have further effects as the situation evolves. Banking systems seem adequate to the challenge, in most scenarios. But whatever the next normal proves to be, if banks are to support an economic recovery, they must leave behind business as usual.

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Stability in the storm: US banks in the pandemic and the next normal

Banks will be tested. Now is their chance to use their hard-won resilience to preserve the financial system and support their customers and communities.

by Kevin Buehler, Miklos Dietz, Marie-Claude Nadeau, Fritz Nauck, Lorenzo Serino, and Olivia White

The humanitarian and economic fallout of the COVID-19 pandemic has upset the global balance. No person, industry, or aspect of society remains untouched.

The banking industry can uniquely act as a primary source of stability. Banks guard savings and investments, provide sound credit and financing, deliver safe and secure payments and transaction services, and offer trusted advice. They are not simply commercial enterprises but providers of important services to individuals and communities, playing a vital role in the functioning of the economy.

Banks in the United States entered the COVID-19 crisis with the strength of ample capital and liquidity and have moved rapidly to protect their employees and customers. Most have shifted the majority of their workforces to remote work and have closed or reduced capacity at branches while also dedicating hours to serving high-risk customers. Individuals and businesses have received forbearance where needed, and banks have served as critical conduits for the liquidity provided by the Federal Reserve and for the credit and loan forgiveness offered via the Paycheck Protection Program and the Main Street Lending Program. As such, in the early phases of the pandemic, US banks have largely been living up to societal expectations.

Yet the challenge to come is daunting and the path uncertain. Unemployment has hit levels not seen since the aftermath of the Great Depression. More than 25 percent of small businesses anticipate declaring bankruptcy in the next six months. Hard-hit industries, such as oil and gas, travel, and retail, may be forever reshaped. For banks, near-zero interest rates and a flattened yield curve mean diminished net interest income. Credit losses could exceed $1 trillion. Recovery, when it comes, will vary in speed and intensity across industries and regions. The lasting effects will linger for many years—perhaps a decade or more.

As our colleagues have suggested, meeting the challenge will require disciplined thought and bold action. So far, banks have acted swiftly and with *resolve* to meet the first acute phase of crisis. Now, they must show *resilience* under great uncertainty, beginning the *return* from lockdown and *reimagining* their new postcrisis future. Amid widespread economic struggles and heightened disparities, banks have the opportunity to rediscover their purpose and *reform* their contract with society, providing stability in the pandemic storm.

Resilience: Strength in uncertainty

Banks will need to plan for the worst among reasonable outcomes while hoping for the best. Our colleagues have developed nine potential macroeconomic scenarios for the economy over the next five years, reflecting a range of virus-containment, public-health, and economic-policy responses (Exhibit 1).[1] They surveyed more than 2,000 executives globally to understand which scenarios they believed to be most likely:

— Scenario A1, a muted recovery, was selected by roughly one-third of surveyed executives. In this scenario, the virus recurs after loosening of physical-distancing measures. US GDP could diminish by 13 percent from peak to trough, with unemployment reaching roughly 20 percent.

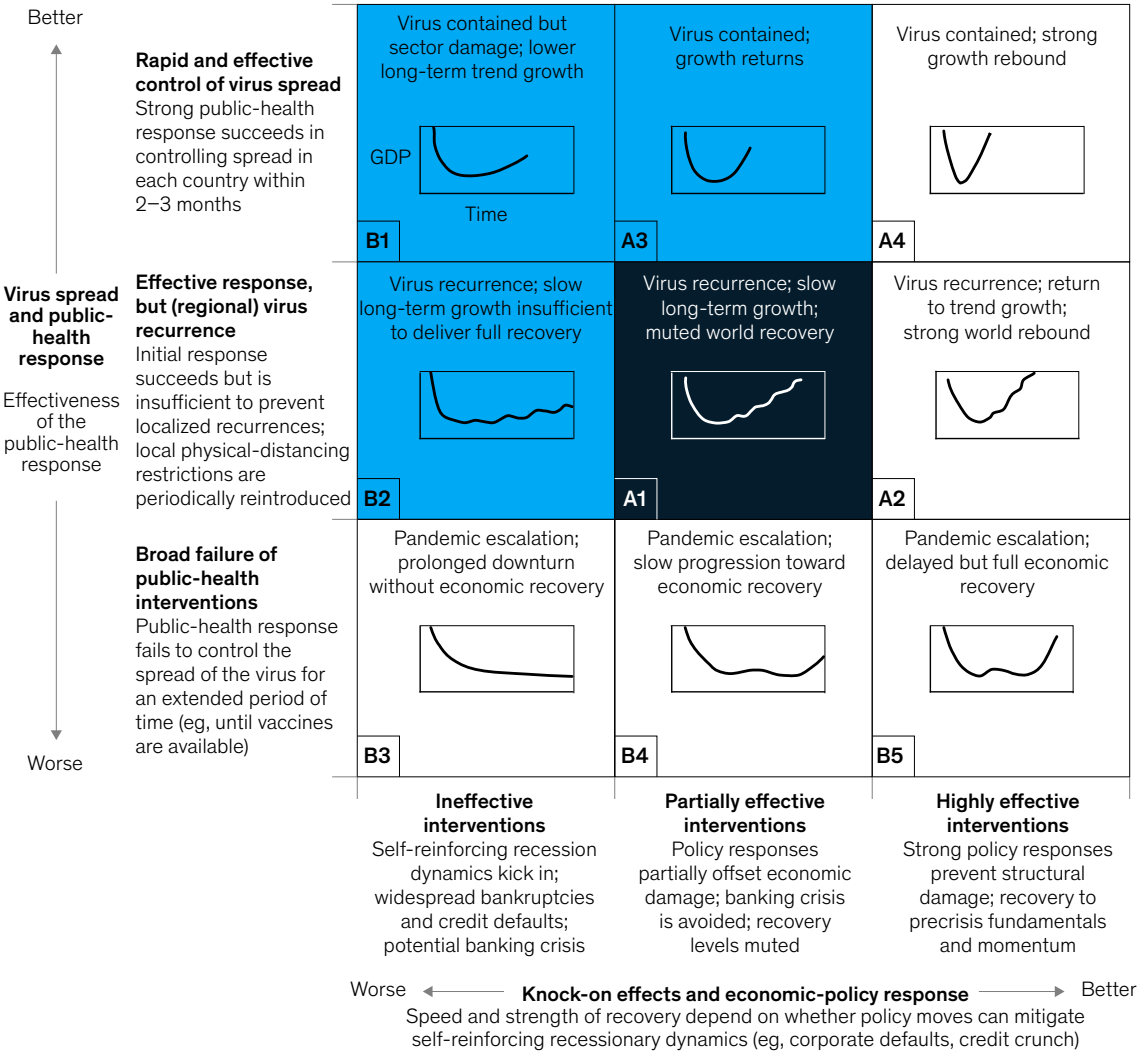
— More than one-quarter of surveyed executives are more optimistic, predicting more effective virus-containment or economic-policy response (scenarios A2, A3, and A4). Among these more positive scenarios, the most commonly selected is scenario A3, in which the virus is well contained and economic policy is somewhat effective. This scenario is nevertheless trying. US GDP suffers in 2020, falling 8 percent from peak to trough, returning to its previous peak level of economic activity at the end of 2020.

[1] Kevin Buehler, Martin Hirt, Ezra Greenberg, Arvind Govindarajan, Susan Lund, and Sven Smit, "Safeguarding our lives and our livelihoods: The imperative of our time," March 2020, McKinsey.com.

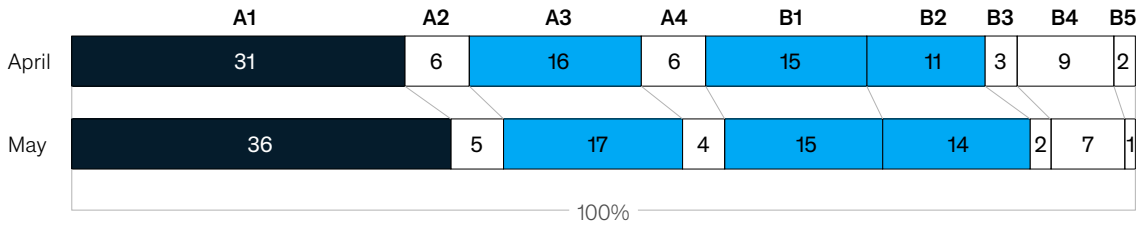
Exhibit 1

Executive uncertainty about the COVID-19 crisis.

GDP impact of COVID-19 spread, public-health response, and economic policies



Most likely scenario, % of respondents



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

Source: McKinsey survey of global executives, n = 2,079

Institutions are staring at multiple years of high credit losses while serving a customer base under enormous financial and psychic strain. Only banks that build sufficient resilience will see renewed growth.

— However, roughly 40 percent of surveyed executives are less sanguine, predicting that either virus containment or economic policy, or both, will be ineffective. Among these less optimistic scenarios, respondents most commonly selected those in which economic policy is ineffective although the virus is contained, potentially with some recurrence (scenarios B1 and B2).

Financial stability

The safety and soundness of the financial system depend on banks' financial resilience. In our estimate, the US financial system would withstand scenario A1 or any of the more optimistic scenarios (scenarios A2, A3, and A4). Regardless of scenario, banks need to manage and allocate their capital carefully to sustain the shock while standing by their customers, employees, society, and regulators.

US institutions entered the current crisis with substantially greater capital and liquidity resources than they had at the onset of the global financial crisis. This is seen through the common-equity Tier 1 capital (CET-1) ratio, a core measure of bank financial strength. In 2007, US banks with more than $50 billion in assets had an average CET-1 ratio of roughly 7 percent, which fell to about 5 percent by 2010. During this period, 12 major institutions suffered erosions of 300 basis points or more; half did not survive as independent entities.[2]

By contrast, at the start of 2020, US banks' CET-1 ratio was about 12 percent. Over the course of this crisis, that figure might decline by one to four percentage points, resulting in an average CET-1 ratio of about 8 to 11 percent. This is in line with the diminution in capital that US banks prepare to withstand during the annual stress-testing exercise. Most leading US banks today are positioned to weather a capital depletion of this magnitude without falling below regulatory minimums.

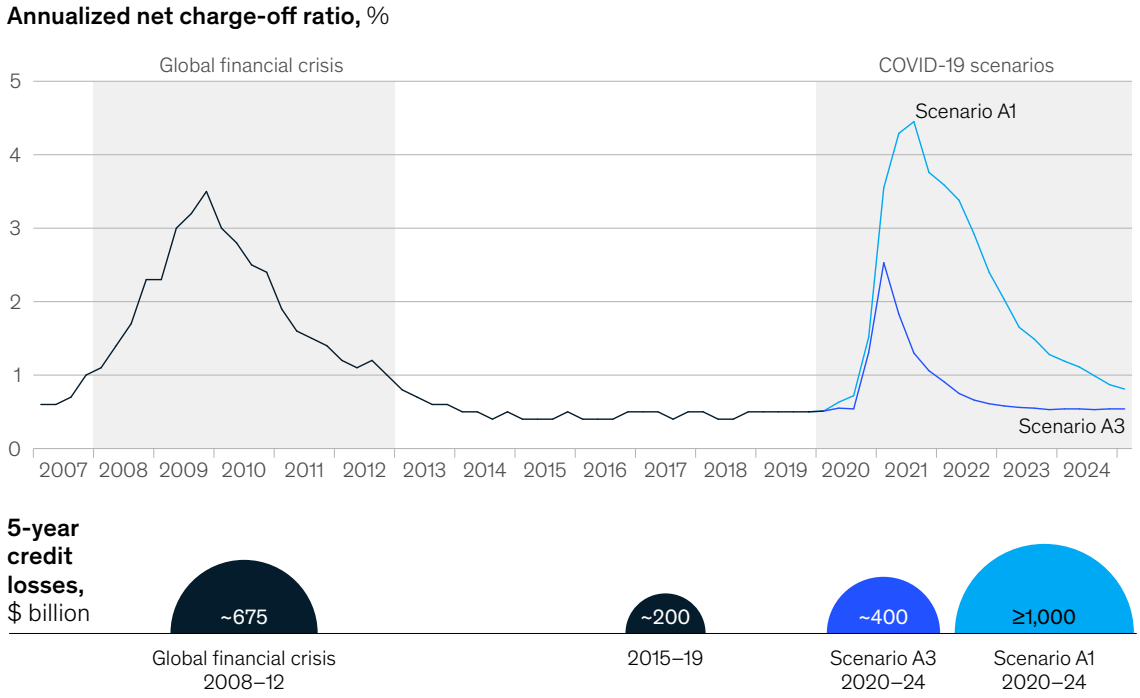
We expect that two factors will be most material to banks' finances over the next several years. Credit losses may range from $400 billion to $1 trillion between 2020 and 2024 (ranges cited here and later depend on the scenario) (Exhibit 2). Net interest income may decrease by up to $200 billion from its 2019 baseline. Overall, we foresee that the credit losses described later in this article will affect bank revenues the most in the next 18 months. And while we see those losses extending beyond the next two years, reduced demand and tightening of credit availability will most likely be major parts of the revenue impact in 2022–23.

Credit losses will come disproportionately from commercial and industrial (C&I) loans to the industries most heavily affected by lockdowns. For example, in retail, transportation, and automotive, more than half of issuers have already been rerated by the credit agencies.[3] Oil and gas

[2] Jennifer Hynes, Sanders Shaffer, and Scott Strah, *The impact of the recent financial crisis on the capital positions of large U.S. financial institutions: An empirical analysis*, Federal Reserve Bank of Boston, July 16, 2013, bostonfed.org.
[3] "COVID-19: Coronavirus- and oil price-related public rating actions on corporations, sovereigns, and project finance to date," S&P Global, May 7, 2020, spglobal.com.

Exhibit 2

Credit losses may reach $1 trillion, exceeding those in the last financial crisis.



Source: Federal Reserve Board; Federal Reserve Bank of St. Louis; McKinsey analysis, in partnership with Oxford Economics

borrowers will also struggle: up to 40 percent of producers face insolvency if current prices persist.[4] Correspondingly, we expect C&I loan losses to be significant, with cumulative charge-off rates between 2020 and 2024 ranging roughly from 4 percent to 10 percent, depending on the scenario. Commercial-real-estate loan-loss rates will reach similar levels, with hotels and retail properties most deeply and immediately affected.

Unsecured consumer lending will be even harder hit. In the first seven weeks of the crisis, 33 million Americans have filed initial jobless claims, which is more than in the entire global financial crisis. As people struggle financially, credit cards could see cumulative charge-off rates of 25 to 41 percent.[5] Impact on mortgages and home-equity loans could vary widely—with charge-offs ranging from around 1 to 7 percent—depending on house prices, which are enormously uncertain at present, and governments' and servicers' actions, such as forbearance (see sidebar, "Credit-loss projections by asset class").

Ongoing resilience

Resilient institutions not only withstand threat or change but transform for the better. The COVID-19 crisis poses a significant test of financial resilience, as well as banks' operational, organizational, reputational, and business-model resilience.

Remote-working models and broader environmental factors will challenge *operational resilience*. For example, remote working has given hackers and state actors more "attack surface,"

[4] Rachel Adams-Heard and Catarina Saraiva, "Oil companies warn Kansas City Fed of widespread insolvencies," Bloomberg, April 7, 2020, bloomberg.com.

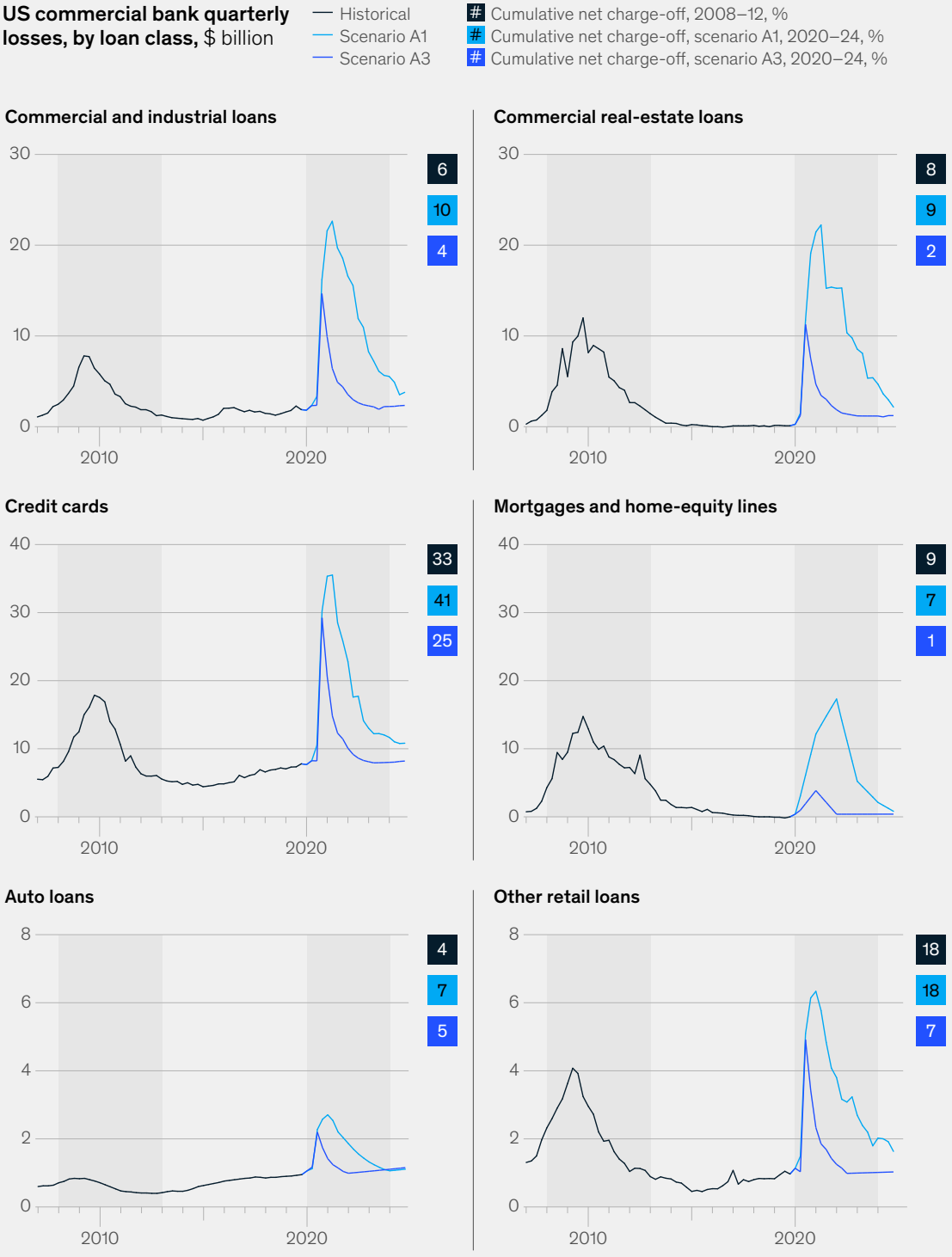
[5] Jennifer Hynes, Sanders Shaffer, and Scott Strah, *The impact of the recent financial crisis on the capital positions of large U.S. financial institutions: An empirical analysis*, Federal Reserve Bank of Boston, July 16, 2013, bostonfed.org.

Credit-loss projections by asset class

Commercial- and industrial-loan losses in the COVID-19 crisis will be significant, with cumulative charge-off rates ranging roughly from 4 to 10 percent, depending on the scenario (compared with about 6 percent in the global financial crisis) (Exhibit A). In the pandemic, losses will be driven by industries most affected by the shutdown and surrounding circumstances, including retail, transportation, automotive, and oil and gas, and small- and medium-size-business borrowers.

Exhibit A

Credit losses will vary by product; more than 70 percent will come from corporate lending, commercial real estate, and credit cards.



Source: FDIC; Federal Reserve Board; Federal Reserve Bank of St. Louis; Federal Reserve Bank of New York; McKinsey analysis, in partnership with Oxford Economics

We expect the loan-loss rates of commercial real estate to be about 2 to 9 percent. At the high end, that would exceed the rate in 1990–91 and the 8 percent rate seen during the global financial crisis.

We expect unsecured retail loans to be extremely hard hit, given the historic levels of unemployment. Credit cards could reach cumulative charge-off rates over five years of roughly 25 to 41 percent, compared with 33 percent during the global financial crisis.[1] Total charge-offs may exceed those of the global financial crisis by about 60 percent.

Losses on auto-loan portfolios could reach between 5 and 7 percent. In the last crisis, auto-loan losses were relatively lower (about 4 percent), as consumers chose to pay these loans ahead of others, and resale values for cars were high. Today, with higher levels of subprime auto lending, mobility curtailed, and residual values already in decline, we anticipate losses from loans and leases will be higher.

Mortgage and home-equity-loan charge-offs could vary widely, from about 1 to 7 percent. That is lower than the 9 percent cumulative charge-offs seen between 2008 and 2012, during the global financial crisis. In the current crisis, in addition to the macroeconomic scenario, the key factors will be house prices (which are enormously uncertain at present) and governments' and servicers' actions, such as forbearance.

[1] "COVID-19: Coronavirus- and oil price-related public rating actions on corporations, sovereigns, and project finance to date," S&P Global, May 7, 2020, spglobal.com.

increasing cyberrisk, with new malware campaigns and scammers posing as corporate help-desk teams. External fraud and technology risk have both also grown as more people work from home. Banks have and will need to continue ongoing COVID-19-specific control testing, monitoring, and enhancement while also reinforcing their capabilities to respond quickly to new similarly unforeseen events.

Organizational resilience requires talent development, new measures in people management, and robust succession planning. Building the reskilling capabilities to promote greater agility and scalability helps banks build the organizational capacity to cope with rapid changes like the 80-fold increase in origination volume for small and medium-size bank (SMB) lending experienced recently. Development and succession planning for executive management is equally central for resilience. The COVID-19 pandemic is a grim reminder that no institution can assume its leadership team to be immune from mishap or worse.

Reputational resilience will confront significant tests in the face of COVID-19. Banks are not only the beneficiaries of government support but also major vectors for delivering government aid. As they do so, they must take care to funnel the funds appropriately, which can be a challenge under extreme pressures of time and throughput. At the same time, as loan delinquencies and defaults rise, so, too, will the reputational stakes. Adhering to bank rules and regulations on how to treat delinquent loans and ensuring that those who can pay do pay while also reckoning with new social movements, such as #NoRent, will be a reputational quagmire for which banks must prepare.

Finally, *business-model resilience* requires institutions to adapt to potentially significant shifts in customer demand, competitive landscape, and regulatory terrain, as we discuss next.

Return and reimagination: Toward a new future

Many banks are justifiably focused on returning to "normal" as quickly as possible. However, the halcyon days of 2018—with a more typical yield curve, low credit losses, consistent growth, controlled expenses, and paced evolution toward digital—will not return.

It is already clear that this crisis has accelerated change in the way banks interact with customers

and undertake remote operations. At the same time, institutions are staring at multiple years of historically high credit losses while serving a customer base itself under enormous financial and psychic strain. Only banks that build sufficient resilience will be able to envisage renewed growth. But in this environment, even resilient banks will need to provide differentiated client relationships and to reduce their cost structures dramatically.

Three characteristics of banks that will succeed in this new future stand out. They will digitize customer interactions to address prolonged public-health risks. They will restructure their workforces and operations to become more agile and productive. And they will increase their pace of innovation to deliver those changes while evolving their value propositions to respond to rapidly changing customer needs.

Digitization out of necessity

Over the past two months, banks' interactions with customers have become almost entirely remote, as people have self-quarantined and branches have closed or reduced their hours. Interestingly, during this time when phone interactions have increased substantially, consumers are using online and mobile banking only slightly more than they did before. In North America, online log-ons increased by 8 percent and mobile log-ons by 1 percent (compared with a 15 percent increase in call volume) since December 2019.[6]

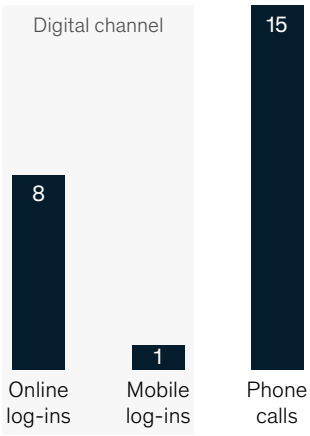
Many organizations have predicted that a tsunami of new customer demand would cause a swift shift to digital banking. In fact, McKinsey surveys suggest that retail-customer preferences are largely unchanged. For example, when asked how they expect their behavior to change after the pandemic, 13 percent expect to use mobile banking services more, while 7 percent expect to use them less (Exhibit 3).[7] Nevertheless, previous investments in digital offerings are paying off for many banks, and a significant opportunity remains to upgrade digital capabilities so that they become more convenient than a phone call for a broader array of customer interactions.

[6] McKinsey Finalta Remote Banking Pulse Check Survey, April 2020, covering 130 banks globally, including 21 in North America.
[7] McKinsey Financial Insights Pulse Survey, April 26, 2020.

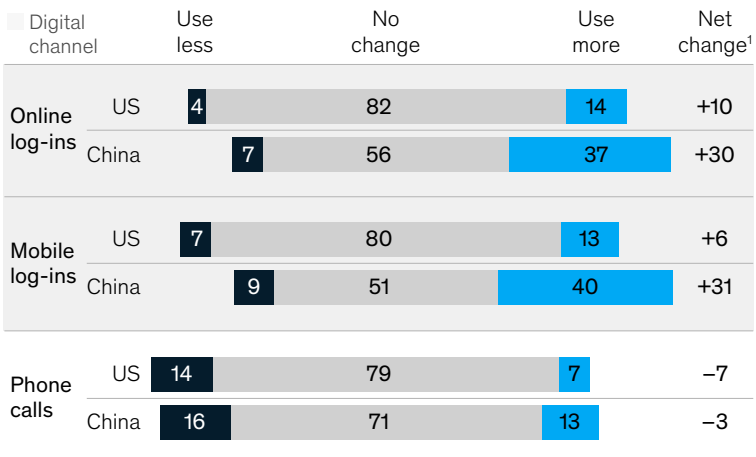
Exhibit 3

US consumers expect to use digital banking somewhat more after the crisis, but this is not evident in their choices today.

Current US remote-banking use, % change since Dec 2019



Consumers' expectations for remote-banking use after COVID-19, % of respondents



[1] Net intent is calculated by subtracting the % of respondents stating they expect to decrease usage from the % of respondents stating they expect to increase usage.

Source: McKinsey Finalta Remote Banking Pulse Survey, Apr 2020, covering 130 banks globally, including 21 in North America; McKinsey Financial Insights Pulse Survey, Apr 16, 2020, n = 509, sampled to match China general population aged ≥18, survey accuracy is ±3 percentage points

Even in the immediate term, organizations that reimagine processes to help people collaborate more meaningfully will have a leg up on recruiting and keeping the best talent.

While we don't see evidence yet for a rapid groundswell of digital demand, the digital revolution will come of necessity. Even if customers would prefer to go back to the way things were, those days are likely gone, with public-health risks potentially continuing for months or years, particularly for older generations.

Beyond the immediate impact of the disease, as banks face likely lower revenues and greater pressure on productivity, they may also come to see that their branches are a cost that is not absolutely necessary. US bank branches (which numbered about 88,000 in 2019, roughly 8, 000 fewer than in 2013) have been largely vacant for six weeks. Many banks will conclude, based on both branch economics and customer behaviors, that they should not reopen some of those shut branches. In that way, US banking might come to look more like other developed markets. The United States has 35 bank branches per 100,000 adults; by comparison, Canada and the United Kingdom have a density of 20 and 19 branches per 100,000, respectively.[8]

Similarly, commercial banks will need to rely more heavily on digital channels to serve SMBs, to make it cost effective to serve them and their increased needs. That will mean increasing investment in digital and remote sales capabilities to replace in-person sales approaches. Interestingly, this could improve growth prospects for some smaller commercial banks struggling to cover large geographies, allowing them to access new markets further afield. It may allow some smaller banks to focus on industry niches or specific population segments at a regional or national level.

An agile and productive workforce

Lockdowns throughout the world have pushed companies quickly to remote and more agile ways of working. While the story is evolving, multiple indicators suggest that some remote work will persist even as COVID-19 abates. For example, in one survey, 74 percent of CFOs said they plan to keep at least 5 percent of their workforces remote.[9] In another survey, 54 percent of professionals indicate that working from home during the COVID-19 pandemic has had a positive impact on their productivity.[10]

Those results may not be resounding proof of employee preference, but they do indicate the feasibility of retaining at least some remote work—and the more agile collaboration models that go with it. Banks now face a prolonged period during which co-locating large numbers of employees in small spaces will be inadvisable. In this context, many banks are reorganizing to promote greater agility and scalability.

Remote-work productivity typically increases when an entire team collaborates remotely, as compared with split-team models. Even in the immediate term, for remote employees struggling to work effectively, organizations that reimagine processes to help people collaborate more meaningfully will have a leg up on recruiting and keeping the best talent. For instance, some capital-markets leaders are learning how to

[8] United States Census Bureau, census.gov; "Summary of Deposits" 2013 and 2018, Federal Deposit Insurance Corporation, fdic.gov; "Commercial bank branches (per 100,000 adults)," World Bank, 2019, data.worldbank.org; Chris Rhodes, "Bank branch and ATM statistics," House of Commons Library, January 30, 2020, commonslibrary.parliament.uk.

[9] "Gartner CFO survey reveals 74% intend to shift some employees to remote work permanently," Gartner, April 3, 2020, gartner.com.

[10] "Brent Schrotenboer, "Working at home had a positive effect on productivity during the pandemic, survey says," *USA Today*, May 4, 2020, usatoday.com.

manage remote teams across the deal flow on a virtual trading floor. Other banks are training relationship managers to engage with customers digitally.

When banks bring some people back to the workplace, they will need to consider the personal details of each team and each employee and their ability to return to the office based on factors such as disease susceptibility, transportation constraints, and local rules. Return plans will need to be highly detailed, spanning new designs for physical infrastructure to protect workers, safe transportation to the office, and childcare for those who need to come to work while schools remain closed.

As banks reimagine work-activity processes from the standpoint of employees, they have the opportunity to radically simplify and digitize each process, yielding welcome productivity benefits. Many tasks that were manually processed a year ago are already being quickly digitized to adapt to the new normal. The potential for automation will shift the role that banks need to fill. As banks rethink their operating models for the next normal, they can take a fresh look at expenses that previously seemed like givens, from third-party spend to unnecessary travel and meetings to their real-estate footprint. Many banks are already actively exploring changes to each of those areas.

Flexible and rapid innovation

The flexibility to address new realities will matter tremendously, with the spoils going to those that can meet the practical demands of the moment with creativity and a commitment to make the most of the inevitable. Flexible innovators that reimagine both customer interactions and underlying operations will be rewarded with customer-share gains and higher productivity in the next normal. Banks that try to wait it out, resist the change by trying to return to a previous normal, or get distracted by novelties are likely to suffer. The following are a few innovation examples:

— For customers forced by branch closings into new interaction models, banks can create innovative experiences that address a wider variety of needs—for example, advice, problem resolution, and loan modification. Our surveys suggest that call-center volumes have spiked since the COVID-19 crisis began. Customers who cannot resolve issues through digital or physical channels are resorting to phone calls, with long hold times. Regardless of channel, banks that can rapidly innovate customer experience and underlying processes will gain superior customer-acquisition and -retention capabilities. The banking equivalent of the one-click purchase—for example, streamlined "one tap" financial-health advice—is not far in our future.

— The most successful banks will shape value propositions as true partners, advisers, and sources of financial stability. Banks can reestablish trust in a context in which customers do not see them as the cause of the crisis but as a potential mitigant. Banks may see value in shifting their product mix and risk appetite—for example, away from subprime credit cards and toward personal loans, or even layaway products, combined with financial-health advice and budgeting.

— Banks that rethink how they use data in risk decisions and personalization will emerge stronger. The pandemic has demonstrated the benefits of both broader data sharing and broader types of data. Because of the crisis's suddenness and high variance in financial impact, historical traditional financial data will be of limited value in training credit and other risk models or in guiding banks on business decisions during the recovery. The most successful banks will reimagine how to tap their extensive data to understand customers' risk and potential beyond the traditional markers of creditworthiness. At the same time, increased data availability and sharing will also transform the art of the possible for personalization. We

Today, in the face of massive societal and economic change, banks are well positioned to serve once again as pillars of stability for consumers, companies, and society as a whole.

anticipate that banks will accelerate efforts to use data to inform personalized offerings and interactions that take into account each customer's unique financial situation rather than using a segmented view that is likely to miss critical nuances.

Another factor in a reimagined future bears mentioning: the potential to reshape a bank's portfolio. Of today's 5,177 banks[11] and thousands of fintechs, many may not have the resilience to withstand such stress and uncertainty for a long time. As in the years after the financial crisis, stronger institutions will have the chance to acquire many weaker competitors and fintech capabilities at a relative discount, enabling new customer-value propositions, innovation, and productivity gains.

Reform: The new social contract for banks

Almost every economic and epidemiological indicator suggests that this pandemic will be a generational event, with potential to be even worse than the Great Depression. Twelve years ago, a crisis durably damaged the reputation of banks. Some called for banks to be broken up or left to fail. The banking industry has worked hard in the decade since to rebuild its strength and restore its reputation. Today, in the face of massive societal and economic change, such as shrunken global trade, large income disparities, and a potentially lost generation of small businesses, banks are well positioned to serve once again as pillars of stability for consumers, companies, and society as a whole.

Most immediately, banks could consider other means of supporting their communities to highlight their renewed role in a broader social contract. They might expedite financing for medical equipment and manufacturing. They might offer their branches as centers for free COVID-19 testing or, alternatively, for providing free advice on financial budgeting. Banks can also steer their charitable donations toward those hit hardest by COVID-19 and dedicate portions of their owned marketing channels to public-health information.

Many are calling for companies to demonstrate empathy with customers, some of whom have lost their loved ones or their livelihoods. In our view, the only useful form of empathy from banks is one that aligns the incentives of both bank and customer. To do this, banks will need to reform many aspects of their business. For example, metrics and incentives that may have previously emphasized sales would instead encourage a better experience and stronger financial health for customers. Banks would need to modify or eliminate certain financial products that may not align well with that new social contract.

In the bigger picture, the current crisis is a call to action for all businesses—and banks, in particular, given their role in society—to define anew why

[11] "Statistics at a glance," FDIC, updated on February 25, 2020, fdic.gov.

they exist and their desired impact on the world. Expectations for business's role in society are at an all-time high: 73 percent of people say a company could take specific actions that both increase profits and improve the economic and social conditions in the communities in which it operates, up nine percentage points from 2018.[12] Expectations for banks are especially high at this particular moment. So far, consumers see banks rising to the challenge. In fact, a McKinsey Consumer Survey indicates that 87 percent trust their banks to "do the right thing" during the crisis, and some two-thirds of consumers trust their banks more now than they did before the pandemic.[13] Banks should seize this moment. As credit losses rise sharply in coming months, the challenge will also escalate. Banks need to use the platform provided by the crisis to clarify and communicate their role and assert a compelling purpose.

What exactly the future holds for society, the economy, and banks is deeply uncertain. The moves that banks make today will be critical, not only in safeguarding the lives and livelihoods of their customers and employees but also in reestablishing their role and preserving the trust of society for the years to come.

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[12] "2019 Edelman Trust Barometer," January 20, 2019, edelman.com.
[13] 2020 McKinsey Financial Insights Pulse Survey, April 26, 2020.

Cybersecurity tactics for the coronavirus pandemic

The pandemic has made it harder for companies to maintain security and business continuity. But new tactics can help cybersecurity leaders to safeguard their organizations.

by Jim Boehm, James Kaplan, Marc Sorel, Nathan Sportsman, and Trevor Steen

The COVID-19 pandemic has presented chief information security officers (CISOs) and their teams with two immediate priorities. One is securing work-from-home arrangements on an unprecedented scale now that organizations have told employees to stop traveling and gathering, and government officials in many places have advised or ordered their people to stay home as much as possible. The other is maintaining the confidentiality, integrity, and availability of consumer-facing network traffic as volumes spike—partly as a result of the additional time people are spending at home.

Recent discussions with cybersecurity leaders suggest that certain actions are especially helpful to fulfill these two priorities. In this article, we set out the technology modifications, employee-engagement approaches, and process changes that cybersecurity leaders have found effective.

Securing work-from-home arrangements at scale

The rapid, widespread adoption of work-from-home tools has put considerable strain on security teams, which must safeguard these tools without making it hard or impossible for employees to work. Conversations with CISOs in Asia, Europe, and North America about how they are securing these new work-at-home arrangements highlight the changes these executives are making in three areas: technology, people, and processes.

Technology: Make sure required controls are in place

As companies roll out the technologies that enable employees to work from home and maintain business continuity, cybersecurity teams can take these actions to mitigate cybersecurity risks:

— *Accelerate patching for critical systems.* Shortening patch cycles for systems, such as virtual private networks (VPNs), end-point protection, and cloud interfaces, that are essential for remote working will help companies eliminate vulnerabilities soon after their discovery. Patches that protect remote infrastructure deserve particular attention.

— *Scale up multifactor authentication.* Employees working remotely should be required to use multifactor authentication (MFA) to access networks and critical applications. Scaling up MFA can be challenging: the protection it will add calls for a surge in short-term capacity. Several practices make the rollout of MFA more manageable. One is to prioritize users who have elevated privileges (such as domain and sys admins, and application developers) and work with critical systems (for instance, money transfers). Targeting those users in pilot rollouts of modest scale will allow cybersecurity teams to learn from the experience and use that knowledge to shape more extensive implementation plans. Cybersecurity teams can also benefit from using MFA technologies, such as the application gateways offered by several cloud providers, that are already integrated with existing processes.

— *Install compensating controls for facility-based applications migrated to remote access.* Some applications, such as bank-teller interfaces and cell-center wikis, are available only to users working onsite at their organizations' facilities. To make such facility-based applications available to remote workers, companies must protect those apps with special controls. For example, companies might require employees to activate VPNs and use MFA to reach what would otherwise be facility-based assets while permitting them to use MFA alone when accessing other parts of the corporate environment.

— *Account for shadow IT.* At many companies, employees use so-called shadow IT systems, which they set up and administer without formal approval or support from the IT department. Extended work-from-home operations will

expose such systems because business processes that depend on shadow IT in the office will break down once employees find themselves unable to access those resources. IT and security teams should be prepared to transition, support, and protect business-critical shadow assets. They should also keep an eye out for new shadow-IT systems that employees use or create to ease working from home, to compensate for in-office capabilities they can't access, or to get around obstacles.

— *Quicken device virtualization.* Cloud-based virtualized desktop solutions can make it easier for staff to work from home because many of them can be implemented more quickly than on-premises solutions. Bear in mind that the new solutions will need strong authentication protocols—for example, a complex password, combined with a second authentication factor.

People: Help employees understand the risks

Even with stronger technology controls, employees working from home must still exercise good judgment to maintain information security. The added stress many people feel can make them more prone to social-engineering attacks. Some employees may notice that their behavior isn't monitored as it is in the office and therefore choose to engage in practices that open them to other threats, such as visiting malicious websites that office networks block. Building a "human firewall" will help ensure that employees who work from home do their part to keep the enterprise secure.

— *Communicate creatively.* A high volume of crisis-related communications can easily drown out warnings of cybersecurity risks. Security teams will need to use a mix of approaches to get their messages across. These might include setting up two-way communication channels that let users post and review questions, report incidents in real time, and share best practices; posting announcements to pop-up or universal-lock screens; and encouraging the innovative use of existing communication tools that compensate for the loss of informal interactions in hallways, break rooms, and other office settings.

— *Focus on what to do rather than what not to do.* Telling employees not to use tools (such as consumer web services) they believe they need to do their jobs is counterproductive. Instead, security teams must explain the benefits, such as security and productivity, of using approved messaging, file-transfer, and document-management tools to do their jobs. To further encourage safe behavior, security teams can promote the use of approved devices—for example, by providing stipends to purchase approved hardware and software.

— *Increase awareness of social engineering.* COVID-19–themed phishing, vishing (voice phishing), and smishing (text phishing) campaigns have surged. Security teams must prepare employees to avoid being tricked. These teams should not only notify users that attackers will exploit their fear, stress, and uncertainty but also consider shifting to crisis-specific testing themes for phishing, vishing, and smishing campaigns.

— *Identify and monitor high-risk user groups.* Some users, such as those working with personally identifiable information or other confidential data, pose more risk than others. High-risk users should be identified and monitored for behavior (such as unusual bandwidth patterns or bulk downloads of enterprise data) that can indicate security breaches.

Processes: Promote resilience

Few business processes are designed to support extensive work from home, so most lack the right embedded controls. For example, an employee who has never done high-risk remote work and hasn't set up a VPN might find it impossible to do so because of the in-person VPN-initiation requirements. In such cases, complementary security-control processes can mitigate risks. Such security processes include these:

Even with stronger technology controls, employees working from home must still exercise good judgment to maintain information security.

— *Supporting secure remote-working tools.* Security and IT help desks should add capacity while exceptionally large numbers of employees are installing and setting up basic security tools, such as VPNs and MFA. It might be practical to deploy security-team members temporarily at call centers to provide added frontline support.

— *Testing and adjusting IR and BC/DR capabilities.* Even with increased traffic, validating remote communications and collaboration tools allows companies to support incident-response (IR) and business-continuity (BC)/disaster-recovery (DR) plans. But companies might have to adjust their plans to cover scenarios relevant to the current crisis. To find weak points in your plans, conduct a short IR or BC/DR tabletop exercise with no one in the office.

— *Securing physical documents.* In the office, employees often have ready access to digital document-sharing mechanisms, as well as shredders and secure disposal bins for printed materials. At home, where employees might lack the same resources, sensitive information can end up in the trash. Set norms for the retention and destruction of physical copies, even if that means waiting until the organization resumes business as usual.

— *Expand monitoring.* Widening the scope of organization-wide monitoring activities, particularly for data and end points, is important for two reasons. First, cyberattacks have proliferated. Second, basic boundary-protection mechanisms, such as proxies, web gateways, or network intrusion-detection systems (IDS) or intrusion-prevention systems (IPS), won't secure users working from home, off the enterprise network, and not connected to a VPN. Depending on the security stack, organizations that do not require the use of a VPN or require it only to access a limited set of resources may go largely unprotected. To expand monitoring, security teams should update security-information-and-event-management (SIEM) systems with new rule sets and discovered hashes for novel malware. They should also increase staffing in the security operations center (SOC) to help compensate for the loss of network-based security capabilities, such as end-point protections of noncompany assets. If network-based security capabilities are found to be degraded, teams should expand their IR and BC/DR plans accordingly.

— *Clarify incident-response protocols.* When cybersecurity incidents take place, SOC teams must know how to report them. Cybersecurity leaders should build redundancy options into response protocols so that responses don't stall if decision makers can't be reached or normal escalation pathways are interrupted because people are working from home.

— *Confirm the security of third parties.* Nearly every organization uses contractors and off-site vendors, and most integrate IT systems and share data with both contract and noncontract third parties, such as tax or law-enforcement authorities. When organizations assess which controls must be extended to employees to secure new work-from-home protocols, they should do the same for third-party users and connections, who are likely to be managing similar shifts in their operations and security protocols. For example, ask providers whether they have conducted any remote IR or BC/DR tabletop drills and, if they have, ask them to share the results. Should any third parties fail to demonstrate adequate security controls and procedures, consider limiting or even suspending their connectivity until they remediate their weaknesses.

— *Sustain good procurement practices.* Fast-track procurement intended to close key security gaps related to work-from-home arrangements should follow standard due-diligence processes. The need for certain security and IT tools may seem urgent, but poor vendor selection or hasty deployment could do more harm than good.

Supporting high levels of consumer-facing network traffic

Levels of online activity that challenge the confidentiality, integrity, and availability (CIA) of network traffic are accelerating. Whether your organization provides connectivity, serves consumers, or supports transactions, securing the CIA of network activity should be a top priority for any executive team that wants to protect consumers from cyberbreaches during this period of heightened vulnerability. Much as organizations are stepping up internal protections for enterprise networks, security teams in organizations that manage consumer-facing networks and the associated technologies will need to scale up their technological capabilities and amend processes quickly.

Technology: Ensure sufficient capacity

Companies that make it possible for employees to work from home must enable higher online network-traffic and transaction volumes by putting in place technical building blocks such as a web-application firewall, secure-sockets-layer (SSL) certification, network monitoring, antidistributed denial of service, and fraud analytics. As web-facing traffic grows, organizations should take additional actions to minimize cyberrisks:

— *Enhance web-facing threat-intelligence monitoring.* To anticipate threats and take preventive measures, security teams must understand how heightened consumer traffic changes the threat environment for web-facing enterprise activities. For example, to find out if attackers are becoming more interested in an organization's web-facing technologies, organizations can conduct increased passive domain-name scans to test for new malicious signatures tailored to the enterprise domain or for the number of adversarial scans targeting the enterprise network, among other threats.

— *Improve capacity management.* Overextended web-facing technologies are harder to monitor and more susceptible to attacks. Security teams can monitor the performance of applications to identify suspected malware or low-value security agents or even recommend the removal of features (such as noncritical functions or graphics on customer portals) that hog network capacity.

Processes: Integrate and standardize security activities

Customers, employees, and vendors all play some part in maintaining the confidentiality, integrity, and availability of web-facing networks. Several steps can help organizations to ensure that the activities of these stakeholders are consistent and well integrated:

— *Integrate fraud-prevention capabilities with the SOC.* Organizations that support the execution of financial transactions should consider integrating their existing fraud analytics with

SOC workflows to accelerate the inspection and remediation of fraudulent transactions.

— *Account for increased costs.* Many SOC tools and managed-security-service providers base charges for monitoring on usage—for example, the volume of log records analyzed. As usage increases with expanded network traffic, organizations with usage-based fee arrangements will need to account for any corresponding increase in costs.

— *Help consumers solve CIA problems themselves.* For media providers, enabling customers to access content without interruption is essential, but increased usage levels can jeopardize availability. Companies may wish to offer guides to show users how to mitigate access problems, particularly during periods of peak use.

Securing remote-working arrangements and sustaining the CIA of customer-facing networks are essential to ensure the continuity of operations during this disruptive time. The actions we describe in this article, while not comprehensive, have helped many organizations to overcome the security difficulties they face and maintain their standing with customers and other stakeholders.

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McKinsey and Praetorian have entered into a strategic alliance to help clients solve complex cybersecurity challenges and secure innovation. As a part of this alliance, McKinsey is a minority investor in Praetorian.

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From surviving to thriving: Reimagining the post-COVID-19 return

For many, the toughest leadership test is now looming: how to bring a business back in an environment where a vaccine has yet to be found and economies are still reeling.

by Kevin Sneader and Bob Sternfels

The 1966 World Cup marked a low point for Brazilian soccer. Although the winner of the previous two tournaments, the team was eliminated in the first round, and its star player, Pelé, failed to perform. Fouled frequently and flagrantly, he threatened never to return to the World Cup. Many wondered if Brazil's glory days were over. Four years later, however, Brazil won again, with such grace and style that the 1970 team is not only widely regarded as the best team ever to take the pitch but also as the most beautiful. And Pelé was named the player of the tournament.

Making this turnaround required innovation, in particular, the creation of a unique attacking style of soccer. It required building a cohesive team, even as most of the roster changed. And it required leadership, both in management and on the field. The result: by reimagining everything, Brazil came back stronger.

As businesses around the world consider how they can return from the torment inflicted by the coronavirus, Brazil's journey from failure to triumph provides food for thought. In a previous article, McKinsey described five qualities that will be critical for business leaders to find their way to the next normal: resolve, resilience, return, reimagination, and reform. We noted that there would likely be overlap among these stages, and the order might differ, depending on the business, the sector, and the country.

In this article, we suggest that in order to come back stronger, companies should reimagine their business model as they return to full speed. The moment is not to be lost: those who step up their game will be better off and far more ready to confront the challenges—and opportunities—of the next normal than those who do not.

There are four strategic areas to focus on: recovering revenue, rebuilding operations, rethinking the organization, and accelerating the adoption of digital solutions.

1. Rapidly recover revenue

Speed matters: it will not be enough for companies to recover revenues gradually as the crisis abates. They will need to fundamentally rethink their revenue profile, to position themselves for the long term and to get ahead of the competition. To do this companies must SHAPE up.

S*tart-up mindset.* This favors action over research, and testing over analysis. Establish a brisk cadence to encourage agility and accountability: daily team check-ins, weekly 30-minute CEO reviews, and twice-a-month 60-minute reviews.

H*uman at the core.* Companies will need to rethink their operating model based on how their people work best. Sixty percent of businesses surveyed by McKinsey in early April said that their new remote sales models were proving as much (29 percent) or more effective (31 percent) than traditional channels.

A*cceleration of digital, tech, and analytics.* It's already a cliché: the COVID-19 crisis has accelerated the shift to digital. But the best companies are going further, by enhancing and expanding their digital channels. They're successfully using advanced analytics to combine new sources of data, such as satellite imaging, with their own insights to make better and faster decisions and strengthen their links to customers.

P*urpose-driven customer playbook.* Companies need to understand what customers will value, post-COVID-19, and develop new use cases and tailored experiences based on those insights.

E*cosystems and adaptability.* Given crisis-related disruptions in supply chains and channels, adaptability is essential. That will mean changing the ecosystem and considering nontraditional collaborations with partners up and down the supply chain.

Rapid revenue response isn't just a way to survive the crisis. It's the next normal for how companies will have to operate. Assuming company leaders are in good SHAPE, how do they go about choosing what to do? We see three steps.

Identify and prioritize revenue opportunities. What's important is to identify the primary sources of revenue and, on that basis, make the "now or never" moves that need to happen before the recovery fully starts. This may include launching targeted campaigns to win back loyal customers; developing customer experiences focused on increased health and safety; adjusting pricing and promotions based on new data; reallocating spending to proven growth sources; reskilling the sales force to support remote selling; creating flexible payment terms; digitizing sales channels; and automating processes to free up sales representatives to sell more.

Once identified, these measures need to be rigorously prioritized to reflect their impact on earnings and the company's ability to execute quickly (exhibit).

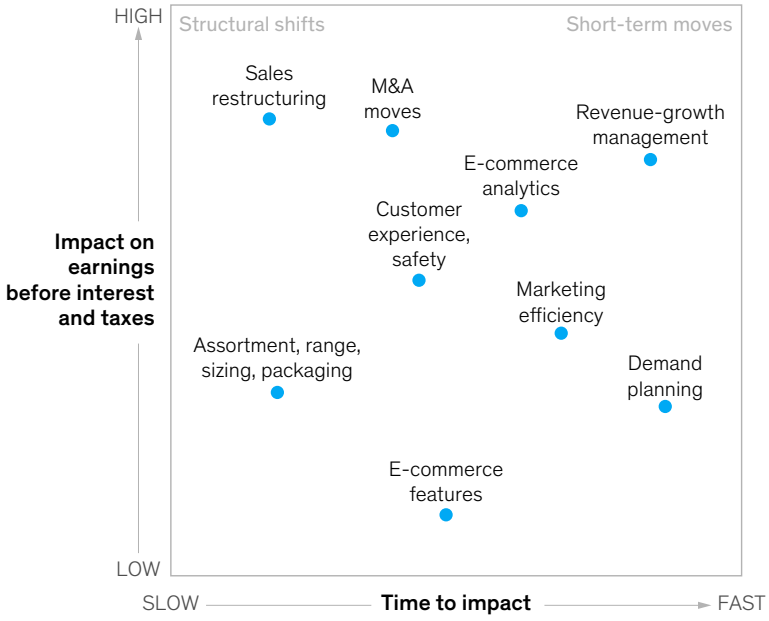
Act with urgency. During the current crisis, businesses have worked faster and better than they dreamed possible just a few months ago. Maintaining that sense of possibility will be an enduring source of competitive advantage.

Consider a Chinese car-rental company whose revenues fell 95 percent in February. With the roads

Exhibit

Recovering revenues is an important element of reimagining the return.

Matrix for prioritizing measures for rapid revenue recovery, illustrative



During the current crisis, businesses have worked faster and better than they dreamed possible just a few months ago. Maintaining that sense of possibility will be an enduring source of competitive advantage.

empty, company leaders didn't just stew. Instead, they reacted like a start-up. They invested in micro–customer segmentation and social listening to guide personalization. This led them to develop new use cases. They discovered, for example, that many tech firms were telling employees not to use public transportation. The car-rental company used this insight to experiment with and refine targeted campaigns. They also called first-time customers who had cancelled orders to reassure them of the various safety steps the company had taken, such as "no touch" car pickup. To manage the program, they pulled together three agile teams with cross-functional skills and designed a recovery dashboard to track progress. Before the crisis, the company took up to three weeks to launch a campaign; that is now down to two to three days. Within seven weeks, the company had recovered 90 percent of its business, year on year—almost twice the rate of its chief competitor.

Develop an agile operating model. Driven by urgency, marketing and sales leaders are increasingly willing to embrace agile methods; they are getting used to jumping on quick videoconferences to solve problems and give remote teams more decision-making authority. It's also important, of course, for cross-functional teams not to lose sight of the long term and to avoid panic reactions.

In this sense, "agile" means putting in place a new operating model built around the customer and supported by the right processes and governance. Agile sales organizations, for example, continuously prioritize accounts and deals, and decide quickly where to invest. But this is effective only if there is a clear growth plan that sets out how to win each type of customer. Similarly, fast decision making between local sales and global business units and the rapid reallocation of resources between them require a stable sales-pipeline-management process.

2. Rebuilding operations

The coronavirus pandemic has radically changed demand patterns for products and services across sectors, while exposing points of fragility in global supply chains and service networks. At the same time, it has been striking how fast many companies have adapted, creating radical new levels of visibility, agility, productivity, and end-customer connectivity. Now leaders are asking themselves: How can we sustain this performance? As operations leaders seek to reinvent the way they work and thus position themselves for the next normal, five themes are emerging.

Building operations resilience. Successful companies will redesign their operations and supply chains to protect against a wider and more acute range of potential shocks. In addition, they will act quickly to rebalance their global asset base and supplier mix. The once-prevalent global-sourcing model in product-driven value chains has steadily

declined as new technologies and consumer-demand patterns encourage regionalization of supply chains. We expect this trend to accelerate.

This reinvention and regionalization of global value chains is also likely to accelerate adoption of other levers to strengthen operational resilience, including increased use of external suppliers to supplement internal operations, greater workforce cross-training, and dual or even triple sourcing.

Accelerating end-to-end value-chain digitization. Creating this new level of operations resilience could be expensive, in both time and resources. The good news, however, is that leading innovators have demonstrated how "Industry 4.0" (or the Fourth Industrial Revolution suite of digital and analytics tools and approaches) can significantly reduce the cost of flexibility. In short, low-cost, high-flexibility operations are not only possible—they are happening. Most companies were already digitizing their operations before the coronavirus hit. If they accelerate these efforts now, they will likely see significant benefits in productivity, flexibility, quality, and end-customer connectivity.

Rapidly increasing capital- and operating-expense transparency. To survive and thrive amid the economic fallout, companies can build their next-normal operations around a revamped approach to spending. A full suite of technology-enabled methodologies is accelerating cost transparency, compressing months of effort into weeks or days. These digital approaches include procurement-spend analysis and clean-sheeting, end-to-end inventory rebalancing, and capital-spend diagnostics and portfolio rationalization. Companies are also seeking to turn fixed capital costs into variable ones by leveraging "as a service" models.

Embracing the future of work. The future of work, defined by the use of more automation and technology, was always coming. COVID-19 has hastened the pace. Employees across all functions, for example, have learned how to complete tasks remotely, using digital communication and collaboration tools. In operations, changes will go further, with an accelerated decline in manual and repetitive tasks and a rise in the need for analytical and technical support. This shift will call for substantial investment in workforce engagement and training in new skills, much of it delivered using digital tools.

Reimagining a sustainable operations competitive advantage. Dramatic shifts in industry structure, customer expectations, and demand patterns create a need for equally dramatic shifts in operations strategies to create competitive advantage and new customer value propositions. Successful companies will reinvent the role of operations in their enterprises, creating new value through a far greater responsiveness to their end customers—including but not limited to accelerated product-development and customer-experience innovation, mass customization, improved environmental sustainability, and more interconnected, nimble ecosystem management.

Taking action. To keep up during COVID-19, companies have moved fast. Sales and operation planning used to be done weekly or even monthly; now a daily cadence is common. To build on this progress, speed will continue to be of the essence. Companies that recognize this, and that are willing to set new standards and upend old paradigms, will build long-term strategic advantage.

3. Rethinking the organization

In 2019, a leading retailer was exploring how to launch a curbside-delivery business; the plan stretched over 18 months. When the COVID-19 lockdown hit the United States, it went live in two days. There are many more examples of this kind. "How can we ever tell ourselves that we can't be faster?" one executive of a consumer company recently asked.

Call it the "great unfreezing": in the heat of the coronavirus crisis, organizations have been forced to work in new ways, and they are responding. Much of this progress comes from shifts in operating models. Clear goals, focused teams, and rapid decision making have replaced corporate bureaucracy. Now, as the world begins to move into the post-COVID-19

era, leaders must commit to not going back. The way in which they rethink their organizations will go a long way in determining their long-term competitive advantage.

Specifically, they must decide who they are, how to work, and how to grow.

Who we are. In a crisis, what matters becomes very clear, very fast. Strategy, roles, personal ownership, external orientation, and leadership that is both supportive and demanding—all can be seen much more clearly now. The social contract between the employee and employer is, we believe, changing fundamentally. "It will matter whether you actually acted to put the safety of employees and communities first," one CEO told us, "or just said you cared." One noticeable characteristic of companies that have adapted well is that they have a strong sense of identity. Leaders and employees have a shared sense of purpose and a common performance culture; they know what the company stands for, beyond shareholder value, and how to get things done right.

How we work. Many leaders are reflecting on how small, nimble teams built in a hurry to deal with the COVID-19 emergency made important decisions faster and better. What companies have learned cannot be unlearned—namely, that a flatter organization that delegates decision making down to a dynamic network of teams is more effective. They are rewiring their circuits to make decisions faster, and with much less data and certainty than before. In a world where fast beats slow, companies that can institutionalize these forms of speedy and effective decentralization will jump ahead of the competition.

Organizations are also showing a more profound appreciation for matching the right talent, regardless of hierarchy, to the most critical challenges. In an environment with strong cost pressures, successful leaders will see the value in continuing to simplify and streamline their organizational structures. Experience has shown a better way, with critical roles linked to value-creation opportunities and leadership roles that are much more fluid, with new leaders emerging from unexpected places: the premium is placed on character and results, rather than on expertise or experience. This can only work, however, if the talent is there. To hire and keep top talent, the scarcest capital of all, means creating a unique work experience and committing to a renewed emphasis on talent development.

How to grow. Coming out of the crisis, organizations must answer important questions about growth and scalability. Three factors will matter most: the ability to embed data and analytics in decision making; the creation of learning platforms that support both individual and institutional experimentation

Many leaders are reflecting on how small, nimble teams built in a hurry to deal with the COVID-19 emergency made important decisions faster and better.

and learning at scale; and the cultivation of an organizational culture that fosters value creation with other partners.

Those organizations that are making the shift from closed systems and one-to-one transactional relationships to digital platforms and networks of mutually beneficial partnerships have proved more resilient during the crisis. "Every business is now a technology business, and what matters most is a deep understanding of the customer, which is enabled by technology," remarked a retail CEO.

By organizing to encourage insight generation—for example, by linking previously unconnected goods and services—technology is revolutionizing how organizations relate to their customers and their customers' customers. Creating digitally enabled ecosystems is therefore critical because these catalyze growth and enable rapid adaptation. When the crisis hit, one company moved all its full-time direct employees into a virtual operating environment; meanwhile, its outsourcing partner, the CEO recalled, "hid behind their contract and played one customer off against another." It is not difficult to imagine who is better placed to succeed in the more flexible post-COVID-19 business environment, where value creation is shared and strategic partnerships matter even more.

4. Accelerate digital adoption to enable reimagination

Over the past few months, there has been a transformation in the way we interact with loved ones, do our work, travel, get medical care, spend leisure time, and conduct many of the routine transactions of life. These changes have accelerated the migration to digital technologies at stunning scale and speed, across every sector. "We are witnessing what will surely be remembered as a historic deployment of remote work and digital access to services across every domain," remarked one tech CEO. He is right. Through the COVID-19 recovery, too, digital will play a defining role.

During the early recovery period of partial reopening, business leaders will face some fundamental challenges. One is that consumer behavior and demand patterns have changed significantly and will continue to do so. Another is that how the economy lurches back to life will differ from country to country and even city to city. For example, consumers may feel comfortable going to restaurants before they will consider getting on a plane or going to sporting events. Early signals of increased consumer demand will likely come suddenly, and in clusters. Analyzing these demand signals in real time and adapting quickly to bring supply chains and services back will be essential for companies to successfully navigate the recovery.

To address these challenges, leaders will need to set an ambitious digital agenda—and deliver it quickly, on the order of two to three months, as opposed to the previous norm of a year or more. There are four elements to this agenda:

Refocus digital efforts to reflect changing customer expectations. To adapt, companies need to quickly rethink customer journeys and accelerate the development of digital solutions. The emphasis will be different for each sector. For many retailers, this includes creating a seamless e-commerce experience, enabling customers to complete everything they need to do online, from initial research and purchase to service and returns. For auto companies, this could mean establishing new digital distribution models to handle trade-ins, financing, servicing, and home delivery of cars. For industries such as airlines, ensuring health and safety will be essential, for example, by reinventing the passenger experience with "contactless" check-in, boarding, and in-flight experiences.

Use data, Internet of Things, and AI to better manage operations. In parallel, companies need to incorporate new data and create new models to enable real-time decision making. In the same way that many risk and financial models had to be rebuilt after the 2008 financial crisis, the use of

data and analytics will need to be recalibrated to reflect the post-COVID-19 reality. This will involve rapidly validating models, creating new data sets, and enhancing modeling techniques. Getting this right will enable companies to successfully navigate demand forecasting, asset management, and coping with massive new volumes. For example, one airline developed a new app to manage and maintain its idle fleet and support bringing it back into service; and a North American telecommunications company developed a digital collection model for customers facing hardship.

Accelerate tech modernization. Companies will also need to greatly improve their IT productivity to lower their cost base and fund rapid, flexible digital-solution development. First, this requires quickly reducing IT costs and making them variable wherever possible to match demand. This means figuring out what costs are flexible in the near-to-medium term, for example, by evaluating nonessential costs related to projects or maintenance, and reallocating resources. Second, this involves defining a future IT-product platform, establishing the skills and roles needed to sustain it, mapping these skills onto the new organization model, and developing leaders who can train people to fill the new or adapted roles. Third, the adoption of cloud and automation technologies will need to be speeded up, including bringing cloud operations on-premise and decommissioning legacy infrastructure.

Increase the speed and productivity of digital solutions. To deal with the crisis and its aftermath, companies not only need to develop digital solutions quickly but also to adapt their organizations to new operating models and deliver these solutions to customers and employees at scale. Solving this "last mile" challenge requires integrating businesses processes, incorporating data-driven decision making, and implementing change management. There are different ways to do this. A wide variety of companies, from banks to mining operations, have accelerated delivery by establishing an internal "digital factory" with cross-functional teams dedicated to matching business priorities to digital practices. Others, in addition to reinventing their core businesses, have established new business–building entities to capture new opportunities quickly.

For companies around the world, the qualities that brought Brazilian football to new heights in 1970—imagination, leadership, and on-the field execution—will be paramount as they consider how to navigate the post-COVID-19 environment. Business as usual will not be nearly enough: the game has changed too much. But by reimagining how they recover, operate, organize, and use technology, even as they return to work, companies can set the foundations for enduring success.

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Is your supply chain risk blind—or risk resilient?

Operational risk to supply chains has been growing over the last several years—compounded by the ongoing impact from COVID-19. Organizations need a new approach to manage risk and build resilience.

by Knut Alicke, Ed Barriball, Susan Lund, and Daniel Swan

For more than a generation, organizations have relied on global, interconnected supply chains to improve margins. Since 2000, the value of intermediate goods traded globally has tripled to more than $10 trillion. During the same period, indicators of supply-chain efficiency—such as inventory levels, on-time-in-full deliveries, and lead times—have improved for those businesses that succeeded in creating lean, global networks.

However, these efficiencies have not come for free. An ever-expanding set of global challenges has increased the surface area and magnitude of supply-chain risks, from climate change and the rise of a multipolar economic system to increased mobility and digitization. These global disruptions have meant that in every year over the past several years, at least one company in twenty has suffered a supply-chain disruption costing at least $100 million.

Fast forward to the coronavirus crisis, whose humanitarian and human-livelihood costs are still rising, even as it also reveals supply-chain vulnerabilities that many companies didn't realize they had. As a result, building flexibility and resilience in operations has gone from one priority among many to business-critical. In this context, organizations need a new approach to manage supply-chain risk and build resilience.

In the short term, companies are concerned about the shortages of critical goods. In the long term, as businesses and governments emerge from the current crisis, we anticipate a renewed focus on better quantifying risks, with a mindset similar to buying insurance—by using probabilistic approaches, such as discrete-event simulation, and by redesigning business cases to include potential losses from a lack of resilience measures. These responses represent a shift in business strategy, with companies showing more willingness to weigh the benefits of investments to navigate future risks against the potential fallout from failing to do so.

Companies will need a much deeper view of their supply-chain vulnerability and exposure to create effective mitigation and business-continuity plans.

Find your vulnerabilities and exposures

Operations risk-management practices that view risk as arising mainly from discrete sources of shock or specific elements of supply-chain design, such as geographic footprint, are too narrow to be sufficient in today's environment. The most advanced businesses will model the size and impact of various shock scenarios to determine the actions they should take to rebuild their supply chains and mitigate future risks. A comprehensive understanding of supply-chain risk considers two distinct elements: first, the underlying vulnerabilities in the supply chain that make it fragile, and second, the level of exposure or susceptibility to unforeseen events (or shocks) that exploit these vulnerabilities.

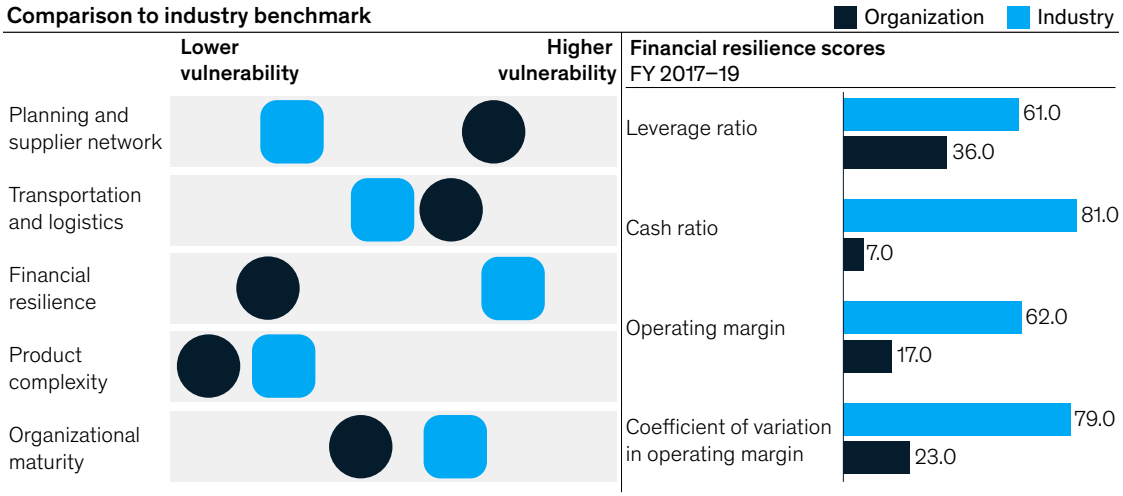
Supply-chain vulnerabilities manifest in five main areas: planning and supplier networks, transportation and logistics systems, financial resilience product complexity, and organizational maturity. These vulnerabilities include realities inherent to an industry, such as high levels of cyclicality or long lead times, as well as active decisions, such as the level of inventory to maintain, or the approach to product development. Designs relying on single-source components are an obvious chokepoint—but as manufacturers have learned to their peril, even components with seemingly ample supplier ecosystems may be concentrated in a single region, or may themselves depend on commodities that are highly concentrated.

Exhibit 1 illustrates how these vulnerabilities manifest for an illustrative company. While for most dimensions, the company shows lower or industry-average vulnerability—in part because of unusually high financial resilience—its planning capabilities and supplier network are significantly more vulnerable than the industry

Exhibit 1

A vulnerability assessment reveals weaknesses in managing supply-chain risks.

Should financial resilience erode, other vulnerabilities become more important



benchmark. These factors could become more important should financial resilience erode, as would be typical as a crisis wears on.

Exposure refers to unforeseen events that exploit a vulnerability and disrupt a supply chain. There are four main sources of exposure: force-majeure shocks (natural disasters), macropolitical (economic shocks), malicious actors (cyberattacks); and counterparties (fragile suppliers). As shown in the current COVID-19 crisis, these shocks can affect supply and demand in varying and even contradictory ways, with demand in freefall for many classes of goods, even as suppliers strain to deliver medical products and similar necessities.

Understand your supply chain's structure

Now is the time for business leaders to know their supply-chain structure and understand its vulnerabilities and exposure—and that of their suppliers, and of their suppliers' suppliers. Many organizations can only speak in general terms beyond the Tier 1 level, even though this is often where the most critical suppliers sit within a network. Creating a comprehensive view of the supply chain through detailed subtier mapping is a critical step to identifying hidden relationships and nodes of interconnectivity that invite vulnerability.

Build transparency through analytics

In many industries, gaining transparency from an outside-in approach is difficult. However, combining the mosaic of publicly available data and network-analytics algorithms can illuminate the probable supply chain for many companies.

Once visible, network analytics can be used to quantitatively diagnose the relative fragility of the supply chain, and draw meaningful comparisons with peers and industry benchmarks. Supply chains that have higher concentration, interconnectivity, depth (in terms of subtier layers), and

codependence—or that show low substitutability and transparency—are the most vulnerable (Exhibit 2). Large organizations often have several different archetypes of supply-chain networks within their overall system, each implying a different degree of resilience.

Collaboration to build transparency

Companies can work more closely with their Tier 1 suppliers to build more transparency—especially given that Tier 1 suppliers are likely to have similar concerns as their customers about supply issues in the lower tiers. However, collaboration is often viewed as a fraught territory, with supplier networks viewed as proprietary, and to create a more cooperative working environment can involve a deep change of mindset.

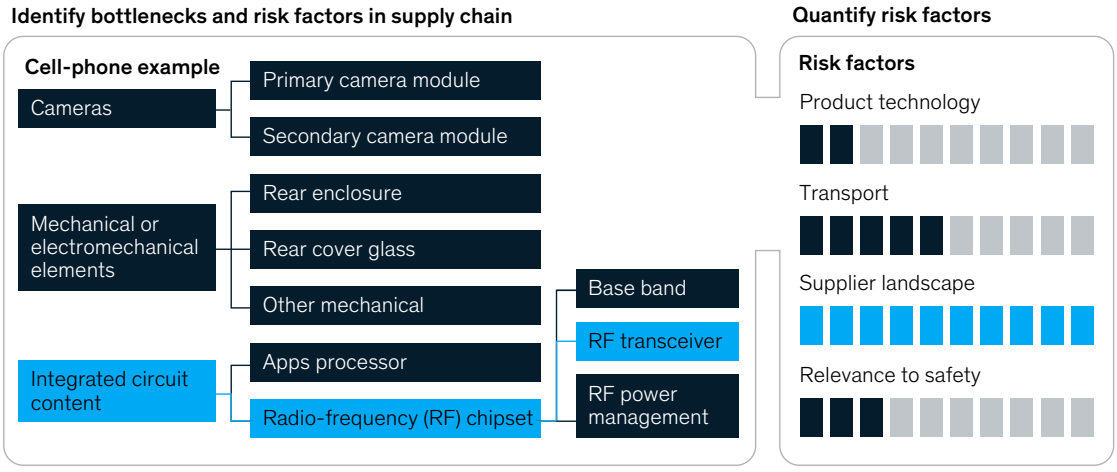
A few guidelines to build transparency across the supplier network can help ease concern. Companies do not need to disclose every detail to their suppliers, but to effectively perform network planning, transparency of inventory levels, capacity, and flexibility can give a lens into potential bottleneck issues. We suggest organizations begin to tackle issues in a structured way, cataloging and addressing known risks while improving the organization's resilience for the inevitable unknown risks that can become a problem in the future.

Tailoring the organization to maintain transparency over time

More advanced companies have permanent supply-chain risk-management teams and processes in place. The leading automotive OEMs, chemicals, and electronics companies with very complex global supply chains generally belong to this group. The information cascade between the supply-chain risk-management team and other functions, such as marketing, IT, and legal is well-established, with clearly defined interfaces. They work to increase transparency throughout multitier supply chains, with leaders in supply-chain risk management setting up databases of suppliers across tiers that includes each supplier's location, performance, and audit results.

Exhibit 2

In-depth mapping of supply-chain structures shows vulnerability and exposure across tiers.



Challenge established investment and design decisions

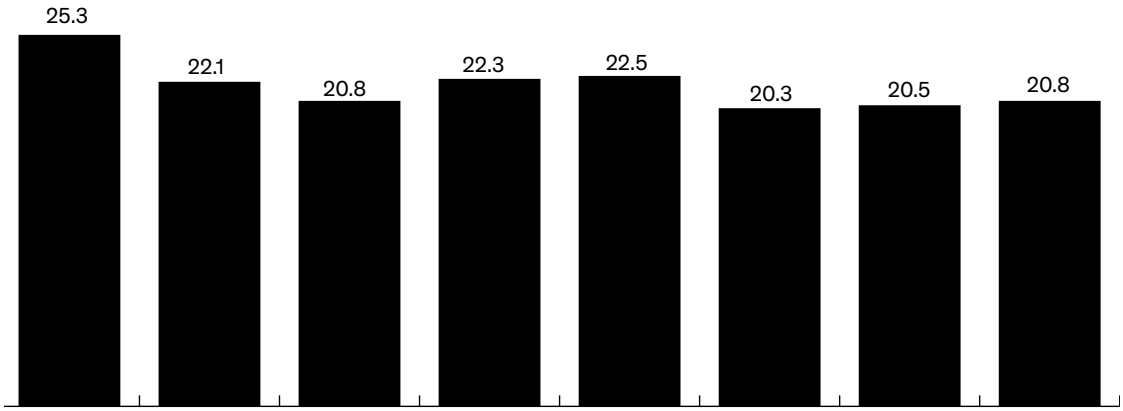
Supply-chain risk ultimately lies at the cross-section of vulnerability and exposure. A robust mitigation framework considers these factors and prioritize risk across three dimensions to ensure effective mitigation and continuity planning: the likelihood of the risk manifesting, the financial impact, and the organization's ability to mitigate.

Typically, companies struggle to quantify risks, and fall back on methodologies that generate a discrete point estimate versus a range of outcomes. This approach often results in systematic over-optimism that minimizes the expected value of catastrophic

Exhibit 3

Financial modeling can quickly assess risk scenarios.

Example of EBITDA[1] impact on fictional company



	Typical EBITDA	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Shutdown		Full	Full	Partial	None	Partial	None	None
Raw-material delivery		None	Full	Full	Partial	Full	Partial	Full
Distribution		No distribution	Normal	Normal	Normal	Normal	Normal	No distribution

Assumptions

- 30-day shock
- 5 days a week of manufacturing at steady state
- No property damage
- No start-up time after shutdown
- Safety stock utilized to offset sales loss
- No seasonality in sales
- 25% of sales recovered across the fiscal year
- Manufacturing capacity and raw-material delivery set to 50% when "partial"

[1] Earnings before interest, taxes, depreciation, and amortization

risks because of a perceived low probability. Given risk management is inherently a probabilistic field, companies need to get comfortable with uncertainty in forecasts and continue to take an insurance-like mindset centered on buying down risk, especially for large risks with lower probability.

For example, in our research, a typical pharmaceutical company could lose up to 25 percent of its earnings before interest, taxes, depreciation, and amortization from a supply shock that disrupts operations for one month (Exhibit 3). Building a series of scenarios and assessing the relative probability of each is critical for bounding the uncertainty to estimate the range of potential costs from unmitigated risks. Companies can undertake supply-chain designs and investment decisions with the costs of these risks factored into the business case.

Robust mitigation and business-continuity plans, naming individual project owners with concrete timelines and milestones, can be built around the highest priority risks. These plans, as well as the risks that were not prioritized, require increased scrutiny at regular intervals as part of a comprehensive risk-management system.

Risk resilience needs a risk culture

Supply-chain resilience requires a risk-aware culture to help an organization establish and maintain strong defensive layers against unknown risks, as well as respond more quickly in the event of a severe crisis or operational threat. As COVID-19 brought to light vulnerabilities in companies supply chains, building resilience is not only a matter of awareness, but of setting an intent across the organization, clearly communicating to the entire workforce, and taking tangible action to address the immediate and long-term risks.

An essential task is for leaders to clearly define and communicate an organization's risk tolerance. Risk mitigation often has an associated incremental cost, and so it is important to align on which risks need to be mitigated and which can be borne by the organization. The ideal organizational culture also allows warning signs of both internal and external risks to be openly shared. Management and employees need to feel empowered to pass on bad news and lessons on how they course corrected.

This openness fosters an environment where people understand that they can voice issues and deal with them. Culturally, this can be enabled by creating an ownership environment, where members feel responsible for the outcomes of actions and decisions when a risk event occurs, and work harmoniously towards a rapid resolution.

As the world continues to grapple with the challenges caused by COVID-19, we could start to see discontinuous shifts and a "next normal" beyond the recovery for supply chains. Rather than wait, organizations can begin builiding resilience into their supply chains now. Vulnerability will continue to exist within interconnected systems, and global shocks will continue to be unpredictable and increasingly impactful. Efficiency alone cannot cope with this reality. Investing in resilience and continuity today will pay off as the next crisis inevitably emerges.

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Pharma operations: The path to recovery and the next normal

Pharma operations leaders have increased their focus on network risk management, agile and transparent operations, and shaping the workforce of the future in the post-COVID-19 path to recovery.

by Katie Kelleher, Ketan Kumar, Parag Patel, and Ulf Schrader

Some might argue that leaders of operations in the pharmaceutical industry have been historically slow to respond to changing times. During the COVID-19 pandemic, however, many across the industry have been highly responsive. Industry operations leaders have rallied to enable the supply of key medicines across borders, manage workforce safety, and handle evolving government restrictions all while beginning to prepare for new vaccines and therapeutics. And most companies have put crisis-response command centers in place to appropriately manage and bring stability to an otherwise unstable time.

With these initiatives established, companies can begin taking stock of what lies ahead. Given the shifts that have taken place seemingly overnight in response to the immediate crisis, companies are also turning their attention to recovery and the path to the next normal. This will likely bring about fundamental changes in pharma operations. While individual companies will drive many of these changes, some will be driven industry-wide, and external factors, including government's involvement, will also have impact on shaping the post-COVID-19 recovery (Exhibit 1).

At the industry level, for example, network strategy has evolved. Landed costs are no longer the key metric as the focus shifts to the cost implications of location risk. As the pandemic has reinforced, supply chains can be at significant risk when there is over-reliance on a location that may be vulnerable to disruption. Shifting production locations so that production is closer to end markets or in lower-risk countries that are less subject to disruption are now routine considerations in risk mitigation.

Supply chains are also becoming more patient-centric due to the increased adoption of digital tools, telehealth, and app-based ecosystems. New technologies are expected to also emerge, such as mRNA-based vaccines, that may alter the market dynamics for capacity.

Exhibit 1

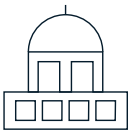
Pharma operations: The path to recovery and the next normal.

Considerations for companies

- Reorganizing assets and supply chains will create resilience
- Agility and transparency will be critical, with digital and analytics being the engine of acceleration
- The future of work will likely be remote and distributed, and new capabilities and talent will be needed now

Considerations for industry

- Landed cost is no longer paramount as networks rebalance cost and risk
- Supply chains could become patient-centric with different end points of delivery and information
- New technologies should emerge and shift the overall industry



Implications for governments

- Governments and regulators might continue to get more involved, the industry is at a crossroad, and respective actions in the next few weeks and months should determine the extent of this involvement

In the path to the next normal, operations organizations should consider adapting quickly as an imperative

In the aftermath of COVID-19, the intense focus on risk management across networks and supply chains will likely continue, despite the inevitable increased costs.

At the individual company level, companies are now more focused on operational resilience and accelerating initiatives that enable more agility—including workforce agility as workforces become more remote and distributed—and transparency through greater deployment of digital and analytics tools and automation.

As the recovery begins to shape, there are considerations for governments and regulators as well. This is likely to evolve as the industry itself evolves in its recovery from the crisis.

Each of these shifts—at the industry, company, and government level—will have fundamental implications for pharma operations and its path to recovery.

Recovery and the next normal: Company perspective

In the path to recovery, COVID-19 has increased the focus on risk management as companies reassess their supply-chain strategies and footprints to make them more agile and resilient to disruption. This also includes the potential for disruptions to the workforce as changes in design and operating models will drive redistribution of talent and new skill sets.

Reorganizing assets and supply chains will create more resilience. In the aftermath of COVID-19, the intense focus on risk management across networks and supply chains will likely continue, despite the inevitable increased costs.

Companies should consider reevaluating their strategies, risk tolerance, and overall network footprint to address these risks. Their considerations may include how much excess capacity they will need, dual sourcing, and geographic diversification. Make versus buy decisions will also be impacted and will be dependent on the way companies evaluate their contract development and manufacturing organizations (CDMOs), such as weighing solvency risks, the amount of control they want to have, the need to choose partners based on diversifying locations and other considerations that balance cost versus risk.

These shifts may have fundamental implications for contract manufacturing as companies reevaluate their strategy, supply chain, and distribution networks. There may also be growth in the demand for last-mile production/postponement and a gradual shift away from global supply chains to self-sufficient local supply chains. These changes may require sourcing strategies to evolve as there will be areas of limited supply in the short term—in categories such as sterile fill/finish and logistics/air freight—and fundamental changes in the long term as contract manufacturing organizations and supplier industries change and potentially consolidate. To adapt to this evolution, more agile and strategic procurement organizations may emerge.

Digital and analytics tools and automation will be the engines that accelerate agility and transparency. The demands on risk mitigation will drive companies to seek more transparency across the value chain and create more agile operating models. In the shift, companies will rely even more on digital- and analytics-led solutions. For example, if international transparency on stocks of essential

(and possibly all) medications and medical supplies become the norm, digital will play an essential role. Distributors and drug manufacturers may also begin to collaborate to create better stock visibility and improve forecasting.

Automating manufacturing processes and warehouses will also play an important role in the future, increasing data availability and, more importantly, decreasing a reliance on manpower. "Lights out" fully automated facilities will also reduce the risk of future disruptions due to infectious disease. Digital tools will also enable some key business processes—such as auditing or product release—to be done remotely, potentially decreasing the risk of disruption while improving efficiencies.

Agility, especially in product transfers and new material validation, will become distinctive features of a resilient strategy. More traditional pharmaceutical processes will shift to agile models that allow for expediting processes for future emergencies. These may include simplified medical-equipment approval, quality and risk-assessment processes for new material qualification and validation, remote monitoring for site quality audits, and more rapid adoption of electronic batch records.

As the future of work becomes more remote and distributed, demand may shift to new capabilities and talent. Reevaluating the future of work will be a key focus for most industries and pharmaceutical operations will be no exception. As overall network costs come under scrutiny driven by increased costs elsewhere, traditional organizations may come under pressure, driving changes in design and operating models and resulting in a significant redistribution of talent. For example, there may be less focus on requirements to work on site—and the post-COVID-19 workforce will be more at ease working remotely. This workforce agility will in turn enable leaner, more flexible, and well-distributed organizations.

The post-COVID-19 workforce and organization will also likely adopt new, more efficient ways of working. Out of necessity, organizations have stopped a great deal of relatively low-value work during the COVID-19 slowdown, developing ways to be more efficient and productive. Organizations focused on retaining and building on these new efficiencies will do well when work resumes.

Within operations functions, new capabilities will also be needed as the workforce shifts from manual skills to more technical skills. As the adoption of digital and analytics tools and automation increases, pharmaceutical-operations organizations may have a greater need for talent that can program, operate, and interpret data from these new technologies. This will require significant up-skilling and capability-building efforts alongside ongoing strategic planning.

Recovery and the next normal: Implications for the industry

At an industry-level, the changes will likely be more sweeping with more focus on network optimization, patient-centricity, and new demands on capacity and efficiency.

New networks will balance total cost and risk. Network optimization in the industry has recently been focused on total landed costs, but the new optimal state will place more consideration on balancing cost with risk. This will result in fundamental shifts in what the industry footprint will look like. There has long been an underlying sense of unease in the industry as core centers of supply are located far from their demand. The COVID-19 crisis has reinforced this unease and forced companies to consider moving a portion of last-mile production-supply capacity closer to end markets.

Additionally, companies should consider reassessing today's global supply hubs, with special attention paid to higher-risk areas. To further mitigate risk, companies may also consider creating excess capacity in the global network to enable flexibility, increasing the extent of dual sourcing, diversifying their partner portfolios, and/or adopting near-shoring or local-for-local strategies. This shift may result in increased industry-wide capacity and investment in some markets or product types.

Investors in current supply hubs may provide this supply capacity by shifting their investments. Local manufacturers in Europe and the United States may also choose to invest in capacity. Additionally, there could be a significant growth in last-mile production across the industry.

For small-molecule drugs and manufacturing, the trend of creating excess capacity in particular could impact final dosage form more than active-pharmaceutical-ingredient (API) manufacturing as labor arbitrage is higher for API manufacturing than finished-goods manufacturing. Scalable economics for API manufacturing will also be more difficult to reach for some markets.

Biologics manufacturing is comparatively more geographically diverse, so this trend may have less of an impact in this space. However, this may be an important factor when deciding where to locate new investments, such as in sterile fill/finish capacity.

Supply chains will become patient-centric with different end points of delivery and information. As the increased adoption of digital tools, telehealth, and app-based ecosystems make patient-level data more available, patient-centric supply chains should consider how to serve this demand. In a recent survey of physicians, significant increases in telemedicine, video-conferencing, remote-working tools, and clinical-decision-support tools are all expected (Exhibit 2).

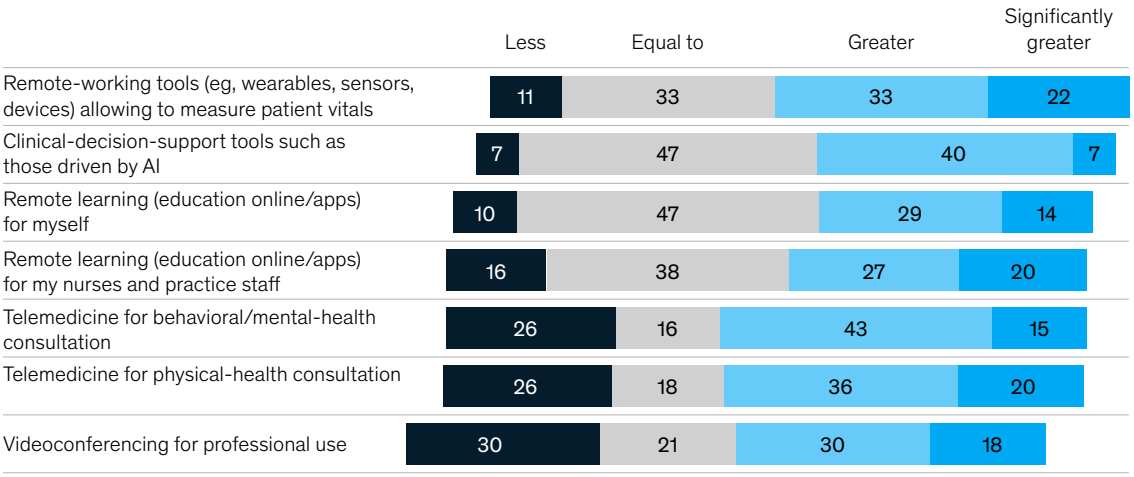
Customers and patients will expect increased supply-chain transparency and information, and this move to telehealth and app-based ecosystems will require a tech-enabled delivery model. The digitization of supply chains will accelerate, and investors may step in to further disrupt and reform supply chains.

Pharmaceutical-distributor and pharmacy models could also be fundamentally disrupted, and

Exhibit 2

Physicians expect significant growth in the use of digital tools.

Physician expectations of remote-working-tool usage postcrisis relative to precrisis, % of respondents by remote tool (n = 213)



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

Source: Sermo COVID-19 HCP survey, April 2020

customer-acquisition costs may change by an order of magnitude. This could lead to differentiated business-delivery models that find new sources of relevance in the market (such as strategic reserves of pandemic inventory) and also drive new partnerships to scale a more patient-centric delivery model.

New technologies will emerge and shift the overall industry. mRNA technology has rapidly accelerated as several of the COVID-19 vaccine candidates are mRNA-based. In an April 2020 McKinsey survey on the impact of COVID-19 to date, four out of five of top pharmas surveyed predicted a significant increase in demand for lyophilisation, as well as for mRNA and other technologies.[1] The industry may look for novel ways to rapidly increase this capacity as well as repurpose existing capacity. This may have significant implications if companies redistribute capacity to products with higher landing costs.

The same could also be said for traditional biologics-drug-substance capacity, some of which may be repurposed from traditional mAB production to produce new technologies and products to support COVID-19 response. There may also be a wider adoption of continuous manufacturing technologies, which requires less space, less upfront investment and creates flexibility in potentially enabling more local production.

Operations organizations should consider adapting quickly in the path to the next normal. As individual actions in the pharmaceutical industry stack up, change will be inevitable for the industry. Operations organizations would need to consider quickly adapting as the industry the evolves to include both the traditional players as well as the new entrants, who have come to stay. The market could also see more vertical integration and joint ventures.

Recovery and the next normal: The role of government

The industry is at a crossroads and change is inevitable. How the industry responds, both to the immediate crisis and in the path to the next normal will affect decisions at the government level.

Key stakeholders in the recovery will include governments and regulators who have become more involved in crisis decisions and response. In a recent survey of top pharma companies, four out of the five respondents reported an increase in government involvement in key markets.[2] One example in the United States is the Food and Drug Administration's recently announced Coronavirus Treatment Acceleration Program (CTAP), which aims to better support companies and scientists looking to field trials as well as helping to expeditiously qualify new treatments for use.[3] Similar actions from other governments have been seen across the world.

The respective actions in the next few weeks and months will determine the future of government involvement and regulations. So far, the industry has come together like never before, with increased collaboration industry-wide to ensure product supply. For example, a wide group of pharma companies have come forward with plans of ramping up the production of hydroxychloroquine in light of the increased demand for COVID-19 treatment coupled with export challenges from India.[4] The European Medicines Agency has also seen pharmaceutical companies, who have been competitors, come together to secure critical, high-demand medicines for hospital intensive-care units by setting up the industry-single-point-of-contact (i-SPOC) system, which enables close monitoring of possible disruptions in supply.[5] This continued collaboration could change how governments and regulators play a role in oversight.

[1] McKinsey Survey of Large Innovative Pharma Companies, April 2020, n = 5.
[2] McKinsey Survey of Large Innovative Pharma Companies, April 2020, n = 5.
[3] Coronavirus Treatment Acceleration Program, US Food and Drug Administration, fda.gov.
[4] Sandra Levy, "Pharma companies ramp up production of hydroxychloroquine to support COVID-19," *Drug Store News*, March 20, 2020, drugstorenews.com.
[5] "Update on EU actions to support availability of medicines during COVID-19 pandemic," European Medicines Agency, April 10, 2020, ema.europa.eu.

Intense public scrutiny, however, means governments and regulators could take a more proactive approach in a scenario where pharma companies may be perceived to be falling short. And increased regulatory attention could materialize in different ways: Governments could mandate higher minimum safety stocks for select products and start applying heavier penalties for stockouts. Or it could become mandatory for pharma companies to have flexible capacity for key drugs and medical products which would drive an even more focused wave of SKU standardization. Some governments may also become involved in private companies and push for stronger regulation on operators' access to products.

Preparing for recovery

Given the many changes likely to unfold, operations leaders in the pharmaceutical industry have much to consider. The following questions can help prepare for the years ahead:

1. What is your view on risk mitigation and what are the key decisions you will need to consider to execute your risk strategy?

2. Is your organization considering changing its partnership strategy (such as with contract manufacturing organizations) or will it do more on its own?

3. How diversified is your network in balancing landing costs versus risk? What is your point of view on the locations for specific supply points (such as India and the United States as supply points)?

4. The industry cost curve will likely flatten in the move toward more transparency. What are the changes needed in your operations organization to improve transparency and agility in this scenario?

5. As the increased adoption of digital tools, telehealth, and app-based ecosystems make patient-level data available, how will your organization adapt its operating model and who will be the driver of change?

6. How will you budget for the additional cost buckets due to COVID-19 and what will be the order of magnitude of this impact—both on operating costs and on capital requirements?

7. As you prepare to go back to work, what is your people strategy? What are the key capabilities you need to start building immediately as well as the talent you need to begin recruiting now?

8. What role do you believe government will play in future supply and inventory needs and what are the implications for your supply-chain and manufacturing strategy?

COVID-19 is first and foremost a humanitarian crisis and the role played by pharmaceutical organizations is fundamentally critical. As pharma leaders focus on their crisis response, it is important to consider these questions and the implications for their respective companies in increasing resilience and better adapting to the post-COVID-19 world.

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Oil and gas after COVID-19: The day of reckoning or a new age of opportunity?

Leading companies will use the crisis to redefine their reasons for being and their basis for distinctiveness.

by Filipe Barbosa, Giorgio Bresciani, Pat Graham, Scott Nyquist, and Kassia Yanosek

The oil and gas industry is experiencing its third price collapse in 12 years. After the first two shocks, the industry rebounded, and business as usual continued. This time is different. The current context combines a supply shock with an unprecedented demand drop and a global humanitarian crisis. Additionally, the sector's financial and structural health is worse than in previous crises. The advent of shale, excessive supply, and generous financial markets that overlooked the limited capital discipline have all contributed to poor returns. Today, with prices touching 30-year lows, and accelerating societal pressure, executives sense that change is inevitable. The COVID-19 crisis accelerates what was already shaping up to be one of the industry's most transformative moments.

While the depth and duration of this crisis are uncertain, our research suggests that without fundamental change, it will be difficult to return to the attractive industry performance that has historically prevailed. On its current course and speed, the industry could now be entering an era defined by intense competition, technology-led rapid supply response, flat to declining demand, investor scepticism, and increasing public and government pressure regarding impact on climate and the environment. However, under most scenarios, oil and gas will remain a multi-trillion-dollar market for decades. Given its role in supplying affordable energy, it is too important to fail. The question of how to create value in the next normal is therefore fundamental.

To change the current paradigm, the industry will need to dig deep and tap its proud history of bold structural moves, innovation, and safe and profitable operations in the toughest conditions. The winners will be those that use this crisis to boldly reposition their portfolios and transform their operating models. Companies that don't will restructure or inevitably atrophy.

A troubled industry enters the crisis

The industry operates through long megacycles of shifting supply and demand, accompanied by shocks along the way. These megacycles have seen wide swings in value creation.

After the restructurings of the early 1980s, the industry created exceptional shareholder value. From 1990 to 2005, total returns to shareholders (TRS) in all segments of the industry, except refining and marketing companies, exceeded the TRS of the S&P 500 index. Oil and gas demand grew, and OPEC helped to maintain stable prices. Companies kept costs low, as memories from the 1980s of oil at $10 per barrel (bbl) were still acute. A new class of supermajor emerged from megamergers; these companies created value for decades. Similarly, the "big three" oil-field service equipment (OFSE) companies emerged. Political openings and new technologies created opportunity for all.

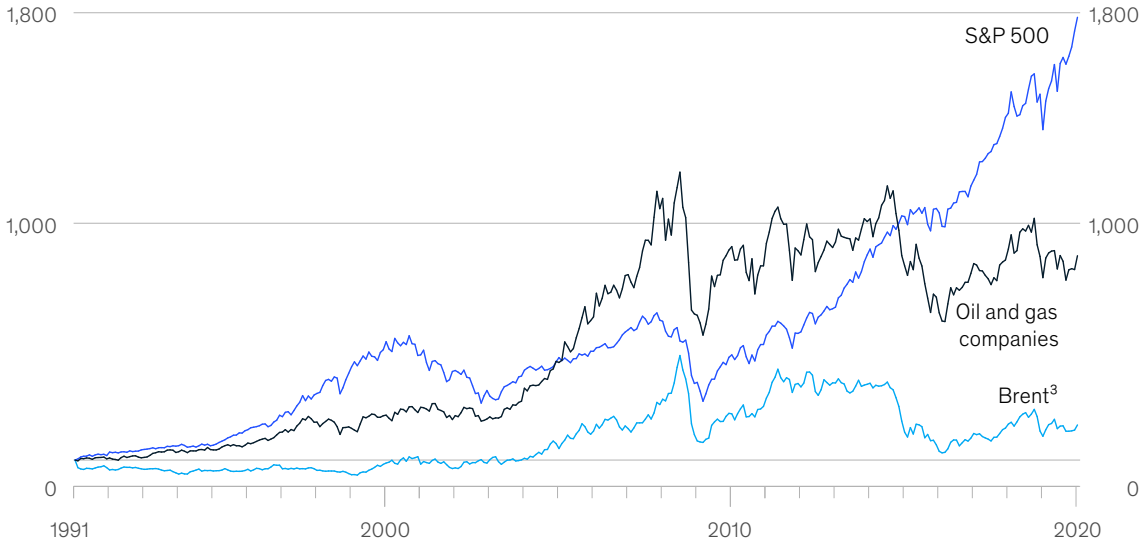
From 2005 to January 2020, even as macro tailwinds such as strong demand growth and effective supply access continued, the global industry failed to keep pace with the broader market. In this period, the average of the oil and gas industry generated annual TRS growth about seven percentage points lower than the S&P 500 (Exhibit 1). Every subsegment similarly underperformed the market, and independent upstream and OFSE companies delivered zero or negative TRS. The analysis excludes companies that were not listed through this period (including some structurally advantaged national oil companies, and private companies).

In the early years of this period, the industry's profit structure was favorable. Demand expanded at more than 1 percent annually for oil and 3 to 5 percent for liquefied natural gas (LNG). The industry's "cost curves"—its production assets, ranked from lowest to highest cost—were steep. With considerable high-cost production necessary to meet demand, the market-clearing price rose. The same was

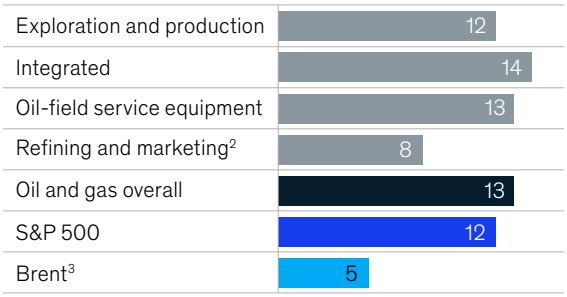
Exhibit 1

The oil and gas industry underperformed against the S&P 500 over the past 15 years.

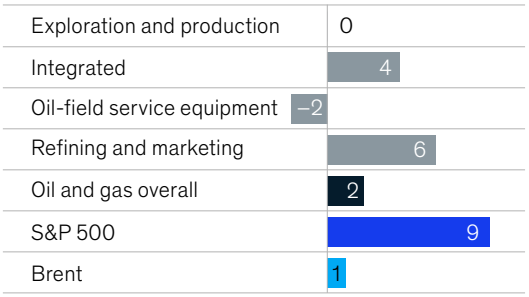
Cumulative total returns to shareholders,[1] index (100 = Dec 1990)



Total annual returns to shareholders, 1990–2005, %



Total annual returns to shareholders, 2005–19, %



[1] National oil companies are allocated as per their business model. At least 1 year of data required for inclusion.
[2] Excludes marketing pure plays.
[3] Represents change in ICE Brent price.

Source: S&P Capital IQ; McKinsey analysis

true for both gas and LNG, whose prices were often tightly linked to oil. Even in downstream, a steep cost curve of the world's refining capacity supported high margins.

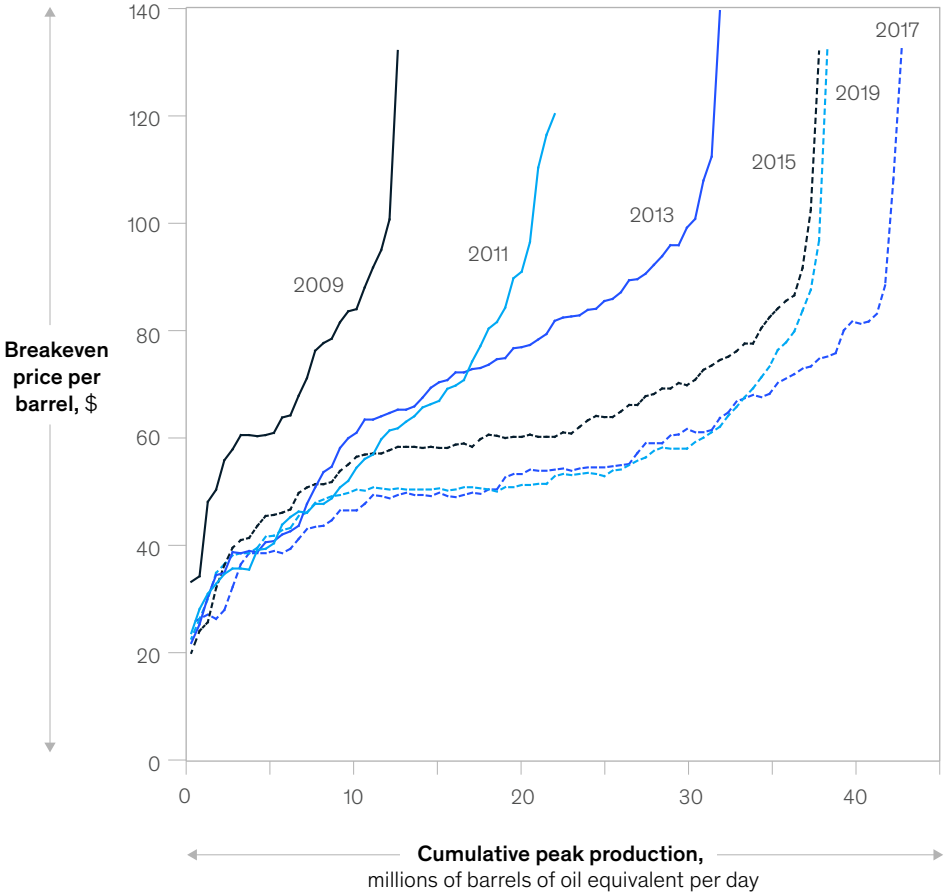
Encouraged by this highly favorable industry structure and supported by an easy supply of capital seeking returns as interest rates fell, companies invested heavily. The race to bring more barrels onstream from more complex resources, more quickly, drove dramatic cost inflation, particularly in engineering and construction. These investments brought on massive proved-up reserves, moving world supplies from slightly short to long.

Significant investment went into shale oil and gas, with several profound implications. To begin with, shale reshaped the upstream industry's structure. As shale oil and gas came onstream, it flattened the production-cost curve (that is, moderate-cost shale

Exhibit 2

New supply flattened the cost curve between 2009 and 2019.

Cost curve of Goldman Sachs's 'top projects,'[1] oil and liquids production,
millions of barrels of oil equivalent per day



[1] Goldman Sachs's pre-plateau projects included in its "top projects" analysis. Identified projects (pre-sanction, under development and production) are evaluated each year and assigned a breakeven price and peak oil production. The oil cost curve depicts the cumulative peak oil production of identified projects.

Source: Goldman Sachs Global Investment Research

oil displaced much higher-cost production such as oil sands and coal gas), effectively lowering both the marginal cost of supply and the market-clearing price (Exhibit 2).

In another wrinkle, the rise of shale made it more challenging for OPEC to maintain market share and price discipline. While OPEC cut oil and natural gas liquids production by 5.2 million barrels per day (bpd) since 2016, shale added 7.7 million bpd over this timeframe, taking share and limiting price increases. When the industry no longer needs a decade to find and develop new resources, but can turn on ample supply in a matter of months, it will be hard to repeat the run-up in prices of 2000–14.

Historically, price wars wipe out poor performers and lead to consolidation. But the capital markets were generous with the oil industry in 2009–10 and again in 2014–16. Many investors focused on volume growth funded by debt, rather than operating cash flows and capital discipline, in the belief that prices would continue to rise and an implied "OPEC put" set a floor.

It hasn't worked out that way.

Challenges today and tomorrow

The combination of the COVID-19 pandemic demand disruption, and a supply glut has generated an unprecedented crisis for the industry.

Short-term scenarios for supply, demand, and prices

Under most best-case scenarios, oil prices could recover in 2021 or 2022 to precrisis levels of $50/bbl to $60/bbl. Crude price differentials in this period are also likely to present both challenges and opportunities. The industry might even benefit from a modest temporary price spike, as today's massive decline in investment results in tomorrow's spot shortages. In two other scenarios we modeled, those price levels might not be reached until 2024. In a downside case, oil prices might not return to levels of the past. In any case, oil is in for some challenging times in the next few years.

Regional gas prices could fall much lower than in the previous megacycle. Shale gas has unlocked abundant gas resources at breakeven costs less than $2.5/MMBtu to $3.0/MMBtu.[1] The pandemic has had an immediate impact, lowering gas demand by 5 to 10 percent versus precrisis growth projections. With North America becoming one of the largest LNG exporters by the early 2020s, and a sharply oversupplied LNG market, regional gas prices in Europe and Asia will be driven by prices at Henry Hub, plus cash costs for transportation and liquefaction (a premium of about $1/MMBtu to $2/MMBtu).

Demand for refined products is down at least 20 percent, and has plunged refining into crisis. We think it will be two years at least before demand recovers, with the outlook for jet fuel particularly bleak.

The immediate effects are already staggering: companies must figure out how to operate safely as infection spreads and how to deal with full storage, prices falling below cash costs for some operators, and capital markets closing for all but the largest players.

Long-term challenges

Looking out beyond today's crisis toward the late 2030s, the macro-environment is set to become even more challenging. Start with supply and demand. We expect growth in demand for hydrocarbons, particularly oil, to peak in the 2030s, and then begin a slow decline.

Excess capacity in refining will be exposed, putting downward pressure on profits—driven by marginal pricing and, in some cases outside the growing non-OECD[2] demand markets, by the economics of some refiners that seek to avoid the high cost of closing assets.

The upstream cost curve will likely stay flat. While geopolitical risks will continue to be a major factor affecting supply, new sources of low-cost, short-cycle supply will reduce the amplitude and duration of price fly-ups. The battered shale oil and gas subsector will nonetheless continue to provide supply that can be rapidly brought onstream. Its resilience might even improve as larger, stronger players consolidate the sector. Declining demand, driven by the energy transition, and global oversupply will make the task of OPEC and OPEC++ harder rather than easier.

Global gas and LNG will have a favorable role in the energy transition, ensuring a place in the future energy mix, supported by the continual demand growth in the coming decade. However, in LNG, the expected and potential cyclical capacity expansion over the decade will add pressure and volatility to global LNG contract pricing, and hence to regional gas prices. In the long term (post-2035), gas will face the same pressures as oil with peak demand and incremental economics driving decision making.

The challenge of the energy transition will continue. Today, governments are intently focused on managing the COVID-19 pandemic and mitigating the effects on economies, which is deflecting attention away from the energy transition. That

[1] Million British thermal units.
[2] Organisation for Economic Co-operation and Development.

The current crisis will have a profound impact on the industry, both short and long term.

said, the climate and environment debate is unlikely to go away. The innovation that has lowered costs for wind, solar, and batteries will continue and the decarbonization will remain an imperative for the industry. Negative public sentiment and investor/lender pressure that the industry has endured in the past may turn out to be mild compared with the future. The energy transition and decarbonization may even be accelerated by the current crisis.

A growing number of investors are questioning whether today's oil and gas companies will ever generate acceptable returns. And their role in the energy transition is also uncertain. Oil and gas companies will have to prove that they can master this space. Discipline in finance, capital allocation, risk management, and governance will be critical.

The crisis as catalyst

The pandemic is first and foremost a humanitarian challenge, as well as an unprecedented economic one. The industry has responded with a Herculean effort to successfully and safely operate essential assets in this challenging time. The current crisis will have a profound impact on the industry, both short and long term. How radically the oil and gas ecosystem will reconfigure, and when, will depend on potential supply–demand outcomes and the actions of other stakeholders, such as governments, regulators, and investors. In any scenario, however, we argue that the unprecedented crisis will be a catalytic moment and accelerate permanent shifts in the industry's ecosystem, with new future opportunities.

Implications for the industry

All companies are rightly acting to protect employees' health and safety, and to preserve cash, in particular by cutting or deferring discretionary capital and operating expenditures and, in many cases, distributions to shareholders. These actions will not be enough for financially stretched players. We are likely to see an opportunity for a profound reset in many segments of the industry.

Upstream. A broad restructuring of several upstream basins will likely occur, underpinned by the opportunity created by balance-sheet weaknesses, particularly in US onshore and other high-cost mature basins. We could see the US onshore industry, which currently has more than 100 sizable companies, consolidate very significantly, with only large at-scale companies and smaller, truly nimble, and innovative players surviving. Broad-based consolidation could be led by "basin masters" to drive down unit costs by exploiting synergies. In the shale patch alone, we estimate that economies of skill and scale, coupled with new ways of working, could further reduce costs by up to $10/bbl, lowering shale's breakeven point and improving supply resilience.

Downstream. Closing refineries and other assets with high costs or poor proximity to growing non-OECD markets was going to be necessary anyway, when oil demand begins a secular decline. However, as we saw in the 1980s and 1990s, governments may intervene to prop up inefficient assets, which will place additional pressure on advantaged assets elsewhere in the global

refining ecosystem. Consolidation, another wave of efficiency efforts, and the hard work needed to wring out every last cent of value from optimizing refineries and their supply chains is the likely industry response. In the medium term, the value of retail networks (and access to end customers) could increase.

Midstream. Well-located midstream assets supported by contracts with creditworthy counterparties have proven a successful business model. Midstream may well continue to be a value-creating component of the oil and gas value chain, however, as demand peaks in the 2030s—there is likely to be downward pressure on rates driven by pipe-on-pipe competition.

Petrochemicals. Petrochemicals has been and could continue to be a bright spot in the portfolio for leading players. Disciplined investment in advantaged assets (such as at-scale integrated refining/petrochemical installations) that feature distinctive technologies and privileged markets should enable value creation.

Global gas and LNG. Gas is the fastest growing fossil fuel, with robust demand driven by the energy transition (for example, the shifts away from coal, and from dispatchable backup to renewables). However, the total extent of greenhouse-gas emissions is still being calculated for some LNG value chains. We estimate that global gas demand will peak in the late 2030s as electrification of heating and development of renewables may erode long-term demand. This, combined with midterm volatility, could lead to further consolidation and to an industry operating on incremental economics.

Oil-field services and equipment (OFSE) and supply chain. Much of the oil and gas supply industry was in a dire position coming into the crisis; significant over-capacity had emerged, and profitability collapsed after 2014. Despite a wave of bankruptcies and restructurings, the industry has not experienced the radical consolidation, capacity reductions, and capability upgrades needed. This restructuring may well happen now, with asset liquidation that resembles the 1980s oil bust more than the soft 2015–20 financial restructuring, and a new wave of business and supply-chain reconfiguration, technological acceleration, and partnership with customers.

National Oil Companies. National Oil Companies (NOCs) will be under additional pressure due to their important role as contributors to national budgets and governments' societal needs. The difficult choices between industry supply discipline and market-share protection will accentuate. For NOCs not blessed with the lowest-cost resources, the pressure for fundamental change (for example, through privatization or a rethinking of collaboration with IOCs and OFSE companies) will be intense.

New businesses related to the energy transition and renewables will continue to emerge, particularly during the crises. The returns for some of these opportunities remain unclear, and the oil and gas industry will have to prove whether it can be a natural and leading participant in these businesses. Hydrogen, ammonia, methanol, new plastics, and carbon capture, utilization, and storage (CCUS) could all be interesting areas for the oil and gas industry.

How to win in the new environment

Some companies whose business models or asset bases are already distinctive can thrive in the next normal. But for most companies, a change in strategy, and potentially business model, is an imperative.

Learning from others

It is instructive to seek inspiration from other industries that experienced sector-wide change, and how the leaders within these industries emerged as value creators. The common thread in these examples is a large reallocation of capital informed by a deep understanding of market trends and future value pools, the value of focused scale, and a willingness to fundamentally challenge and transform existing operating models and basis for competition.

Steel experienced both declining demand and stranded assets due to global shifts in demand, that structurally destroyed value. However, a few players used different strategies to protect value. Mittal Steel built a model around acquiring assets with structural advantage (such as those in insulated markets, and some that allowed backward integration into advantaged raw-material supply) and then cutting costs and improving operations. Additionally, it initiated significant industry consolidation. Nucor combined industry-leading operational capabilities with a first-mover status in electric-arc furnace technology. Others focused on scale and technology in profitable niches like seamless pipe.

In *automobile manufacturing*, faced with rising Asian competition, US and European companies had to change. Fiat Chrysler Automobiles aggressively restructured its business model and culture by pursuing transformative mergers (Chrysler first, PSA Group lately) to gain scale in, or access to, preferred market segments, and to add global brands to its portfolio. It subsequently drove platform sharing across models and integrated supply-chain partners into its ecosystem.

In *materials*, 3M found a way to innovate on commodity materials that enabled it to identify high-value end markets. A telecom-equipment manufacturing company came close to demise when the telecom business collapsed at the end of the dotcom boom. It boldly reallocated resources and conducted programmatic M&A to become a leading producer of LCD glass for the booming mobile-device market.

In *banking*, JPMorgan Chase used its "fortress-like" balance sheet during the financial crisis to make attractive acquisitions and relentlessly pursue market leadership in segments it believed in. It was not always the first mover, but mobilized significant resources (people and capital) against several big bets. ING, the Dutch banking group, undertook a radical digital and agile transformation to fundamentally change its operating platform, which it thinks is now properly geared for the future.

Some traditional and existing models will still apply

Traditionally the super-major approach has been one model for value creation. Companies with scale, strong balance sheets, best-in-class integrated portfolios, advantaged assets, and superior operational abilities should create value even in a challenged future. Basin leadership has also long been a source of distinctiveness and value creation in oil and gas. Similarly, low-cost commodity suppliers with first-quartile assets have also thrived.

Finally, the industry features some focused business models that create value through scale, capability and operational efficiency in specific segments—such as Vitol in trading, Enterprise Products Partners in midstream, Ørsted in offshore wind, and Quantum Energy Partners in private equity. Undoubtably there will be similar opportunities to build commercially disciplined niche companies in the future.

Questions for leaders and emerging insights—the return of strategy

While the current crisis is justifiably consuming leadership time and attention, many are thinking through how to lead their companies after the crisis and are posing existential questions about their reasons for being and basis for distinctiveness. Different strategic choices are available (such as basin master, midstream and trading leader, technology specialist, first-quartile low-cost producer, value-chain integrator, energy transition specialist, and advantaged integrated refining/petrochemical player, among others). It will be unacceptable not to make clear choices.

The value of the traditional multi-business model is often not sufficient enough to overcome bad operational management, poor capital allocation, or structurally disadvantaged assets. Will some large companies survive in their current form? What is the role of independents and mid-size players? How will

NOCs thrive and continue to play their important societal roles in the future?

Will different forms of partnership with the supply chain be an important part of future business models? How should companies structure relationships with digital and advanced analytics companies to transform operations and to support new business models? Can technology and innovation unlock new growth for the industry: What would it take to deliver new LNG projects in a fundamentally different way at $300/ton and displace coal completely? Can the costs of CO_2 mitigation be fundamentally lowered? In an era of abundance, will value flow to those that own the customer relationship and integrated value chains? Should companies make a radical shift toward renewables and away from oil and gas?

In answering these questions, companies should base their responses on three givens. *The opportunity to lead has never been better*—separation between market leaders and laggards will be increasingly sharp. *Shaping regulation will matter*, and enforcing operating standards will benefit industry and market leaders. Similarly, *resilience and balance-sheet strength are non-negotiable*. A new, strategic view on what the capital structure should look like, and the resultant dividend policy, is needed.

Taking bold action during the crisis to secure resilience and accelerated repositioning

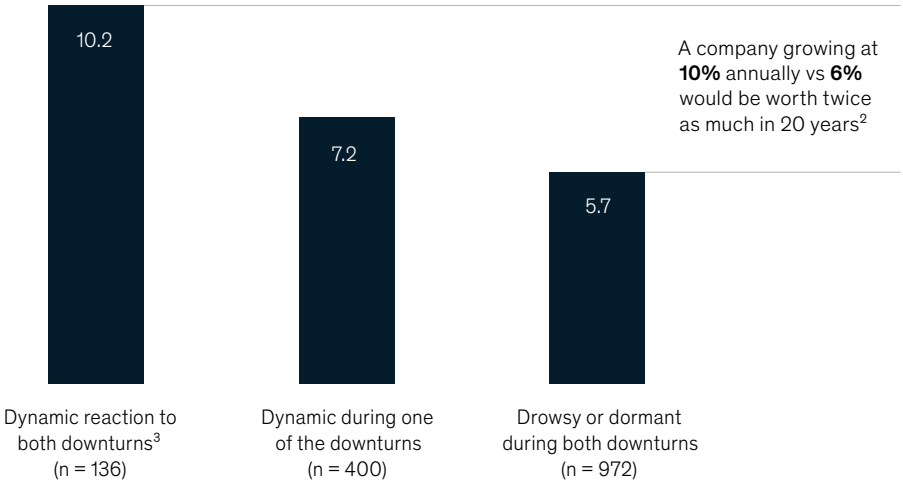
Hard questions, indeed. In the meantime, winners will accept the crisis for what it is: a chance to form their own views of the future and to lead to capture new opportunities. Leaders will adopt tailored strategies that fit within their specific environment and markets in which they choose to compete, and the capabilities they bring (such as low-cost production, regional-gas or downstream-oil market leadership, value-chain integration, and specialized strengths in for example retail, trading, and distribution). In our view, all companies should act boldly on five themes, consistent with their chosen strategy:

1. *Reshape the portfolio, and radically reallocate capital to the highest-return opportunities.* Our studies across multiple industries show that the degree of dynamic capital reallocation strongly correlates to long-term value creation (Exhibit 3). Companies should make tough and

Exhibit 3

Dynamic reallocation is critical in times of economic turbulence.

Average annual returns to shareholders 1990–2010,[1] %



[1] Based on 1,508 companies. Sample is limited to companies with data available during both economic downturns.
[2] Assumes no dividends are paid out.
[3] 1999–2002 and 2007–10 are treated as downturn periods.

Source: Mladen Fruk, Stephen Hall, and Devesh Mittal, "Never let a good crisis go to waste," *McKinsey Quarterly*, October 2013

fundamental choices across the asset base and permanently reallocate capital away from lower-return businesses toward those best aligned with future value creation and sources of distinctiveness. Some companies may choose this moment to accelerate their pivot toward the energy technologies of the future. All this needs to happen in an environment in which companies must also rebuild trust with the capital markets by delivering attractive returns on capital.

2. *Take bold M&A moves.* Could this be another age of mergers—potentially with carve-outs and spin-outs? Is now the time to drive massive consolidation and rationalization, and basin mastery, in US onshore basins such as the Permian, and across basins globally? Winners will emerge with advantaged portfolios that will be resilient to longer-term trends. They should settle for nothing less than the absolutely best positioned assets in upstream, refining, marketing, and petrochemicals.

3. *Unlock a step-change in performance and cost competitiveness through re-imagining the operating model.* Overhead levels at some companies are more than double what they were in 2005. In most cases, these bureaucracies do not improve safety or reliability—and they certainly slow decision making. We believe that G&A and operating costs can be reduced by another 30 to 50 percent. Throughput from existing assets can also be improved significantly—in upstream, average performers have more than 20 percent opportunity, and even top-quartile performers can improve production by 3 to 5 percent. Leading companies will redouble their efforts in this moment, protecting or even scaling up technology, digital, and artificial-intelligence investments; and taking inspiration from some of the new approaches emerging from remote working, so that they do not return to business as usual once the crisis ends. The COVID-19 crisis, which has forced companies to operate in new ways, may be a catalyst to rethink the size and role of the functional teams, field crews, and management processes needed to run an efficient oil and gas company.

4. *Ensure supply-chain resilience through redefining strategic partnership approaches.* Leading operators will act now to ensure resilience, in large part by promoting new commercial and collaborative models with an ecosystem of suppliers to radically simplify standards, processes, and interfaces; lower costs; and increase the speed and quality of the entire system. Deep strategic integration into the supply chain will be critical. “Three bids and a buy” from a deeply distressed supply chain is not a winning model. The OFSE supply chain needs to gain further scale and be able to invest in technology to reduce system costs. Within capital projects, we expect multi-project strategic cooperation and integrated project delivery (IPD) to become much more prevalent; IPD contracting aligns all participants, including sub-contractors, to one over-arching project goal.

5. *Create the Organization of the Future, in both talent and structure.* The oil and gas industry is no longer the premier employer of choice in many markets and is struggling to attract not only the best engineers but also the best new talent in areas such as digital, technology, and commercial. All are needed to drive business-model transformation. The root causes are partly perceptual, as many young people think the sector is placed on the wrong side of the transition. But another cause is the misalignment between the career-

progression timeframes and work–life choices the industry offers and the expectations of newer generations of talent. The industry can learn from this crisis. It can radically flatten hierarchies, reduce bureaucracy, and push decision making to the edge—in short, embed more agile ways of working. A new blend of talent can re-animate some of the innovative and pioneering mindsets from past periods.

Industry fundamentals have changed and the rules of the next normal will be tough. But strong performers—with resilient portfolios, innovation, and superior operating models, potentially very different from today—can outperform. The time for visionary thinking and bold action is now.

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Make it better, not just safer: The opportunity to reinvent travel

Do you remember your first flight? The first time you fell in love with a new city? We do.

by Melissa Dalrymple, Ryan Mann, Melinda Peters , and Nathan Seitzman

We remember the first time we jumped in a cold lake on a hot summer day with our siblings. The first time we ate street food walking the streets of a new country with college roommates. We even remember the first business trip we took—straight out of college, and too nervous to enjoy the ride.

This desire to build memories, to connect with people, and to see new places drove 1.4 billion of us to travel internationally in 2019.[1] Creating safer travel experiences is now paramount to protect this privilege.

Now is clearly a moment of crisis for the travel industry. Available seat miles on US airlines were down 71 percent in April 2020 from the previous year.[2] Globally, hotels are at 29 percent occupancy, compared with 72 percent over the same period in 2019.[3] However, we are seeing green shoots of demand in areas that are opening up, highlighting an enduring desire to travel; our April survey of Chinese leisure travelers shows that many people are already planning their next trip.[4]

But the future of the travel industry will depend on more than just travelers' pent-up demand. For some, the romance that travel used to inspire was already wearing thin even before the crisis. We spoke to people across multiple geographies who have traveled in the last two months,[5] and the one constant across their experiences was added stress—whether due to limited entry points, multiple new checkpoints, or fellow travelers' inconsistent compliance with published safety measures.

Safety must be the first priority. Wherever possible, however, intensified health and hygiene protocols should be implemented in ways that avoid making journeys more difficult in the aftermath of the pandemic—for example, the way that travel became logistically more complex after 9/11 because of additional security measures. The imperative to move fast has often meant unilateral decision making, rather than solutions developed through quick, iterative feedback. Any further advance of cold or sterile experiences as a result of the (appropriate) pursuit of safety could radically shift behaviors toward simpler experiences, such as choosing to drive instead fly, or could even dampen the overall recovery.

Travel companies need to excite and attract customers as well as reassure them. To achieve this, leaders should focus on making travel better—not just safer—which means giving travelers more control, offering greater authenticity and personalization, and taking a customer-centric, agile approach.

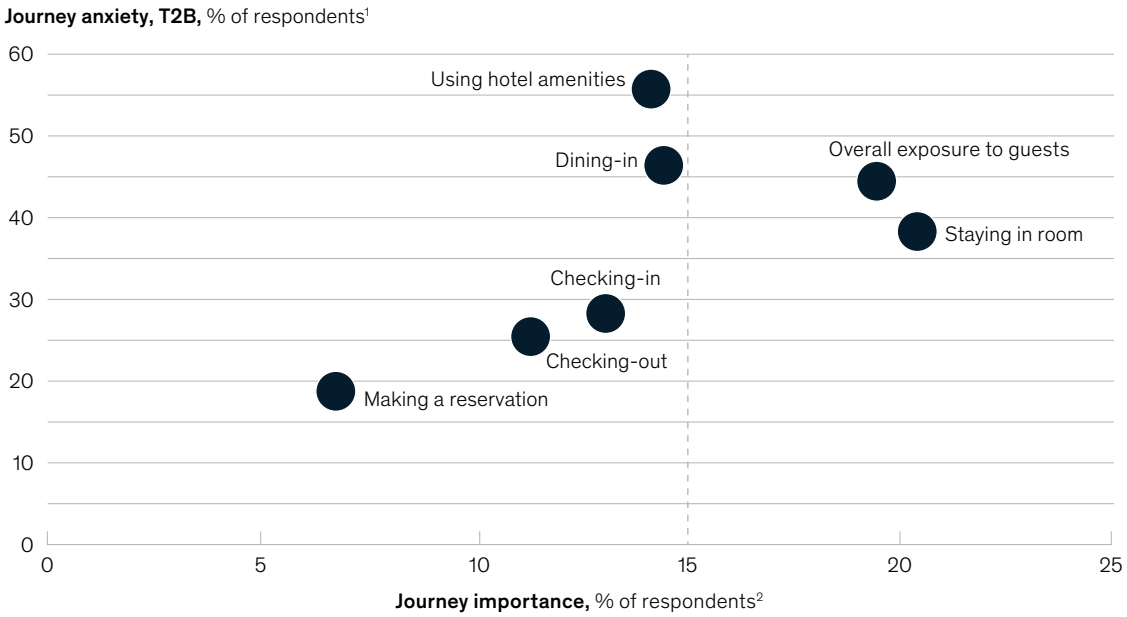
Moving beyond table-stakes safety initiatives

Many travel companies have already announced a series of health and hygiene measures, often promoted with well-known cleaning brands or health experts. But not all of these measures will survive

[1] *International tourism highlights*: 2019 edition, World Tourism Organization, 2019, e-unwto.org.
[2] Andrew Curley, Alex Dichter, Vik Krishnan, Robin Riedel, and Steve Saxon, "Coronavirus: Airlines brace for severe turbulence," April 2020.
[3] STR occupancy data for May 17 through May 23, 2020.
[4] Xiang Mi, "Big data from Tongcheng: The average room rate of domestic hotels during the 'May Day' rose by about 42% year-on-year," *DoNews*, April 27, 2020, donews.com; Kay Chen, Will Enger, Jackey Yu, and Cherie Zhang, "Hitting the road again: How Chinese travelers are thinking about their first trip after COVID-19," May 2020.
[5] Recent traveler interviews conducted May 4 to May 15, 2020, with travelers aged 25–55 from China, Germany, Sweden, and the United States.

Exhibit 1

Staying in the room is driving most of this anxiety.



Takeaways

Staying in the room and overall exposure to guests are the journeys that most impact travelers' anxiety

Both journeys have above average anxiety, suggesting that hotels should prioritize addressing these in order to most impact overall anxiety about returning to hotels

Note: N=645; Questions: (1) Given what you know today about COVID-19, what is your level of anxiety over your health and safety as it relates to coronavirus (COVID-19) and staying in a hotel? (2) What is your level of anxiety with different elements of the hotel experience once you resume traveling?

Overall exposure to travelers and boarding the flight are driving most of travelers' anxiety.

Note: N=455; Questions: (1) Given what you know today about COVID-19, what is your level of anxiety over your health and safety as it relates to coronavirus (COVID-19) and taking flights? (2) What is your level of anxiety with different elements of the flight experience once you resume traveling?

[1] Top 2 Box calculated as % of respondents answering 6 or 7.
[2] Derived importance calculated through Johnson's Relative Weights methodology.

Source: Hotel anxiety Pulse survey—May 2020

in their current forms: some won't be effective, some won't resonate with travelers, and some will prove impossible to deliver consistently and at scale. Constant one-upmanship on cleanliness, though well-intentioned, can be problematic for two reasons. First, each new announcement resets the bar on hygiene standards, leaving industry players scrambling to keep up with initiatives—whether or not they actually improve employee or traveler safety. Second, the travelers we interviewed told us that the fragmentation across new cleanliness programs creates anxiety and confusion about what works and who to trust to keep them safe. If one airport claims that its security process is safer than another's, for example, why would travelers trust that any airport is safe? Travelers should have confidence in the whole system, rather than be anxious about pieces within it (Exhibit 1).

In fact, a focus on health and hygiene only scratches the surface of the changes that are necessary in the aftermath of the current crisis. Companies can consider three types of interventions to reinvent and reinvigorate travel over the coming years (Exhibit 2).

In addition to table-stakes safety initiatives, a second category of actions can reassure and comfort the public. Brands might differentiate themselves and re-engage their travelers with visible, communications-based cues—such as notifications about the health status of the destination city and personalized notes about the importance of testing and other safety measures. Finally, companies need to move beyond reassuring customers to exciting them, perhaps by looking for opportunities to create exceptional travel experiences.

Exhibit 2

Travel companies are off to a good start . . . but are only scratching the surface.

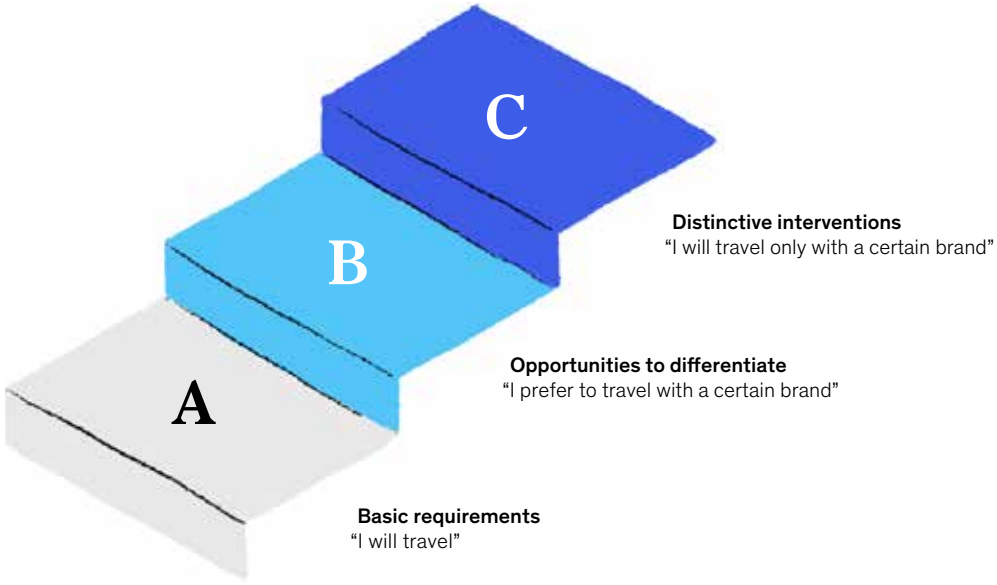


Exhibit 3

The evolution of traveler needs is accelerating major pre-COVID-19 industry trends.

Industry trend

Proliferation of analytics and disruptive tech

Shift to digital and mobile

Environmental impact considerations

Expanded well-being service offerings

Fundamental shifts in food and beverage

Making travel better, not just safer

As travel companies redesign their traveler experiences to address risks and anxieties related to COVID-19, they should remember that the pain points and trends that existed before the crisis—such as the shift toward a more digital and personalized journey, and an increased emphasis on wellness and sustainability—have not gone away (Exhibit 3). Airports, for example, are going to have to rethink customer experience in the coming years, but many already understood the importance of improved service and contactless operations.[6]

Another example is the high-anxiety purchase journey for flights and lodging, meaningful purchases that often cannot be returned. Simplifying these experiences represents a significant opportunity: before the crisis, we estimated (in partnership with the International Air Transport Association) that the value at stake in making airline ticket retail easier might be $40 billion[7]—equivalent to 4 percent of 2019 revenues—by 2030.

Many initiatives can make the travel experience simultaneously better and safer. Housekeeping services, for instance, will need to adjust for safety concerns, but revised protocols can also reduce environmental impact (such as through less-frequent laundering of sheets during each stay), decrease cost, and give guests more flexibility (by letting them choose their own housekeeping schedule).

Companies will also need to look outside the industry to understand changing consumer expectations. Travelers develop preferences and needs based on their interactions with all companies, not only when they're on airplanes or in hotels. Companies should consider, for example, how travelers interact with grocery-store clerks, food-delivery persons, or virtual-shopping experts.

Admittedly, the current economic context makes it difficult to expect companies to do more. Indeed, not every good idea will be economically feasible, and there's little slack in the system for big launches that fail. The good news is that some of the necessary changes will require no significant capital outlay but instead a change in mindset toward customer experience–centric behaviors. Where investment is needed, developing a clear perspective on which actions to prioritize will require balancing of the travelers' needs with consistent delivery (perhaps with a smaller organization) and the business case's viability.

[6] For more, read Melissa Dalrymple and Kevin Dolan, "Beyond contactless operations: Human-centered customer experience," May 2020; "How customer experience takes flight at the Orlando airport," February 2017.
[7] Riccardo Boin, Alex Cosmas, and Nina Wittkamp, "Airline retailing: The value at stake," November 2019.

Travel companies should bear three principles in mind when designing new protocols and experiences.

Give customers more choice and control

Companies should empower customers to build their own itinerary using smarter, connected digital tools and make it easier for them to modify or cancel their plans. In addition, companies must recognize that the factors that promote customer loyalty may now have shifted; near-term uncertainty may mean, for example, that the ability to cancel a reservation matters more than brand choice or price. The moments that matter might mean more digital than ever and in new places within the customer journey. Solutions and policies that provide choice and control will help to build the trust and confidence necessary to get travelers back on the road and in the air.

Be human and genuine, and personalize the experience

Before the crisis, personalized and unique experiences constituted a dominant trend. Boutique hotels, for instance, were the fastest-growing hotel segment in the United States, with supply increasing 10.6 percent between 2018 and 2019, compared with an overall hotel supply growth of 2.0 percent.[8] Travelers are drawn to those hotels that put a human face on the institution, that can combine the high standards and consistency of a hotel chain with the personality and privacy of a vacation rental. Major hotel chains have recognized these changing preferences and launched new "soft brands" that serve as a collection of boutique hotels.

Travel companies now have an opportunity to take this personalization a step further, but—in a world where formerly welcoming smiles are behind masks—they will need to find new ways to connect. We have heard hotel staff calling first responders who were quarantining in their hotels to check on them and including notes of encouragement in their bagged lunches, and of airline pilots addressing passengers pre-flight to reassure them and answer any questions about safety.

Getting this right is a balance: mass emails from the CEO can only go so far, and consumers are already reporting fatigue around "we're all in this together" messaging that is beginning to ring hollow. According to a recent Adobe study, brand marketers are 20 percent more likely than consumers to believe that consumers want to see ads on companies' COVID-19 responses.[9] The bar for authenticity in brand communication and behavior across channels (including in person) must remain high. As such, communication should be focused on what a company is doing for the traveler, rather than delivering superficial platitudes.

Frontline staff can also be powerful messengers and are a great source of insight for improvements or opportunities that a home office will not spot as quickly. Travel workers have been through a lot since the start of the crisis, both professionally and personally, and maintaining an open dialogue around their experiences—and acting upon their feedback—will be vital to ensuring that they feel safe and confident.

[8] Kim Bardoul, "Boutiques can give hoteliers rebound opportunities," *Hotel News Now*, April 22, 2020, hotelnewsnow.com.
[9] *Adobe Blog*, "Navigating advertising strategy during the COVID storm," blog entry by Keith Eadie, May 21, 2020, theblog.adobe.com.

To move forward, the industry can actually look backward and take inspiration from a time when airline travel was exciting and new, and travel companies went out of their way to solve for traveler needs rather than just optimizing against the competition.

Listen to customers, and take an agile approach

We have found that companies that surpass their peers in customer-experience design tend to share a set of features[10]: they have agile, cross-functional teams that develop and iterate with end users and deliver seamlessly across touchpoints. Companies that deliver at the highest level across those themes recognize real returns, outperforming their peers by nearly 3:1 in revenue and 1.5:1 in return to shareholders. In this time of great uncertainty and fluid demand, it will be more important than ever to listen to travelers and understand their rapidly evolving needs.

While many travel companies have begun to embrace agile principles in IT and digital, these principles are becoming a useful tool across the entire enterprise as we go into the "next normal." As travel companies manage their new reality, they will need to be nimble. Cross-functional agile squads that break down traditional silos and collaborate more efficiently can help their companies move quickly to address changing traveler needs across the journey. When launching a new initiative, for example, these teams can conduct quick, one-on-one customer interviews—even in the hotel lobby or boarding area—that can be used to cocreate and pilot solutions at a relatively low expense, using metrics like adoption rate and rapid-fire feedback to course correct in real time.[11]

Picture yourself in your favorite vacation spot. Perhaps you're lying on a beach towel, hiking up a mountain, or skiing down one. Your journey there was different, but the new measures gave you more control and flexibility while ensuring your safety.

The companies that thrive after this crisis will likely be those that work with travelers and employees to cocreate distinctive solutions in a rapid and agile manner, that find new ways to enable choice across the customer experience, and that communicate progress in an authentic and transparent way.

No crystal ball can tell us what the future of travel will be, and we will not find the right solutions to today's fluid situation overnight. This will take time, patience, and probably many attempts as we learn together. But travel companies need to embrace the challenge to come back better.

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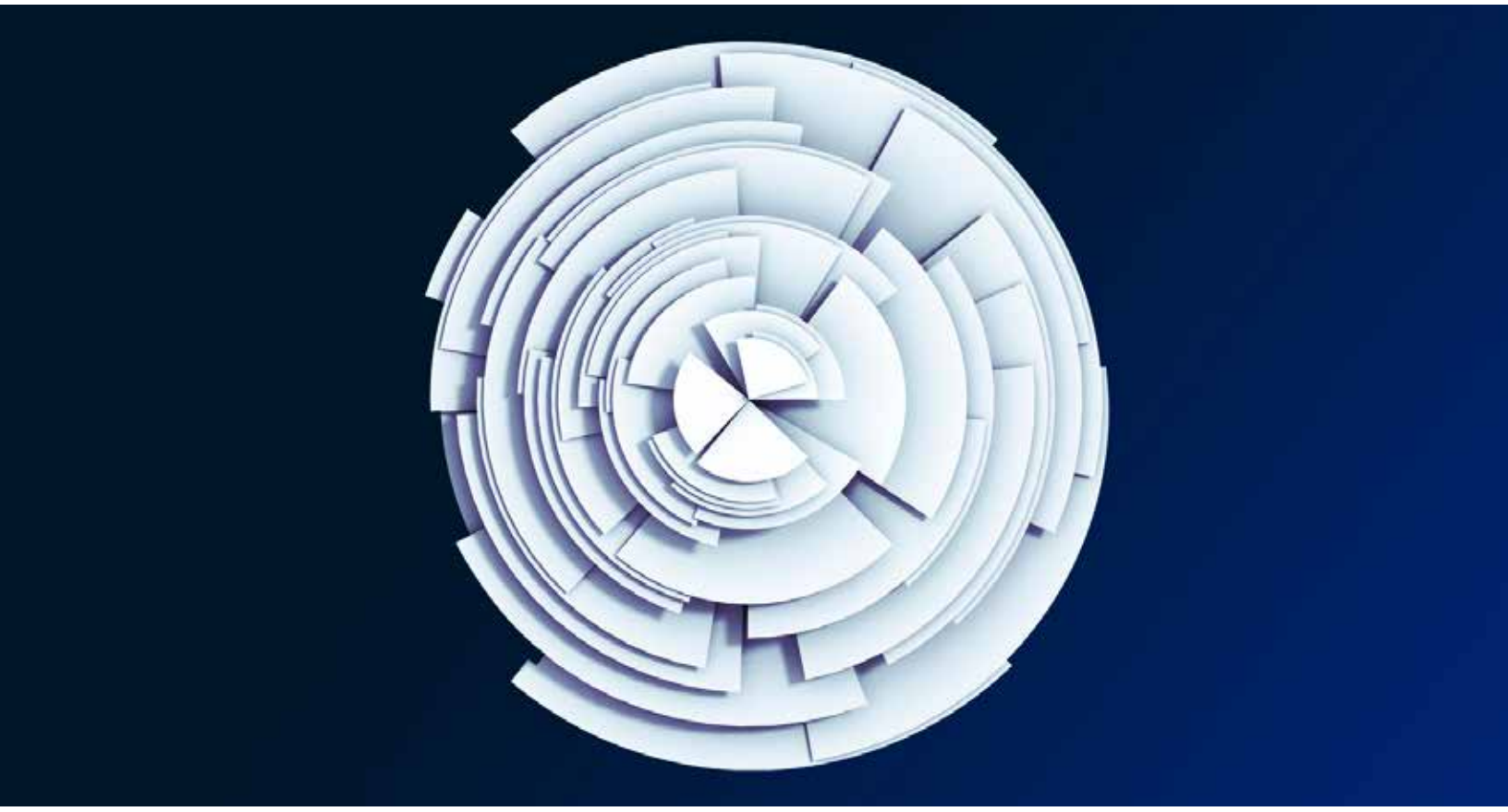
The authors wish to thank Vik Krishnan, Ellen Scully, Nate Lagacy, Kyle Snyder, Andrew Leon Hanna, Anna Obed, and Luis Diego Cabezas for their contributions to this article.

[10] Benedict Sheppard, Hugo Sarrazin, Garen Kouyoumjian, and Fabricio Dore, "The business value of design," *McKinsey Quarterly*, October 2018.
[11] For more on agile principles, see Hugo Sarrazin and Belkis Vasquez-McCall, "Agile with a capital 'A': A guide to the principles and pitfalls of agile development," February 2018.

Digital strategy in a time of crisis

Now is the time for bold learning at scale.

by Simon Blackburn, Laura LaBerge, Clayton O'Toole, and Jeremy Schneider



If the pace of the pre-coronavirus world was already fast, the luxury of time now seems to have disappeared completely. Businesses that once mapped digital strategy in one- to three-year phases must now scale their initiatives in a matter of days or weeks.

In one European survey, about 70 percent of executives from Austria, Germany, and Switzerland said the pandemic is likely to accelerate the pace of their digital transformation. The quickening is evident already across sectors and geographies. Consider how Asian banks have swiftly migrated physical channels online. How healthcare providers have moved rapidly into telehealth, insurers into self-service claims assessment, and retailers into contactless shopping and delivery.

The COVID-19 crisis seemingly provides a sudden glimpse into a future world, one in which digital has become central to every interaction, forcing both organizations and individuals further up the adoption curve almost overnight. A world in which digital channels become the primary (and, in some cases, sole) customer-engagement model, and automated processes become a primary driver of productivity—and the basis of flexible, transparent, and stable supply chains. A world in which agile ways of working are a prerequisite to meeting seemingly daily changes to customer behavior.

If a silver lining can be found, it might be in the falling barriers to improvisation and experimentation that have emerged among customers, markets, regulators, and organizations. In this unique moment, companies can learn and progress more quickly than ever before. The ways they learn from and adjust to today's crisis will deeply influence their performance in tomorrow's changed world, providing the opportunity to retain greater agility as well as closer ties with customers, employees, and suppliers. Those that are successfully able to make gains "stick" will likely be more successful during recovery and beyond.

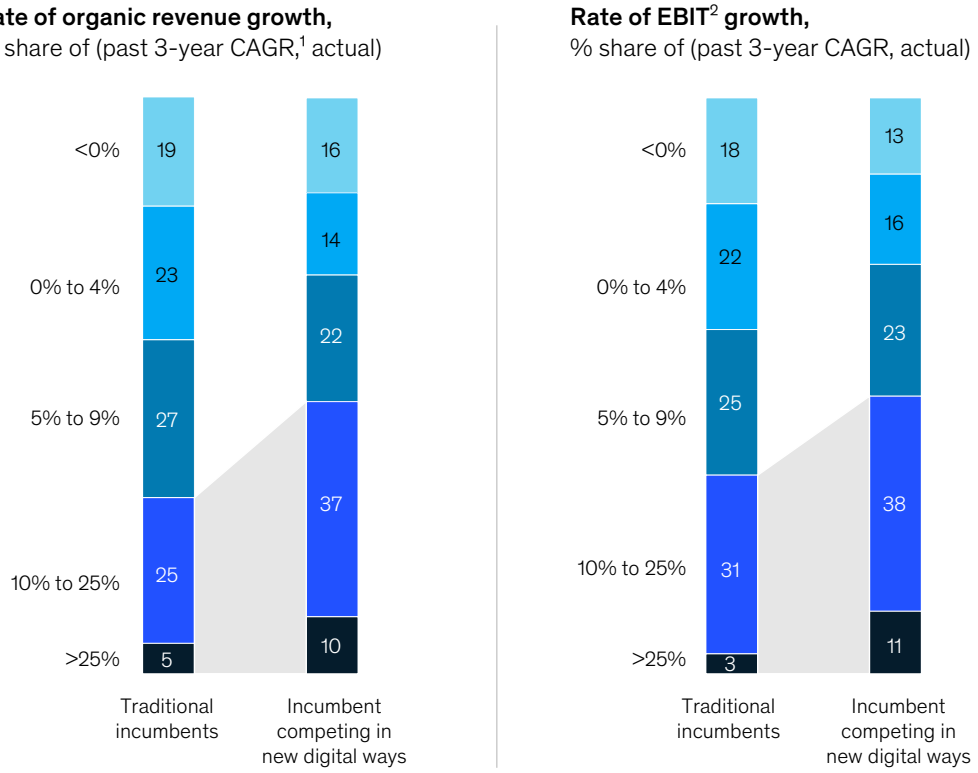
Now is the time to reassess digital initiatives—those that provide near-term help to employees, customers, and the broad set of stakeholders to which businesses are increasingly responsible and those that position you for a postcrisis world. In this world, some things will snap back to previous form, while others will be forever changed. Playing it safe now, understandable as it might feel to do so, is often the worst option.

A crisis demands boldness and learning

Every company knows how to pilot new digital initiatives in "normal" times, but very few do so at the scale and speed suddenly required by the COVID-19 crisis. That's because in normal times, the customer and market penalties for widespread "test and learn" can seem too high, and the organizational obstacles too steep. Shareholders of public companies demand immediate returns. Finance departments keep tight hold of the funds needed to move new initiatives forward quickly. Customers are often slow to adjust to new ways of doing things, with traditional adoption curves reflecting this inherent inertia. And organizational culture, with its deeply grooved silos, hinders agility and collaboration. As a result, companies often experiment at a pace that fails to match the rate of change around them, slowing their ability to learn fast enough to keep up. Additionally, they rarely embrace the bold action needed to move quickly from piloting initiatives to scaling the successful ones, even though McKinsey research shows bold moves to adopt digital technologies early and at scale, combined with a heavy allocation of resources against digital initiatives and M&A, correlate highly with value creation (Exhibit 1).

Exhibit 1

Bold, tightly integrated digital strategies are the most effective approach to digital transformations.



Note: Numbers may not sum to 100, because of rounding.
[1] Compund annual growth rate.
[2] Earnings before interest and taxes.

Source: 2017 Digital Strategy Survey

As the COVID-19 crisis forces your customers, employees, and supply chains into digital channels and new ways of working, now is the time to ask yourself: What are the bold digital actions we've hesitated to pursue in the past, even as we've known they would eventually be required? Strange as it may seem, right now, in a moment of crisis, is precisely the time to boldly advance your digital agenda.

A mandate to be bold

What does it mean to act boldly? We suggest four areas of focus, each of which goes beyond applying "digital lipstick" and toward innovating entirely new digital offerings, deploying design thinking and technologies like artificial intelligence (AI) at scale across your business, and doing all of this "at pace" through acquisitions (Exhibit 2).

New offerings

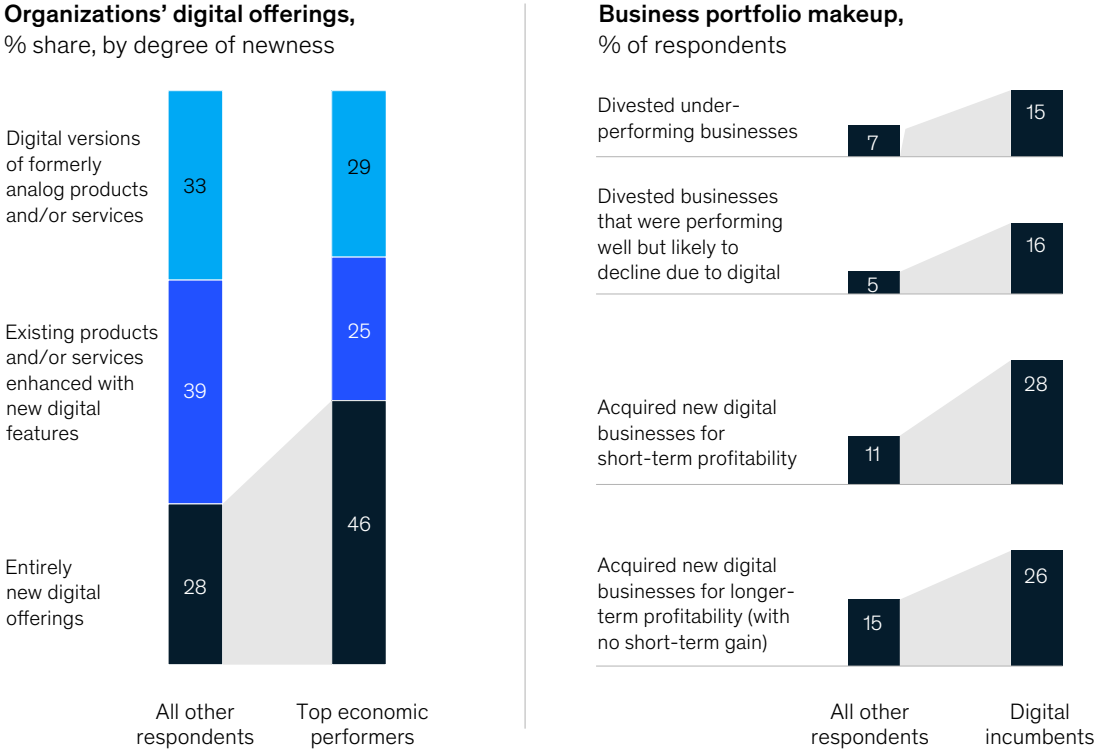
By now you've likely built the minimally viable nerve center you need to coordinate your crisis response. This nerve center provides a natural gathering point for crucial strategic information, helping you stay close to the quickly evolving needs of core customer segments, and the ways in which competitors and markets are moving to meet them. Mapping these changes helps address immediate risks, to be sure, but it also affords looking forward in time at bigger issues and opportunities—those that could drive significant disruption as the crisis continues. Just as digital platforms have disrupted value pools and

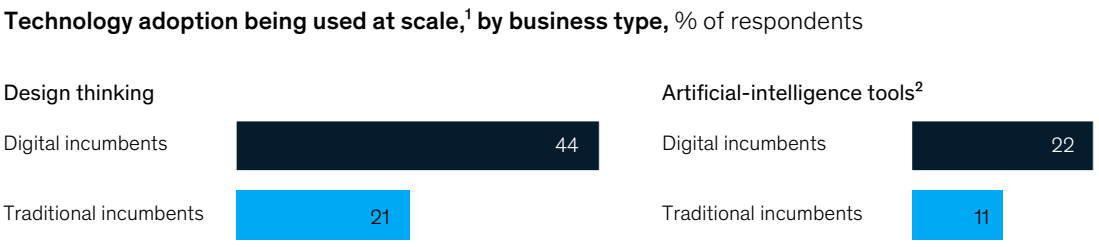
value chains in the past, the COVID-19 crisis will set similar “ecosystem”-level changes in motion, not just changes in economics but new ways of serving customers and working with suppliers across traditional industry boundaries.

In the immediate term, for example, most organizations are looking for virtual replacements for their previously physical offerings, or at least new ways of making them accessible with minimal physical contact. The new offerings that result can often involve new partnerships or the need to access new platforms and digital marketplaces in which your company has yet to participate. As you engage with new partners and platforms, look for opportunities to move beyond your organization’s comfort zones, while getting visibility into the places you can confidently invest valuable time, people, and funds to their best effect. Design thinking, which involves using systemic reasoning and intuition to address complex problems and explore ideal future states, will be crucial. A design-centric approach focuses first and foremost on end users or customers. But it also helps make real-time sense of how suppliers, channel partners, and competitors are responding to the crisis, and how the ecosystem that includes them all is evolving for the next normal emerging after the immediate crisis fades.

Exhibit 2

Organizations that are able to leverage things like design thinking into their new offerings during the crisis will see significant first-mover advantage.





[1] For example virtual assistants, computer vision, voice recognition.
[2] At scale in 1 business unit or function, or organization-wide.

Source: 2017 Digital Strategy Survey

Organizations that make minor changes to the edges of their business model nearly always fall short of their goals. Tinkering leads to returns on investment below the cost of capital.

Reinvent your business model at its core

Going beyond comfort zones requires taking an end-to-end view of your business and operating models. Even though your resources are necessarily limited, the experience of leading companies suggests that focusing on areas that touch more of the core of your business will give you the best chance of success, in both the near and the longer term, than will making minor improvements to noncore areas. Organizations that make minor changes to the edges of their business model nearly always fall short of their goals. Tinkering leads to returns on investment below the cost of capital and to changes (and learning) that are too small to match the external pace of disruption. In particular, organizations rapidly adopting AI tools and algorithms, as well as design thinking, and using those to redefine their business at scale have been outperforming their peers. This will be increasingly true as companies deal with large amounts of data in a rapidly evolving landscape and look to make rapid, accurate course corrections compared with their peers.

While the outcomes will vary significantly by industry, a few common themes are emerging across sectors that suggest "next normal" changes to cost structures and operating models going forward.

— *Supply-chain transparency and flexibility.* Near-daily news stories relate how retailers around the globe are experiencing stock-outs during the crisis, such as toilet-paper shortages in the United States. It's also clear that retailers with full supply-chain transparency prior to the crisis—as well as algorithms to detect purchase-pattern changes—have done a better job navigating during the crisis. Other sectors, many of which are experiencing their own supply-chain difficulties during the crisis, can learn from their retail counterparts to build the transparency and flexibility needed to avoid (or at least mitigate) supply-chain disruption in the future.

— *Data security.* Security has also been in the news, whether it's the security of people themselves or that of goods and data. Zoom managed to successfully navigate the rapid scaling of its usage volume, but it also ran into security gaps that needed immediate address. Many organizations are experiencing similar, painful lessons during this time of crisis.

— *Remote workforces and automation.* Another common theme emerging is the widely held desire to build on the flexibility and diversity brought through remote working. Learning how to maintain productivity—even as we return to office buildings after the lockdown ends, and even as companies continue to automate activities—will be critical to capturing the most value from this real-world experiment that is occurring. In retail, for example, there has been widespread use of in-store robots to take over more transactional tasks like checking inventory in store aisles and remote order fulfillment. These investments won't be undone postcrisis, and those that have done so will find themselves in advantaged cost structure during the recovery.

Boldly evolve your business portfolio

No company can accelerate the delivery of all its strategic imperatives without looking to mergers and acquisitions (M&A) to speed them along. This is particularly true with digital strategy, where M&A can help companies gain talent and build capabilities, even as it offers access to new products, services, and solutions, and to new market and customer segments.

More broadly, we know from research into economic downturns that companies that invest when valuations are low outperform those that do not. These companies divested underperforming businesses 10 percent faster than their peers early on in a crisis (or sometimes in anticipation of a crisis) and then shifted gears into M&A at the first sign of recovery.

In more normal times, one of the main challenges companies face in their digital transformations is the need to acquire digital talent and capabilities through acquisitions of tech companies that are typically valued at multiples that capital markets might view as dilutive to the acquirer. The current downturn could remove this critical roadblock, especially with companies temporarily free from the tyranny of quarterly earnings expectations. Because valuations are down, the crisis and its immediate aftermath may prove an opportune time to pick up assets that were previously out of reach. We are already seeing many private-equity firms actively looking to deploy large swaths of capital.

Learning at the pace of crisis

Moving boldly doesn't mean moving thoughtlessly, however. Bold action and the ability to learn are highly interrelated. The real-time ability to learn during a crisis is in fact the one ingredient that can turbocharge your ability to scale quickly.

Find a new cadence

In situations of extreme uncertainty, leadership teams need to learn quickly what is and is not working and why. This requires identifying and learning about unknown elements as quickly as they appear. Prior to the crisis, leading companies had already been increasing the cadence of their learning as part of a quickened organizational metabolism (Exhibit 3). Companies can look to their example as they work to adapt to change more rapidly during crisis times—and beyond.

Four areas of intervention can help companies learn more quickly during the crisis and the next normal that follows.

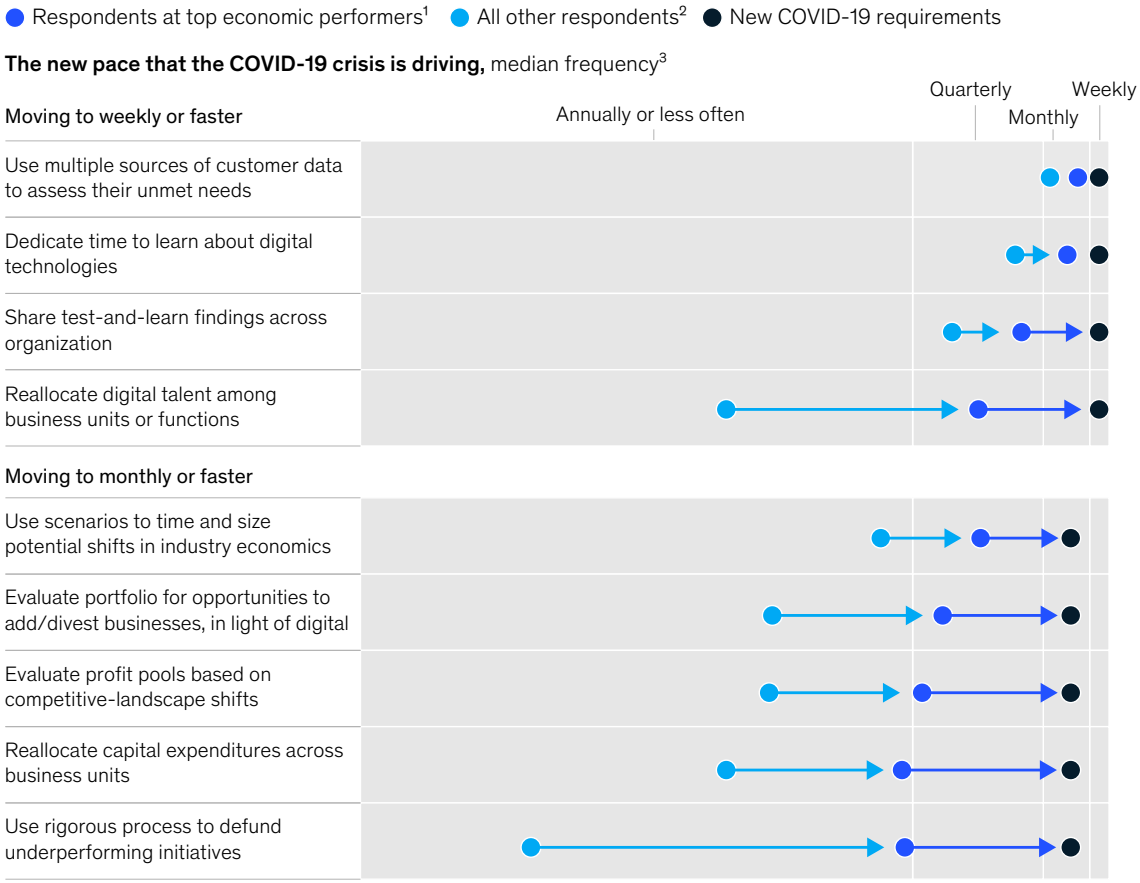
Quicken your data reviews

Start by evaluating the frequency with which you review the available data. You should be reviewing multiple sources of data on a weekly (or more frequent) basis to evaluate the shifting needs of your customers and business partners—as well as your own performance. Look to your crisis nerve center as a single source of truth for newly emerging data about your employees, your customers, your

Because valuations are down, the crisis and its immediate aftermath may prove an opportune time to pick up assets that were previously out of reach.

Exhibit 3

The COVID-19 crisis is causing a need for acceleration beyond what we had seen before, going from three tiers of speed down to two.



[1] Respondents who say their organizations have a top-decile rate of organic revenue growth (ie, of 25% or more in past 3 years), relative to other respondents; n = 138.
[2] n = 1,304.
[3] Frequencies shown are the median values from a histogram, which was constructed by assigning "weekly" responses a value of 1, "monthly" responses 2, "quarterly" responses 3, "annually" responses 4, "every few years" 5, and "never" 6. The question also asked about the frequency of evaluating M&A opportunities as part of strategy-setting discussions. These responses are not shown, because M&A typically requires a longer time frame than the other 10 operational practices tested, often due to regulatory reasons.

channel partners, your supply chains, and the ecosystems in which your company participates. Then turn to secure file-sharing technologies like Box and Zoom to remotely share and discuss insights from this faster pace of data review.

Focus on technology

The abrupt shift to virtual operations and interactions, both inside and outside your organization, also provides an opportunity to accelerate your pace of learning about, and adoption of, technologies with which your organization might have only begun to experiment. As experimentation scales, so does learning. The rapid shift to digital can also reveal potential trouble spots with your organization's current technology stack, giving you a sneak preview of how well your technology "endowment" is likely to perform going forward. Here are some factors to keep an eye on as you more quickly learn about and adopt new technologies:

— *Data security.* Are you experiencing breaches as you move to remote working and data sharing?

— *Scalability.* Where are the breaks and crashes happening as 100 percent of your interactions with customers, employees, and business partners go virtual?

— *Usability.* Right now customers and business partners often have little choice but to access your products or services through your new digital offerings. Their options will expand as we move beyond the crisis. How well will your new offerings stand up? If your current usability is low, experiment to improve it now, while you still have a captive audience to partner with and learn from.

Test and learn

In normal times, experimentation might sometimes seem a risky game. Changing the working models to which employees, customers, or business partners are accustomed can seem to risk pushing them away, even when those experiments take aim at longer-term gains for all concerned. The COVID-19 crisis, however, has made experimentation both a necessity and an expectation.

Start with the customer-facing initiatives that, while more complex, offer a larger upside. Use automation and predictive analytics to quickly and effectively isolate difficulties. Look for opportunities to standardize what you're learning to support scaling digital solutions across core business processes. Standardization can help accelerate projects by reducing confusion and creating common tools that broad groups of people can use.

Learning while scaling

As companies increase their rate of metabolic learning, they need to quickly translate what they're learning into at-scale responses. Scaling what you learn is always an obstacle in a digital transformation. We've had plenty to say regarding scaling up analytics, scaling up quality, or innovating at speed and scale. Here we'll simply highlight the role learning plays in your ability to scale your digital initiatives.

While companies frequently pilot new digital initiatives with the intention of learning from them before they roll out broadly, these experiments and pilots, in normal times, only test one dimension at a time, like the conversion/engagement/satisfaction rates of individual customers, the unit economics of a single transaction, or the user experience of a given digital solution. Whether they want to or not, companies in crisis mode find themselves in a different type of pilot: one of digital programs at massive scale. The rapid transition to full scale in many types of digital operations and interfaces has brought with it many challenges (for example, building and delivering laptops in under two weeks to all employees to enable 100 percent of them for remote working versus the 10 percent that were previously remote). But it also brings opportunities. At the broadest level, these include the prospect for real-time learning about where value is going in your markets and industry, the chance to learn and feed back quickly what's working in your operations and your agile organizational approach, and the opportunity to learn where it is you're more or less able to move quickly—which can help inform where you might need to buy a business rather than build one.

Observing interaction effects

Since scaling quickly requires changing multiple parts of a business model or customer journey simultaneously, now is a valuable time to observe the interaction effects among multiple variables.[1] For example, healthcare providers are facing an increased demand for services (including mental

[1] Interaction effects occur when two or more independent variables interact with at least one dependent variable. The effect of all the interactions together is often either substantially greater (or lesser) than the sum of the parts.

While companies frequently pilot new digital initiatives, these pilots only test one dimension at a time. Companies in crisis mode find themselves in a different type of pilot: one of digital programs at massive scale.

health and other non-COVID-19 presentations) at the same time that their traditional channels are restricted, all in the context of strict privacy laws. This has caused many providers to rapidly test and adopt telehealth protocols that were often nonexistent in many medical offices before, and to navigate privacy compliance as well as patient receptivity to engaging in these new channels. Providers are learning which types of conditions and patient segments they can treat remotely, at the same time that they're widely deploying new apps (such as Yale Medicine's MyChart) to accelerate the digital medical treatment of their patients.

Similarly, when a retailer rolls out, within a week, a new app for country-wide, same-day delivery, it's testing far more than one variability at a time, such as the customer take-up of that new channel. Because of the scale, it can learn about differences in adoption and profitability by region and store format. It can test whether its technology partners can scale across 1,000 stores. It can test whether its supplier base can adapt distribution to handle the new model. Shifting multiple variables simultaneously, however, also increases the degree of difficulty when it comes to interpreting the results—because you're no longer isolating one variable at a time. Companies who have already invested in AI capabilities will find themselves significantly advantaged. Making further investments now—even if you've yet to get going—with continue to pay out postcrisis as well.

Simplify and focus

Given the degree of complexity created by scaled experimentation, organizations need to find ways to simplify and focus to avoid being overwhelmed. Some of that is done for them as the crisis closes many physical channels of distribution and makes others impossible to access. But further streamlining is required along the lines of what is working, what isn't, and why. This is perhaps the first global crisis in which companies are in the position to collect and evaluate real-time data about their customers and what they are doing (or trying to do) during this time of forced virtualization. Pruning activities and offerings that are no longer viable while aggressively fixing issues that arise with your offerings will help increase the chance of keeping a higher share of customers in your lower-cost, digital channels once the crisis passes

Don't go it alone

Research indicates that people and organizations learn more quickly as a result of network effects. The more people or organizations that you add to a

common solution space, in other words, the more quickly learning occurs—and the faster performance improves. Some argue that these network effects occur in a so-called collaboration curve.

At a time of crisis, changing needs drive rapid shifts in employee mindsets and behaviors that play out as a greater willingness to try new things. Consider how you can best support the ways your talented employees learn. One option is to build or tap into platform-based talent markets that help organizations reallocate their labor resources quickly when priorities and directions shift—and help talented employees increase their rate of learning. Be sure to look not just within the boundaries of your own company but across enterprises to include your channel partners, your vendors, and your suppliers. Chances are they will be more willing than ever to collaborate and share data and learnings to better ensure everyone's collective survival.

It's often the case in human affairs that the greatest lessons emerge from the most devastating times of crises. We believe that companies that can simultaneously attend to and rise above the critical and day-to-day demands of their crisis response can gain unique insights to both inform their response and help ensure that their digital future is more robust coming out of COVID-19 than it was coming in.

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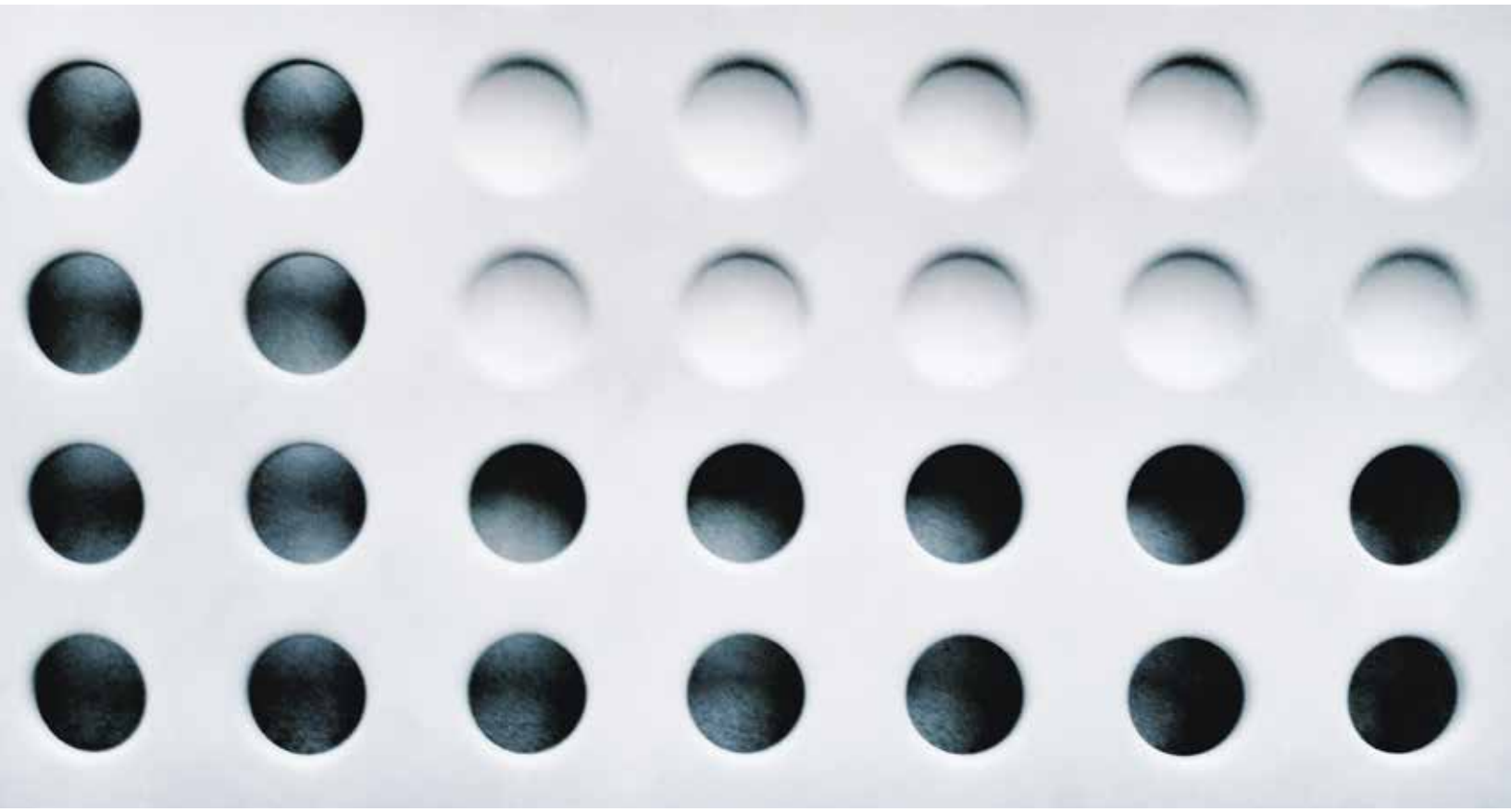
Building security into the customer experience

Companies need to secure their digital channels against malicious attackers—without creating a negative experience for their customers.

by Tucker Bailey, Rich Isenberg, Charlie Lewis, and David Ware



Before the coronavirus pandemic, online business interactions were as least as common as in-person interactions. Since the outbreak, they have become the norm. As companies prepare for postpandemic operations, many business leaders are thinking about the shape of the "new normal." One thing they can agree on is that the quality of the online customer experience will matter more than ever.

To meet demand, companies continue to expand their consumer-facing platforms. But consumers do not always enjoy the time they spend on them. Whether they are paying utility bills, ordering groceries, or keeping telehealth appointments, they have struggled with cumbersome and frustrating digital-authentication requirements. Much of their dissatisfaction stems from levels of complexity that companies have introduced to thwart cyberthreats. Yet those threats have if anything increased.

For these reasons, leading companies are stepping back to think about designing a secure customer journey—that is, a relatively engaging online and mobile experience for legitimate users that is also safe from cyberattacks and fraudsters. This is a worthwhile effort because the constituent programs and controls, including those for consumer-identity and access management (CIAM), have significant business implications.

The importance of consumer identity and access management

The importance of a secure customer journey has grown, along with the rising investments companies are making in digital business and online customer engagement. Most organizations have seen the number of customer accounts and the associated data sets proliferate—including those in industries, such as consumer packaged goods, that have not had large customer-facing digital channels.

The growth of the digital channel has also expanded the domain for cybercrime. Malicious actors have more opportunities to commit fraud or take over accounts, exploiting vulnerabilities associated with consumer-identity and access-management controls. Customers, meanwhile, expect an easier digital experience, including fast authentication and log-in, as well as seamless web and mobile interactivity. Companies able to offer all this while maintaining strong security standards will gain customer loyalty. An experience-driven secure journey can even become a competitive advantage.

Meanwhile, regulators are pressing organizations to secure the customer journey and to give more data privacy and flexibility in terminating accounts. Many organizations collect and use customer data to offer personalized digital experiences, but they have not taken effective measures to prevent the risks that data breaches pose to their customers' privacy.

Consumers also expect options to manage data-privacy settings and to have the data associated with their identities expunged by companies that hold them. New legislation will impose escalating penalties on companies that fail to gain user consent to collect and process data at nearly all stages of digital transactions. Current CIAM architecture may not readily accommodate such data-privacy requirements, so companies will have to make adjustments. Many still struggle with the existing requirements of the General Data Protection Regulation (GDPR). Now they will also have to address the new legislation, which further strengthens consumer protections. Customers, for example, will be able to refuse cookies that track behavior, avoid digital marketing unless they opt in, and file "right to be forgotten" requests.

Companies are essentially being asked to improve and adapt digital channels in several ways—to meet regulatory demands, to fulfill consumer expectations, and to ensure security and resilience against cyberattacks. The enabler will be the secure customer journey.

Five steps to create the secure customer journey

From discussions with leading companies, we have identified five steps that will create a best-in-class secure customer journey.

1. Compose "personas" and design appropriate customer journeys.

2. Select and apply CIAM controls for prioritized journeys.

3. Strike a reasonable balance between security and the customer experience.

4. Integrate design principles within the broader architecture.

5. Use strong governance mechanisms to support the secure customer journey.

1. Compose personas and design appropriate customer journeys

To design a best-in-class secure customer journey, organizations must understand consumers' paths of engagement for receiving products and services. This understanding is expressed as well-defined consumer personas, each with its own assigned characteristics, behavior, attitudes, and pain points (Exhibit 1). The steps those users take are mapped, whether they are logging in to a healthcare portal to book an appointment, submitting an insurance claim, or reviewing a credit-card bill and submitting a payment.

The catalog of user personas and journeys should be comprehensive enough to cover nearly all likely actual users and activities. User personas are designed to be representative of the different segments comprising the organization's customer

Exhibit 1

Leading companies design secure customer journeys based on representative personas and corresponding characteristics.

Example personas

	 **Ivan Ivanov** (Student, age 20)	 **Anna Williams** (Nurse, age 32)	 **Maria Hernandez** (Administrator, age 59)
User description and characteristics	Digital native; student, caretaker to an aging parent who does not speak fluent English; is not on the same insurance plan as his mother	Digital native, familiar with company's online platforms; nurse at a mid-size, rural healthcare system serving military veterans	Digital novice, but has trained extensively to understand payers' online platforms; administrator of e-claims and billing for a mid-size, urban healthcare system
User outlook	First-generation college student, who supports his aging mother by managing her healthcare; accompanies his mother to appointments, coordinates providers, and files insurance-claims reimburse-ment online	Facility is understaffed and so in addition to caring for patients, she acts as an administrative assistant, often copying data from physical records into the insurance portal to support claim-filing and billing	Typically spends her day processing billing and e-claims for her healthcare system; she often coordinates directly with patients who call in to update their insurance information; as needed to update claims, she also coordinates with colleagues at various provider and payer partner organizations
Illustrative pain points	Finds it difficult to remember his own and his mother's accounts; trouble registering the same phone number as multifactor authentication for multiple accounts	Anna does not have enough time to quality-check each of her uploads; occasionally she provides her username and password to a colleague to ensure uploads are completed in a timely manner	Is occasionally interrupted while filing a claim, and must re-authenticate and re-navigate to resume work; uses a generic account to log in

base. They are sometimes represented as a fictional individual, such as "Maria, a member of a health-insurance plan"; alternatively, they might be labeled by role ("insurance agent") or entity ("third-party vendor providing detailed data analytics using the organization's data"). Similarly, a comprehensive set of user actions—selecting a provider, submitting a claim, paying a bill—ensures the degree of nuance needed to reveal pain points and to design controls that avoid them.

Once the user personas and their corresponding transactions have been shaped, they can be mapped to the secure-journey *life cycle*: the totality of activities associated with the customer account. It underlies all transactions, regardless of industry. The secure-journey life cycle includes user registration; user life-cycle management, including username and password recall and reset; changes to user-account settings, such as multifactor authentication (MFA) preferences; user deprovisioning and account deactivation; user-account reactivation; and account termination.

The integration of the secure-journey life cycle with user personas and transactions helps organizations identify everything that might require additional controls. It also ensures appropriate trade-offs among convenience, experience, and security for each user segment.

2. Select and apply CIAM controls for prioritized journeys

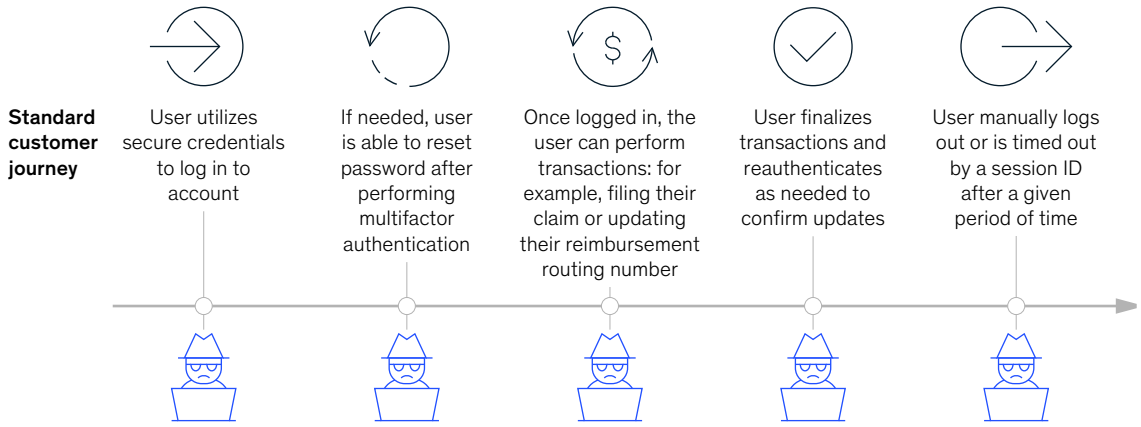
Strong CIAM controls are used across the secure-journey life cycle to reduce risk from cyberattacks. To combat fraud and prevent accounts from being taken over, identity-proofing (validating the identity of the user) and multifactor authentication have become standard controls during user registration and log-in. Organizations may take different approaches to implementing controls through the secure-journey life cycle, however, depending on their risk appetite, recent incidents, and the desired customer experience.

To prioritize controls, companies should determine their most important sources of risk. A bank concerned with a spike in fraudulent accounts, for example, may focus on controlling user registration by applying strong identity-proofing controls when accounts are created and for certain transactions. Leading organizations have

The integration of the secure-journey life cycle with user personas and transactions helps organizations identify everything that might require additional controls.

Exhibit 2

Sample 'attacker journey' bypasses consumer identity-access-management controls to commit fraud.



Standard customer journey	User utilizes secure credentials to log in to account	If needed, user is able to reset password after performing multifactor authentication	Once logged in, the user can perform transactions: for example, filing their claim or updating their reimbursement routing number	User finalizes transactions and reauthenticates as needed to confirm updates	User manually logs out or is timed out by a session ID after a given period of time
Fraudster approach	Fraudster purchases stolen credentials and attempts to access a user's account using credential stuffing (large-scale automated log-in requests)	Fraudster requests a password reset and redirects link to an account to which the fraudster gained access via social engineering (persuasion of users to divulge personal information)	Once logged in, the fraudster gains access to the claims portal and submits several fraudulent claims	The fraudster also reroutes reimbursements to a fraudulent account, bypassing the customer entirely	The fraudster continues to utilize the account to perpetrate fraud until discovered (if ever)
Control weakness exploited	High threshold for credential input allows fraudster to make many attempts to log in and request password reset	Lack of identity-proofing and device recognition allows fraudster to bypass or exploit multifactor-authentication requirement	No controls present: standard account settings enable the fraudster to perform transactions once account takeover has occurred	Lack of reauthentication requirements means fraudster can perform high-risk transactions without further identity checks, such as additional identity-proofing or multifactor authentication	Ineffective device-management controls allow fraudster to remain logged in indefinitely; limited deprovisioning allows access rights to remain active despite account dormancy

made these decisions by mapping "attacker journeys," much as they map user journeys: they imagine how a malicious actor might exploit a system's weaknesses and then solve for needed new controls (Exhibit 2).

Collaboration between business and cybersecurity teams can alleviate customer pain points related to the complexity of controls. Customer feedback can help organizations design controls thoughtfully. To reduce friction from rigid multifactor-authorization requirements, for example, customers could be allowed to choose their preferred multifactor method from a list of options. A customer-sensitive, risk-based approach to the selection and application of controls through the secure-journey life cycle will not only improve security but also support a positive customer experience.

3. Strike a reasonable balance between security and experience

When designing the secure journey, organizations will have to make trade-offs between security and the customer experience. If they achieve the

right balance, users will be offered a seamless journey—creating greater business opportunity—while the risk from exploitative attackers will fall significantly.

Here are some sample trade-off considerations (a fuller list is given in Exhibit 3):

— What level of consumer flexibility is appropriate for multifactor authentication? Customers might want fully customizable authentication, and their choices may gravitate toward less secure options, such as email-based links or text-message codes.

— How often should users have to reauthenticate after logging in? Reauthentication provides stronger security by repeatedly requiring accounts to be verified. When this is required for each transaction (such as log-in, bill payment, and rewards-portal access), customers can become discouraged and leave the site.

— For how long should user devices be recognized? Long recognition times increase the risk of account takeovers, especially if a device is lost or stolen. Friction could arise, however, if users are asked to complete the full authentication process for each session.

Every organization will need to balance its risk appetite, known customer pain points, and the desired experience across the secure-journey life cycle. A defined perspective on each of these trade-offs ensures effective decision making.

4. Integrate design principles within the broader architecture

Optimally designed secure customer journeys use architecture that is both flexible (dynamic on the back end) and conducive to new business value. Three design elements aid this process: centralized entity management, seamless cross-platform customer authentication, and speedy authentication.

Centralized entity management. This structure enables companies to use a single ID and set of credentials for each customer, valid across all consumer-facing digital engagement channels. This approach improves security: each customer's data are correlated with a single account, making it easier for the company to identify anomalous behavior. The customer experience is also enhanced, since customers have to recall relatively few credentials to perform the desired transactions. Companies can also respond more quickly to customer-initiated data-privacy requests, as each customer has their own identifier. This structure also creates business value, as all pertinent data are correlated with the originating ID, irrespective of channel. That increases opportunities to offer tailored customer services or behavior-based recommendations.

Seamless cross-platform customer authentication. A single standardized log-in for all channels reduces friction for the customer. The experience of the brand's entire digital presence is thus an integral one. From an architectural standpoint, organizations can make any needed modifications (such as sunsetting a legacy system or adding or removing a vendor) easily and quickly.

Speedy authentication. Rapid movement through authentication is desirable for customers and organizations alike. Architecturally, this means offering controls suited to existing customer behavior, potentially including biometrics or pattern-based authentication for mobile applications. To improve the customer experience, the design should also permit the effective layering of controls, such as identity proofing and multifactor authentication. MFA, for example, might be triggered only after certain thresholds have been reached, rather than for each transaction the user undertakes during a session.

5. Support the secure customer journey with strong governance

Strong governance is an integral part of the best-in-class approach to the secure customer journey. This means that an organization clearly defines the scope and activities of the secure-journey program, aligns on participation and decision-making responsibilities, and develops the means to measure the program's success. Governance bodies should bring together interested parties from the executive leadership, cybersecurity, and the business to ensure that feedback is accurately reflected in a timely manner.

Exhibit 3

Trade-offs should be considered carefully, to preserve security while promoting a positive customer experience.

Sample trade-offs between customer experience and security, by control area

Control	Experience-driven approach	OR	Security-forward approach	Recommendation
Single identifier for each customer	Emphasize customization, with customer service based on associated behavior patterns		Focus on user behavior analytics to refine account monitoring for abnormalities or fraud	Utilize a single identifier for each customer and identify priority use cases to determine whether to improve business analytics or build stronger account monitoring
Multifactor authentication (MFA)	Offer many options for MFA, including voice or text messages, email factors, biometrics, and pattern recognition		Enforce use of highly secure MFA methods, including tokens or device recognition and biometrics; combine with identity-proofing techniques	Offer a mix of MFA options in addition to identity-proofing techniques; if needed, suggest a more secure MFA to avoid reauthentication
Reauthentication	Limit need for reauthentication by only requiring MFA for specific transactions (eg, updating billing payment)		Require reauthentication for each transaction to ensure the user's identity has remain unchanged throughout the session	Use triggers for reauthentication when abnormal behavior is detected (such as many attempts to reset a password) and require reauthentication for highly sensitive transactions (eg, resetting a billing method)
Lockout policies	Allow users five or more attempts to provide credentials before account lock occurs requiring administrative support		Allow only one or two attempts to reduce risk of brute-force attacks despite need for administrative support	Allow three attempts and impose a "soft lock" (eg, need identity-proofing) before requiring administrative support
Session policies	Enable longer session times to allow users to perform several transactions without timing out		Limit session time to a minimum, allowing users to refresh tokens if session extension is needed	Designate session times based on a user group's needs (eg, in healthcare, doctors and administrators may need longer sessions than patients)
Device recognition	Allow long device-recognition thresholds (eg, 3 months or more) to allow easy customer log-in over time		Heavily restrict device recognition thresholds (eg, 24 hours) to limit risk of device manipulation or exploitation and account takeover	Restrict high-risk users to 24-hour threshold (those with access to customer datasets or databases); for users with access only to their own data, use a reasonable threshold (eg, 2 weeks)
Password policy	Impose a strong password policy and only require reset if a user requests it		Use a strict password policy and enforce password reset if users have been dormant for a given period of time	Require users to comply with a strong password policy and reset if certain conditions are met (eg, known fraud, account dormancy)
Deprovisioning	Provide a seamless log-in experience for users regardless of account status, including long dormancy allowances		Deprovision users after a short dormancy period (eg, 6 months); require credentials to regain access	Use a reasonable threshold to deprovision users after a period of dormancy; ensure credentials have not been compromised during reprovisioning (if applicable)
Account termination	Allow users to request account termination if desired for any reason		Prevent users from requesting account termination unless specific conditions are met (eg, fraud, data-privacy request); revoke credentials immediately and restrict future use	Ensure strict termination requirements to prevent malicious actors from initiating termination during account takeover or fraud
Data privacy compliance	Build consumer identity and access management architecture that facilitates an easy response to data privacy requests, including customer ability to review and track requests		Ensure systems meet data privacy requirements; require reauthentication to fulfill data-privacy requests	Fulfill data-privacy requirements and ensure customers feel empowered to initiate requests to be forgotten if needed; utilize controls for identity-proofing before performing requests

Getting there

The constituent parts of this approach—the full user journey, as well as authentication, governance, and technology—can be designed rapidly by a team drawn from top management, business leaders, and security specialists. The groundwork for the design includes a technology review and consumer research. The supporting technical requirements need to be determined and decisions made about using in-house or vendor-based technology.

On the consumer side, the user population needs to be identified and segmented, with pain points isolated so that the personas and their activities can be mapped. Organizations can then make an inventory of existing and potentially relevant controls, prioritizing them according to decisions to balance the customer experience with security. Finally the technical details can be specified, including underlying data-flow diagrams, technical-process flows, and customer-experience design elements.

In parallel with the design process, a governance committee should meet regularly to review progress, make necessary decisions, and begin developing performance metrics. Collaboration between business and technical people on each aspect of the secure-journey design and governance process will help ensure that the program creates a strong customer experience, without compromising security.

As the complexity of the digital economy grows and companies expand their digital footprint, the need for an optimal customer experience within the secure customer journey will only grow. The five-part approach we suggest will help companies strike the right balance between the digital experience and digital security across the customer journey—to increase customer satisfaction and business opportunities alike.

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The authors wish to thank McKinsey alumnus Celina Stewart for her contribution to this article.

Chapter 4

Social and environmental leadership in the next normal

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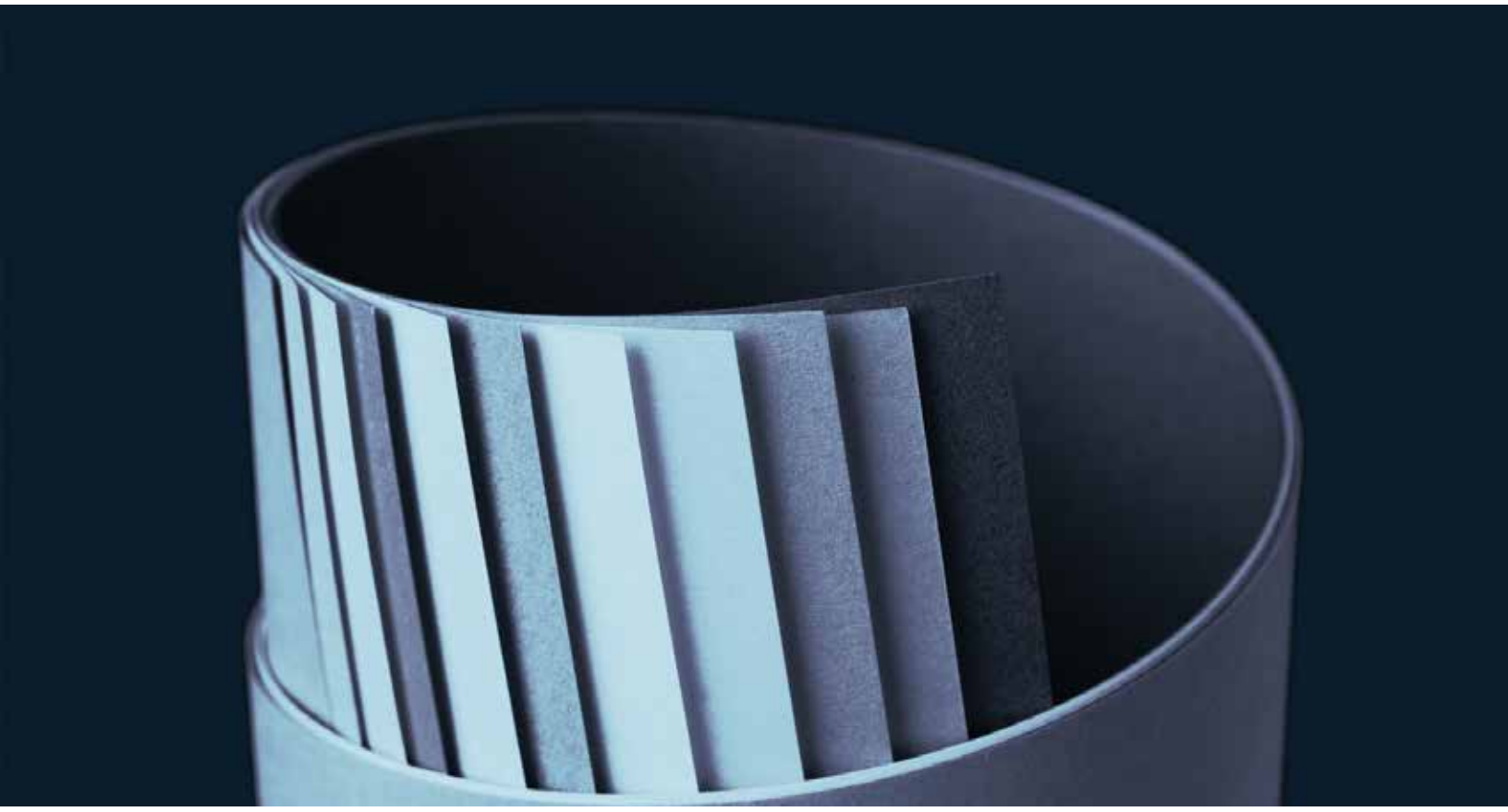
Diversity still matters

Diversity and inclusion are at risk in the crisis— but are critical for business recovery, resilience, and reimagination.

by Kevin Dolan, Vivian Hunt, Sara Prince, and Sandra Sancier-Sultan



COVID-19 is confronting companies around the world with a daunting degree of disruption. In the immediate term, some face devastating losses of revenue, dislocations to operations and supply chains, and challenges to liquidity and solvency. Others are coping with enormous unexpected spikes in demand. In the medium term, we can expect material and lasting shifts in customer markets, regulatory environments, and workforce deployments. Leaders and managers will need a great deal of resolve and resilience as they seek to navigate an economically and socially viable path toward a "next normal."

The lessons from previous crises tell us there is a very real risk that diversity and inclusion (D&I) may now recede as a strategic priority for organizations.[1] This may be quite unintentional: companies will focus on their most pressing basic needs—such as urgent measures to adapt to new ways of working; consolidate workforce capacity; and maintain productivity, a sense of connection, and the physical and mental health of their employees.

Yet we would argue that companies pulling back on D&I now may be placing themselves at a disadvantage: they could not only face a backlash from customers and talent now but also, down the line, fail to better position themselves for growth and renewal. Some of the qualities that characterize diverse and inclusive companies—notably innovation and resilience—will be much in need as companies recover from the crisis.[2] Indeed, it could help companies to unlock the power of D&I as an enabler of business performance and organizational health and contribute to the wider effort to revive economies and safeguard social cohesion. In this article, we explore what companies can do to ensure that D&I remains a core part of their agendas during the downturn, and beyond.

The benefits of D&I are clear now—and that doesn't change in a crisis

Our research has repeatedly shown that gender and ethnic diversity, inclusion, and performance go hand in hand. Our latest report, *Diversity wins: How inclusion matters*, reinforces the business case.[3] Over the past five years, the likelihood that diverse companies will out-earn their industry peers has grown. So have the penalties for companies lacking diversity. Another forthcoming McKinsey report, about Latin America, highlights the strong correlation between gender diversity and positive behavior directly related to better organizational health—which, in turn, is associated with better business performance. Similarly, our previous research found that women tend to demonstrate, more often than men, five of the nine types of leadership behavior that improve organizational performance, including talent development. Women also more frequently apply three of the four types of behavior—intellectual stimulation, inspiration, and participative decision making—that most effectively address the global challenges of the future.

The bulk of this research on the business case for diversity was carried out during the past five years, when economic conditions have been mostly favorable. Yet the evidence from past crises shows that diversity can also play an important role in recovery. For example, several reports have shown that in the 2008–09 global financial crisis, banks with a higher share of women on their boards were more stable than their peers. This research also suggests that banks run by women might be less vulnerable in a crisis.[4] And we are seeing, right now, that cities and countries with women leaders are thought to be facing the COVID-19 pandemic more successfully than those without them.[5] It may be,

[1] *Your Brain at Work*, "Want to thrive through crisis? Focus on diversity & inclusion," blog entry by Paulette Gerkovich, April 23, 2020, neuroleadership.com.
[2] Sylvia Ann Hewlett, Melinda Marshall, Laura Sherbin, "How diversity can drive innovation," *Harvard Business Review*, December 2013, hbr.org.
[3] As a result of data limitations, the performance analysis for *Diversity wins* was limited to gender and ethnic diversity. Given the importance of considering D&I more broadly, McKinsey has conducted separate research to explore challenges and opportunities regarding LGBTQ+ inclusion. The full report is available on McKinsey.com.
[4] See David Lipton, "Boosting growth through diversity in financial leadership," International Monetary Fund, April 13, 2019, imf.org; and Toddi Gutner, "Banks run by women might be less vulnerable in a crisis," *Wall Street Journal*, February 21, 2016, wsj.com.
[5] Tomas Chamorro-Premuzic, "Are women better at managing the COVID19 pandemic?," *Forbes*, April 10, 2020, forbes.com.

some researchers conclude, that female leadership has a trust advantage giving women the edge in certain crisis situations.[6]

The challenge: Why D&I may lose momentum during the COVID-19 crisis

Progress on D&I could slow down during and after the crisis unless companies consciously focus on advancing diversity and fostering inclusion. The importance of such continuity is quite intuitive, but it was not the norm during the 2008–09 financial crisis: although gender-diversity programs were not officially deprioritized, they did not benefit from additional effort or interest, and programs targeting all employees became a higher priority among some of the companies in our sample.[7] Early signs, this time around, are not encouraging. One pulse survey of D&I leaders, for example, found that 27 percent of them report that their organizations have put all or most D&I initiatives on hold because of the pandemic.[8]

Representation at risk. As the crisis makes jobs vulnerable, diverse talent may be most at risk. To be sure, we may see an uptick in the number of jobs and, possibly, in pay for some gendered occupations—such as healthcare providers on the front line of public service.[9] But these effects are likely to be offset by job losses in the private sector, where low-skill, low-paying jobs in retailing, leisure, and hospitality may be hard hit.

Furthermore, the crisis will probably intensify existing workplace-automation trends that are already expected to take a greater toll on women and minorities. While previous research from the McKinsey Global Institute has shown that automation has a more or less equal net impact on the jobs of women and men, it will vary greatly across sectors and regions. Pervasive barriers to the development of skills and access to technology must be overcome if women and minorities are to get new job opportunities, especially in the tech sector. Avenues for economic advancement will continue to be a challenge for them. And because they typically work in medium- and lower-paid occupations, and demand for such roles is expected to shrink, they are likely to bear the brunt of the transition.[10]

We can see this playing out already in the crisis. McKinsey research has found that 39 percent of all jobs held by Black Americans—compared with 34 percent by white ones—are now threatened by reductions in hours or pay, temporary furloughs, or permanent layoffs. That is seven million jobs.

Eroding inclusion. A second key risk is that remote-working conditions may erode inclusion. Sending staff home to work, in a bid to stem the spread of COVID-19, risks reinforcing existing exclusive behavior and biases and undermining inclusive workplace cultures. McKinsey research analyzing the lessons of remote working in China—an early mover because it was at the vanguard of efforts to contain the spread of COVID-19—found that teams or whole business units working remotely can quickly become confused and lose clarity. Isolation leads to uncertainty about whom to talk with on specific issues and how and when to approach colleagues, leading to hold-ups and delays. In such a climate, there is a risk of amplifying noninclusive dynamics.

Remote-working norms, particularly video-conferencing, could make it difficult for some personnel, such as LGBTQ+ employees, to avoid publicly sharing aspects of their home lives they might not be comfortable revealing to all of their colleagues. Working from home also may put women and minorities at a disadvantage, given challenges such as broadband access, the availability (or lack) of home-office space, and childcare and home-schooling duties.[11]

[6] "'Female leadership trust advantage' gives women edge in some crisis situations," *ScienceDaily*, June 26, 2019, sciencedaily.com.
[7] *Women Matter 3: Women leaders, a competitive edge in and after the crisis*, September 2009, McKinsey.com.
[8] Carol Morrison, "Don't let the shift to remote work sabotage your inclusion initiatives," i4cp, March 31, 2020, i4cp.com.
[9] Robert Booth, "Ministers urged to raise pay for care home staff during COVID-19 crisis," *Guardian*, April 14, 2020, theguardian.com.
[10] See "The future of women at work: Transitions in the age of automation," McKinsey Global Institute, June 2019, McKinsey.com.
[11] Lindsey Jacobson, "As coronavirus forces millions to work remotely, the US economy may have reached a 'tipping point' in favor of working from home," CNBC, March 23, 2020, cnbc.com.

The chance: Leveraging D&I in the crisis

These challenges, if unaddressed, could undermine corporate responses to the COVID-19 crisis. Leaders and organizations will need enhanced problem-solving skills and vision to address dislocations in businesses, industries, and regulatory environments. Strategic agility—the ability to spot and seize game changers—is likely to be a mission-critical trait. It is also likely to be stronger in organizations that can draw on the full spectrum of diverse talent available to them.

Our research and the research of others suggest that when companies invest in diversity and inclusion, they are in a better position to create more adaptive, effective teams and more likely to recognize diversity as a competitive advantage.[12] Meanwhile, other companies might struggle. Their responses to D&I during the COVID-19 crisis could mirror the broader stances toward D&I described in our report *Diversity wins*, where three broad categories of approaches emerged.

— *Diversity winners and fast movers.* One-third of the companies in our data set have made significant D&I gains over the past five years and are increasingly pulling ahead of their industry peers in financial performance. Our experience with companies in this group suggests that many of them will view their existing strengths in D&I as a way to bounce back more quickly from the crisis while they actively seek to boost representation and inclusion.

— *Moderate movers and resting on laurels.* A middle group of companies have made only modest D&I gains in the past five years. It's easy to imagine their continuing to tread water during the crisis, perhaps seeking to protect their gains but doing little new to build on or increase them.

— *Laggards.* Companies in this broadest group have progressed little, remained static, or regressed in their gender and ethnic representation in the past five years. With no momentum, most could well deprioritize D&I efforts during the COVID-19 crisis.

The crisis, in other words, will interact with existing D&I trends. Further separation between diversity leaders and laggards is possible, and companies in the muddy middle could make huge progress (exhibit). Such organizations, by raising their D&I sights, should be able to upgrade their "license to operate" and realize the goals of recovery, resilience, and reimagination.

For business executives the world over, this may prove to be a defining moment in their careers. They must not only protect the health of their employees and customers but also navigate far-reaching disruption to their operations, plan for recovery, and prepare to reimagine their business models for the next normal. When leaders and companies reaffirm their commitment to D&I, they can seize the moment as they stretch for gains in five key domains where, our research suggests, D&I frequently makes a significant difference to an organization's performance.

— *Opportunity 1: Winning the war for talent.* Organizations can ensure that they hold onto their top talent by monitoring the demographic profile of their changing workforce and ensuring that diverse talent isn't lost. The shift to remote working could offer advantages here. Remote working may have some downsides, as we've mentioned earlier, but its benefits, particularly increased flexibility, may play a more significant role in the long term of retaining women, who often shoulder a disproportionate share of family duties.[13] The wholesale shift to remote working is also opening up access to a whole new array of talen$_t$ that may not have been available to companies previously: working parents, dual-career couples, and single parents are all better suited to a flexible workplace and remote working.

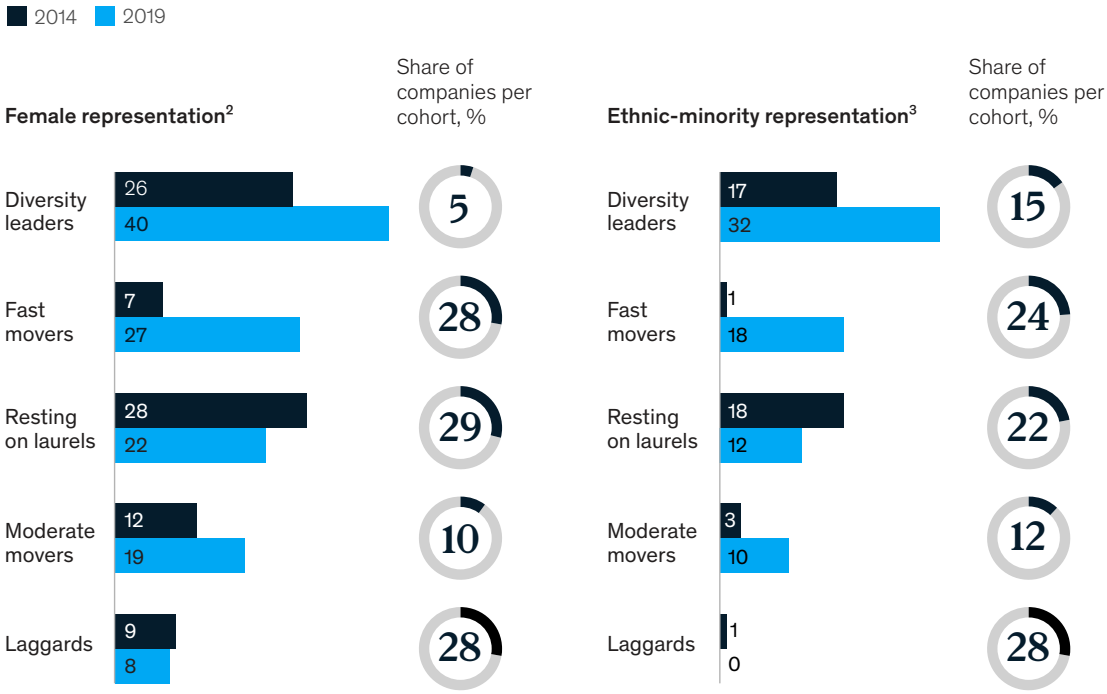
[12] Heidi Grant, Jacqui Grey, and David Rock, "Diverse teams feel less comfortable—and that's why they perform better," *Harvard Business Review*, September 22, 2016, hbr.org.

[13] Alisha Haridasani Gupta, "Why this economic crisis differs from the last one for women," *New York Times*, March 31, 2020, nytimes.com.

Exhibit

Progress in UK and US executive-gender and -ethnicity diversity since 2014 shows stark differences among cohorts.

Representation of diversity, 2014 and 2019, by cohort,[1] %



[1] We would expect this distribution of companies and diversity progress across the cohorts to vary in the rest of the world, depending on macro factors as well as industry-specific and company-specific factors.
[2] Total cohort analysis, n = 365; US and UK.
[3] Total cohort analysis, n = 241; US and UK. Absolute representation, not relative to fair share. Figures may not sum to 100%, because of rounding.

— *Opportunity 2: Improving the quality of decision making.* In the face of major dislocations, enhanced problem-solving skills and vision will be needed to reappraise business models, competitive dynamics, and the external environment. Our research has demonstrated that organizations investing in diversity and inclusion are strongly positioned in this regard, in part because diversity brings multiple perspectives to bear on problems, thereby boosting the odds of more creative solutions. Diverse companies are also more likely to have employees who feel they can be themselves at work and are empowered to participate and contribute. In addition, research shows that diverse teams focus more intently on facts and process them more carefully. What's more, "they may also encourage greater scrutiny of each member's actions, keeping their joint cognitive resources sharp and vigilant."[14]

— *Opportunity 3: Increasing customer insight and innovation.* Research also indicates that diverse teams are more innovative—stronger at anticipating shifts in consumer needs and consumption patterns that make new products and services possible, potentially generating a competitive edge. For example, one study found

[14] Heidi Grant and David Rock, "Why diverse teams are smarter," *Harvard Business Review*, November 4, 2016, hbr.com.

that over a two-year period, companies with more women were more likely to introduce radical new innovations into the market.[15] A separate study found that businesses run by culturally diverse leadership teams were more likely to develop new products than those with homogenous leadership.[16] Similarly, our forthcoming research on Latin America has found that employees in companies committed to diversity are about 150 percent more likely to report that they can propose new ideas and try new ways of doing things.

— *Opportunity 4: Driving employee motivation and satisfaction.* McKinsey research on Latin America showed that companies perceived as committed to diversity are about 75 percent more likely to report a pro-teamwork leadership culture.[17] Instead of letting remote working erode inclusion during this crisis, companies can reaffirm their commitment to D&I by capitalizing on its advantages in flexibility and access to talent. They can also use society-wide feelings of solidarity, which are growing in the crisis, to build agile, inclusive work cultures going forward. Proponents of D&I should show the leaders and managers of their companies the business benefits of D&I and the critical importance of inclusive leadership to ensure that all employees feel valued and motivated at a time of increased vulnerability. One tangible way to achieve this goal may be to consider offering hazard pay to help compensate for socioeconomic inequities associated with, for example, the fact that minorities are disproportionately represented in essential work categories, which involve lower pay and more exposure to infection for them and their families.[18]

— *Opportunity 5: Improving a company's global image and license to operate.* Companies that maintain, or even increase, their focus on D&I during the downturn are likely to avoid the risk of being penalized in its aftermath—for example, by losing customers, struggling to attract talent, and losing government support and partnerships. Companies that seek to emphasize solidarity and purpose and reach beyond the organization to support the broader economy and society stand to gain. Diverse organizational environments can have a positive impact on individual and collective behavior, boosting collaboration and creativity. Companies can take steps to seed these benefits more widely. For organizations, this can take the form of cushioning the impact of the crisis on society by donating money to hard-hit areas or leading upskilling and reskilling efforts, such as instruction in coding for poor communities. There are already many examples of small and employee-driven initiatives to support neighborhoods, towns, and cities, of companies encouraging employees to give back to them in nonfinancial ways (such as volunteering), and of larger corporations coming together to find innovative ways to minimize the pandemic's impact on public health and to limit disruptions to economies and supply chains.[19]

If there is one thing this crisis is demonstrating, it's that the interdependencies among business, government, and society can no longer be ignored. To survive and thrive, business needs healthy consumers, functional societies, and a diverse and inclusive workforce. This crisis helps us to understand diversity in a broader context. Rather than restricting our discussions about D&I to a narrow focus on representation in organizations, we can talk about how to welcome, include, consider, and engage people from all backgrounds in all walks of life. Organizations that do so are likely to be rewarded in the longer term.

Seizing the moment to forge a new commitment to equality

The experience of diversity winners we have studied has shown that if companies deploy a systematic approach to D&I and don't fear bold action to foster

[15] Grant and Rock, "Why diverse teams are smarter," *Harvard Business Review*.
[16] Grant and Rock, "Why diverse teams are smarter," *Harvard Business Review*.
[17] Forthcoming McKinsey report on Latin America.
[18] Aria Florant, Nick Noel, Shelley Stewart III, and Jason Wright, "COVID-19: Investing in Black lives and livelihoods," April 2020, McKinsey.com.
[19] Katie Clift and Alexander Court, "How are companies responding to the Coronavirus crisis?," World Economic Forum, March 23, 2020, weforum.org.

inclusion and belonging, they are most likely to reap the rewards. We believe that now is the time to be even bolder.

After the 2008–09 crisis, when we asked companies what they believed to be the key organizational dimensions needed to emerge successfully from a crisis, most emphasized the importance of the leadership team and the ability to define a clear direction for the company going forward—both dimensions in which diversity plays a vital role. Now is the time for leaders to reaffirm their commitment to D&I and to reap its benefits not just because it is likely to give them a better chance at recovery but also because it is the right thing to do.

As we saw during World War II—when many married women with children joined the labor force for the first time—big crises can bring about big change. At this watershed moment, there is an opportunity to forge a new commitment to equality and fairness that will ensure more prosperity for all.

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COVID-19: Investing in Black lives and livelihoods

An unfolding public-health and economic disaster, the COVID-19 pandemic will disproportionately impact Black Americans—unless stakeholders respond immediately.

by Aria Florant, Nick Noel, Shelley Stewart III, and Jason Wright

Amid the rising deaths, infections, and possible economic implosion of the COVID-19 pandemic, our country's most pressing need is to save lives and arrest any plunge into a prolonged recession or depression. The crisis is already hitting major social and economic systems, yet Black Americans will experience a disproportionate share of the disruption—from mobidity and mortality to unemployment and bankruptcy.

McKinsey analysis shows that Black Americans are almost twice as likely to live in the counties at highest risk of health and economic disruption, if or when the pandemic hits those counties.[1] To assess disruption, we evaluated five indicators: underlying health conditions, poverty rate, number of hospital beds, percentage of people in severe housing conditions, and population density. This integrated health and economic perspective describes which counties are likely to take a "one-two punch" due to the pandemic and could get trapped in a vicious cycle of economic instability and poor health.

In addition, we found that about seven million jobs—39 percent of all those held by Black Americans, as compared with 34 percent for white Americans—are now threatened by reductions in hours or pay, temporary furloughs, or permanent layoffs.[2]

Indeed, the pandemic underscores the consequences of the structural disparities that have persisted in this country for centuries while presenting an opportunity to invest in building more equitable systems that will benefit society overall. In this article, we outline some of the key findings from our forthcoming report on COVID-19 and Black America.

Places

Because the situation continues to evolve, projections are necessarily, at best, probabilistic. Even so, our analysis suggests that Black Americans are 1.4–1.8 times as likely to live in counties at highest risk of disruption from the pandemic (exhibit). Thirty percent of the country's population lives in these high-risk counties, compared with 43 percent (17.6 million) of Black Americans. The counties in the highest-risk decile are home to only 10 percent of the US population as a whole—but to 18 percent of the Black population.

Health and lives

Nationally, Black Americans are not only more likely to be at higher risk for contracting COVID-19 but also have lower access to testing. In addition, they are likely to experience more severe complications from the infection; Black Americans are on average about 30 percent likelier to have health conditions that exacerbate the effects of COVID-19.[3]

Unfortunately, Black Americans are overrepresented in nine of the ten lowest-paid, high-contact essential services, which elevates their risk of contracting the virus. Thirty-three percent of nursing assistants, 39 percent of orderlies, and 39 percent of psychiatric aides,[4] are Black. Black workers are putting their lives and health on the line to provide goods and services that matter to our society.

Although little testing data are available, as of April 4th, ten of the 16 states where 65 percent of Black Americans live were below the median testing rate for the country as a whole.[5] Black Americans

[1] Counties' risk of disruption related to the pandemic is measured by comorbidities that predispose residents to complications associated with COVID-19, poverty rates, population density, number of hospital beds, and the share of residents in severe housing conditions (characterized by overcrowding, a lack of access to kitchen and plumbing facilities, and rent burdens). For each of these indicators, we ranked counties into 10 deciles, with each decile representing 10% of the population, and assigned a decile score for that indicator. Then, we created a combined index score based on the individual decile scores, and assigned a final, combined decile score to each county. Each indicator is equally weighted. Age was not included. This analysis does not include epidemiological forecasting. Counties do not have to have identified cases of COVID-19 to qualify for this analysis. Sources include: 2017 CMS-LDS Medicare FFS data and DRG 835/837 data © 2020 DR/Decision Resources, LLC. All rights reserved. Reprinted with permission. Reproduction for non-commercial use is permitted if attributed; American Community Survey, 5-year estimates 2013– 2018. Poverty status in the past 12 months; U.S Census Bureau. 2010 Census. *Population, Housing Units, Area, and Density*; American Community Survey, 5-year estimates 2013–2018. Total Population; CMS Hospital Compare and Medicare Provider Cost Reports; Robert Wood Johnson Foundation, *US Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy*.

[2] McKinsey Global Institute analysis.

[3] Centers for Disease Control and Prevention; includes cardiovascular disease, asthma, diabetes, chronic kidney disease, hypertension, and obesity.

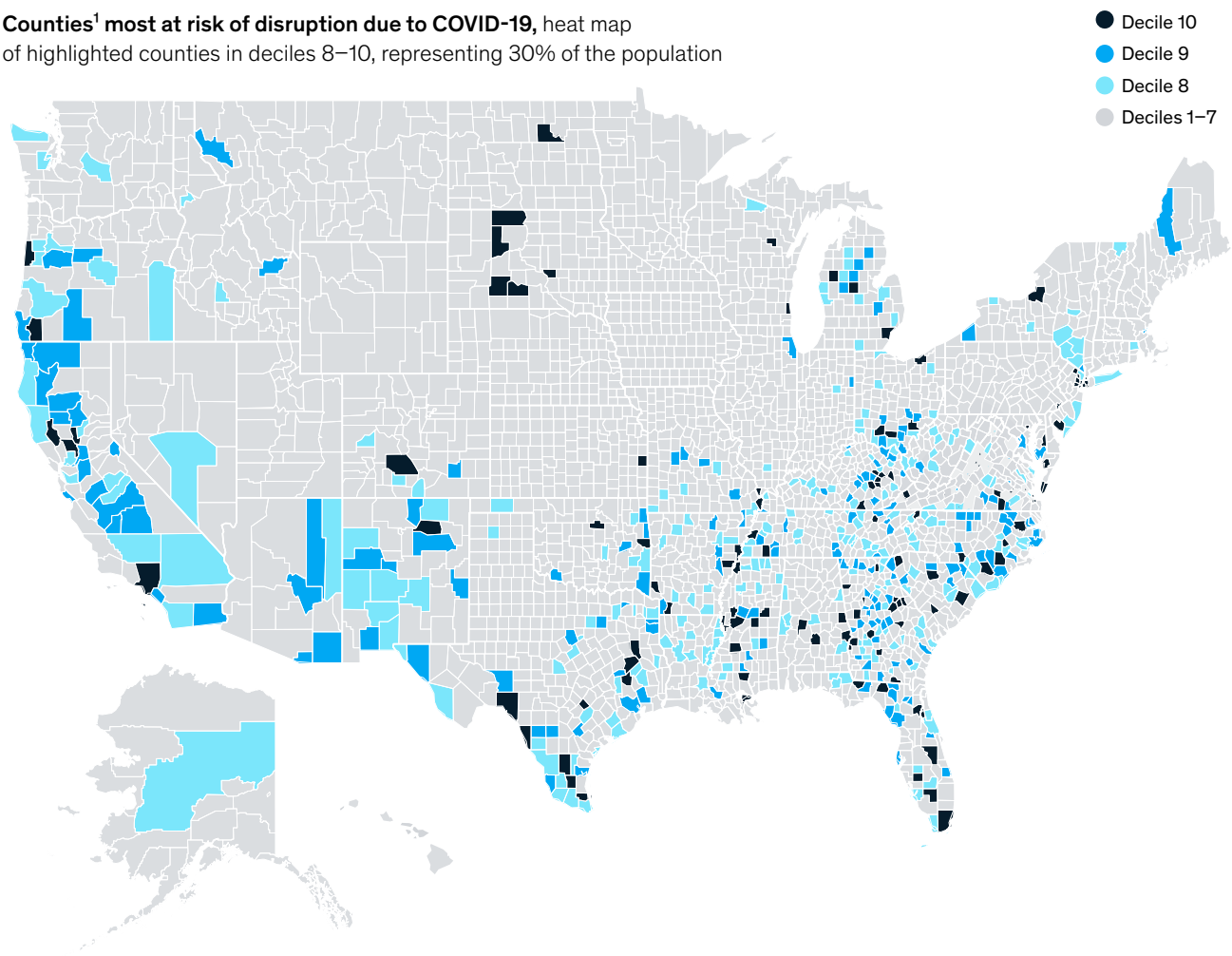
[4] McKinsey Global Institute analysis, US Bureau of Labor Statistics, and the National Center for O*NET Development.

[5] Most recent data: The COVID Tracking Project (State by State), April 7, 2020, covidtracking.com.

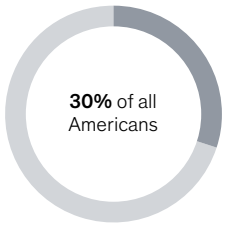
Exhibit

Black Americans are almost twice as likely to live in places where, if contagion hits, the pandemic will likely cause outsize disruption.

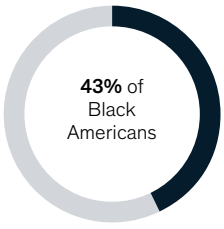
Counties[1] most at risk of disruption due to COVID-19, heat map of highlighted counties in deciles 8–10, representing 30% of the population



Deciles 8–10 (566 total counties)



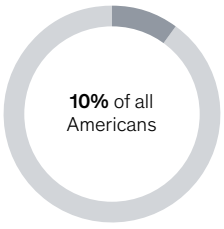
99.5 million people



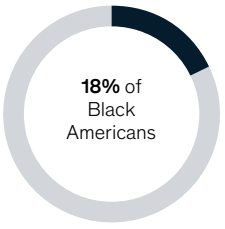
17.6 million people

Black Americans are clustered[2] in **244 counties**

Decile 10 (127 total counties)



33.0 million people



7.3 million people

Black Americans are clustered in **72 counties**

[1] Data includes 3,115 counties, 99% of counties in the United States. For 30 counties, COVID comorbidities were estimated using the state average due to lack of available data.

[2] In these counties, Black Americans are overrepresented (>13%) or above 100,000 total people in absolut terms.

Source: 2017 CMS-LDS Medicare FFS data and DRG 835/837 data © 2020 DR/Decision Resources, LLC. All rights reserved. Reprinted with permission. Reproduction for noncommercial use is permitted if attributed; American Community Survey, 5-year estimates 2013–18, *Population, housing units, area, and density*; American Community Survey, 5-year estimates 2013–18, *Poverty status in the past 12 months*; *Comprehensive Housing Affordability Strategy*, US Department of Housing and Urban Development; Robert Wood Johnson Foundation; total population, hospital compare and Medicare provider cost reports, US Centers for Medicare & Medicaid Services; 2010 US Census, US Census Bureau; McKinsey Global Institute analysis

were already twice as likely as their white peers to die from diabetes, hypertension, and asthma—all risk factors that exacerbate COVID-19 symptoms.[6] Even Black Americans who do not need care for COVID-19 are likelier than white Americans to suffer from the pandemic's secondary effects on our overloaded medical system, including delayed—but necessary—medical procedures.[7]

Risks to livelihoods and economic futures

As the impact of the pandemic moves from health to economic consequences, Black Americans will likely sustain more damage across every stage of the wealth-building journey.[8] Crucially, 39 percent of jobs held by Black workers (seven million jobs in all) are vulnerable as a result of the COVID-19 crisis compared with 34 percent for white workers.[9] Forty percent of the revenues of Black-owned businesses are located in the five most vulnerable sectors—including leisure, hospitality, and retail—compared with 25 percent of the revenues of all US businesses.[10] Forty-eight percent of Black survey respondents[11] report regularly using food-assistance programs, compared with 31 percent of white respondents. Such services are likely to come under significant strain and interruptions as a result of the pandemic.[12]

Protective measures

There is an immediate opportunity to protect Black Americans and their communities from the worst effects of the COVID-19 crisis. These interventions should target the places where Black people live, work, and do business.

To identify and mitigate disparities, it will be critical to track the damage and the recovery from the pandemic along racial lines. Relevant information includes (but is not limited to) rates of infection, access to healthcare providers and testing, jobs lost, and small business loans allocated. In addition, stakeholders could also identify and patch gaps in services normally provided by the public education system and increase resources for the most affected students and families.

Training and deploying community health workers, which are common in places where the need for healthcare significantly outstrips supply, could increase access to health services.[13] Community health workers help connect patients to both health and social services, build trust in healthcare systems, and reserve capacity for licensed healthcare workers to treat the most critical cases. Community and faith-based organizations can use their roles as hubs to organize the workers, share information about the virus, encourage preventive measures such as environmental and personal hygiene and physical distancing, and distribute personal protective equipment (PPE) and sanitary equipment to the homes of essential workers. These organizations can also provide targeted, wrap-around support to people with high-risk comorbidities.

Stakeholders could deliberately support the most vulnerable workers, including Black Americans. Some employers are finding creative solutions that keep people employed, and this could be supplemented with job-matching and reskilling programs that can efficiently redeploy talent even during a macroeconomic contraction. Employers could also maintain a commitment to equity when they downsize. Support programs that provide direct and in-kind forms of liquidity (such as straightforward cash assistance, short-term extensions for financial obligations, and loan- and interest forgiveness) could help sustain families in financial distress.

[6] Victor R. Fuchs, "Black gains in life expectancy," *JAMA*, November 2016, Volume 316, Number 8, pp. 1869–70.
[7] Summary Health Statistics: National Health Interview Survey, 2018.
[8] For more on Black Americans and the wealth-building journey, see Nick Noel, Duwain Pinder, Shelley Stewart III, and Jason Wright, "The economic impact of closing the racial wealth gap," August 2019, McKinsey.com.
[9] McKinsey Global Institute analysis; 'Vulnerable' jobs are subject to furloughs, layoffs, or being rendered unproductive (for example, workers kept on payroll but not working) during periods of high physical distancing.
[10] Analysis of 2012 Survey of Business Owners.
[11] Survey respondents from McKinsey's March 27–29, 2020, Consumer Survey.
[12] McKinsey COVID-19 Consumer Survey, March 29, 2020.
[13] Nellie Peyton, "Using lessons from Ebola, West Africa prepares remote villages for coronavirus," Reuters, March 25, 2020, reuters.com.

Community development financial institutions (CDFIs), churches, and nonprofits could help Black-owned businesses and residents to access recovery funds. Similarly, new financial products and programs such as community rainy-day funds could fortify the resilience of communities. Corporations could make a point to work with Black-owned businesses.

Recovery, rebuilding and reimagination

COVID-19's outsized impact on the Black community reflects public health and socioeconomic disparities that have long been intertwined. The pandemic is an opportunity to invest in addressing structural challenges to help Black Americans recover and to build and sustain more equitable communities.

Investments in public health, digital infrastructure, institutions of public education, and economic development planning should continue long after the COVID-19 pandemic subsides. In particular, stakeholders could consider setting national goals to improve health equity and create plans to meet those goals.

Support for Black homeowners and businesses could be a priority to ensure that they do not lose their assets and resources. That kind of support could include protection from bankruptcy, insolvency, and eviction, all of which will disproportionately affect Black Americans as part of the pandemic's fallout. Institutions could also support equity in compensation and career progression. These types of assistance speak less to protection and more to providing the opportunities and stability required to help Black families build a resilient economic foundation.

The COVID-19 pandemic is already a generation-defining crisis. Because it affects all social systems, it heightens preexisting structural challenges that Black Americans face. But a trial can also be an opportunity. Our society can consider how we can respond to the COVID-19 crisis and fallout to fortify Black communities and help them do more than simply recover. We can use the urgency of the pandemic to build more equitable systems that increase the long-term resilience of Black Americans, communities, and institutions. As we progress toward this goal, the US economy could benefit to the tune of $1.5 trillion.[14]

Aria Florant and **Nick Noel** are consultants the Washington, DC, office, where **Jason Wright** is a partner. **Shelley Stewart III** is a partner in the New Jersey office.

The authors wish to thank Earl Fitzhugh, JP Julien, Duwain Pinder, and Sam Yamoah for their insights and contributions to this article.

[14] Noel, Pinder, Stewart, and Wright, "The economic impact of closing the racial wealth gap."

Feeding the world sustainably

Green technologies, biotech advances, and artificial intelligence could help tame agricultural emissions and waste, while safeguarding ocean resources.

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Agriculture takes center stage in the drive to reduce emissions

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Using artificial intelligence in the fight against food waste

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Making fisheries sustainable—and profitable—with advanced analytics

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The quest for sustainable proteins

A burst of technology in the 1960s—the Green Revolution—raised agricultural output significantly across developing economies. Since then, rising incomes have boosted protein consumption worldwide, and elevated new challenges: greenhouse-gas emissions from agriculture are increasing (more than a fifth of all emissions worldwide), while a host of practices, from waste to overfishing, threaten the sustainability of food supplies. The COVID-19 pandemic has brought these concerns to the fore: the disease has disrupted supply chains and demand, perversely increasing the amount of food waste in farms and fields while threatening food security for many.

As agriculture gradually regains its footing, participants and stakeholders should be casting an eye ahead, to safeguarding food supplies against the potentially greater and more disruptive effects of climate change. Once again, innovation and advanced technologies could make a powerful contribution to secure and sustainable food production. For example, digital and biotechnologies could improve the health of ruminant livestock, requiring fewer methane-producing animals to meet the world's protein needs. Genetic technologies could play a supporting role by enabling the breeding of animals that produce less methane. Meanwhile, AI and sensors could help food processors sort better and slash waste, and other smart technologies could identify inedible by-products for reprocessing. Data and advanced analytics also could help authorities better monitor and manage the seas to limit overfishing—while enabling boat crews to target and find fish with less effort and waste. Agriculture is a traditional industry, but its quest for tech-enabled sustainability offers valuable lessons.

Agriculture takes center stage in the drive to reduce emissions

Cross-sector investment opportunities will lead the way.

by Daniel Aminetzah, Joshua Katz, and Peter Mannion

More than one-fifth of the world's greenhouse-gas (GHG) emissions stem from agriculture—over half from animal farming.[1] Unless these emissions are actively addressed, they will probably increase by 15 to 20 percent by 2050 as the Earth's population rises and the need for food continues to grow. Limiting the impact of climate change will require shifts in what we eat, how much we waste, and how we farm and use our land.

There is no clear path to fully eliminating agricultural emissions. Nonetheless, a wave of transformation is within reach of the food industry and the broader agricultural market. Historically, agricultural innovation has arisen at points of intersection with other industries as creative firms borrowed and built on advances in areas such as human health, chemicals, advanced engineering, software, and advanced analytics. Cross-cutting opportunities portend the next wave of innovation to reduce agricultural emissions by capturing food-process efficiencies (exhibit).

While the abatement costs vary and the market opportunities continue to evolve, mitigation measures could reduce emissions by about 20 to 25 percent by 2050.[2] In this article, we highlight the top three cost-negative or cost-neutral measures in which business actors will play a critical role. Scaling up these solutions will require investment, technological innovation, and behavioral change—particularly among farmers around the world.

Zero-emissions farm equipment

The largest amount of emissions abatement from a single measure can be achieved by shifting from traditional fossil-fuel equipment—such as tractors, harvesters, and dryers—to their zero-emission counterparts. This transition alone would realize cost savings of $229 per ton of carbon-dioxide equivalent (tCO_2e)[3] and transform the $139 billion global agricultural-equipment industry.

Unfortunately, the current market penetration of zero-emission equipment is lower in farming than it is in consumer vehicles: market leaders are only at the stage of piloting proofs of concept. The right investments by machinery manufacturers would make it possible to achieve total-cost-of-ownership parity between, for example, tractors powered by internal-combustion engines and tractors powered by zero-emissions sources (such as battery electric power) by around 2030.[4] Like early investors in passenger electric vehicles (EVs), investors in agricultural EV technology are now poised to benefit from first-mover advantage. AGCO's Fendt, Rigitrac, and Escorts' Farmtrac each showcase electric-tractor models, and John Deere has battery-run and corded electric-tractor prototypes. If electric farm equipment captured just 10 percent of the 2030 market, this would represent an opportunity of $13 billion.

Battery capacity and charging speeds have been the main obstacles to the adoption of

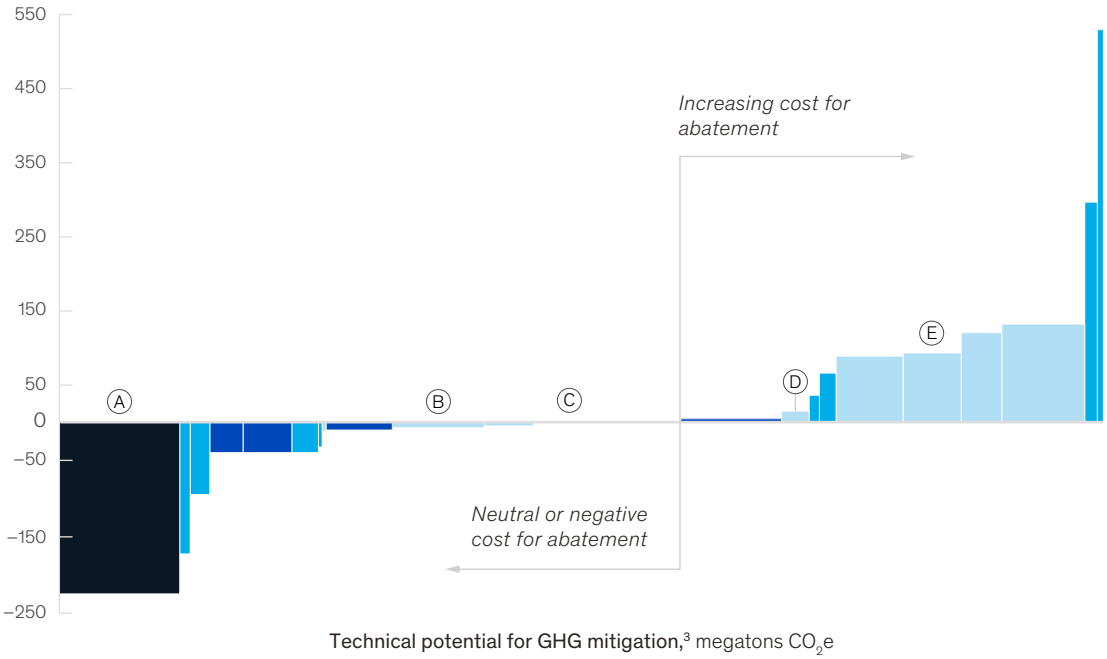
[1] Does not include land use, land-use change, and forestry. Non-CO2 emissions converted using 20-year global-warming-potential (GWP) values based on the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC).
[2] For more, see Daniel Aminetzah, Nicolas Denis, Kimberly Henderson, Joshua Katz, and Peter Mannion, "Reducing agriculture emissions through improved farming practices," May 2020, McKinsey.com.
[3] Used to compare emissions of greenhouse gases.
[4] See Markus Forsgren, Erik Östgren, and Andreas Tschiesner, "Harnessing momentum for electrification in heavy machinery and equipment," April 2019, McKinsey.com.

Exhibit

Abatement measures in agriculture open up cross-sector opportunities—including opportunities that either save money or are cost neutral.

Top 25 mitigating measures for agriculture[1] and associated abatement costs

Energy Crops Rice Animal protein



Some abatement measures offer cross-sector investment opportunities beyond agriculture. For example:

(A) Automotive
Transition to zero-emissions farm machinery and equipment
–$229/Mt$CO_2e$

(B) Animal health/ pharmaceutical
Improved health monitoring and illness prevention
–$5/Mt$CO_2e$

(C) Genetics
GHG-focused breeding and genetic selection
0/MtCO_2e

(D) Chemicals
Apply nitrification inhibitors on pasture
+$15/Mt$CO_2e$

(E) Energy
Expand use of anaerobic manure digestion
+$92/Mt$CO_2e$

[1] Implementing all 25 measures would reduce GHG emissions from agriculture by 20%.
[2] Based on 20-year global warming potential (GWP) cited in fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC).
[3] Based on 100-year GWP cited in IPCC's fifth assessment report.

electric farm equipment. However, battery weight is less problematic for farm equipment than for passenger vehicles. A rapid reduction in prices for batteries, which alone account for up to 40 percent of tractor-component costs, will help further overcome adoption barriers.[5]

Animal health monitoring

As our colleagues have noted, achieving a 1.5-degree warming pathway[6] would require a significant reduction in human consumption of animal protein (for more, see "Climate math: What a 1.5-degree pathway would take," on McKinsey.com). The agricultural sector has a major role to play by meeting the world's animal-protein needs with fewer, healthier animals that generate lower emissions from enteric fermentation and by improving manure management. These steps could reduce emissions by more than 400 million tons of carbon-dioxide equivalent (MtCO2e) by 2050 (realizing savings of $5 per tCO2e) and generate productivity benefits that would improve agricultural economics.

Emerging biological technologies and computational capabilities, such as gene sequencing and artificial intelligence, enable farmers to detect disease early—and even prevent it—by applying predictive algorithms to existing and new sources of data. For example, Moocall, an Irish company collaborating with Vodafone, aims to reduce cow mortality rates from birth-related complications by up to 80 percent by placing (on the animal's tail) a palm-sized sensor alerting farmers to how long a cow has been calving. In North America, which has the third-largest cow inventory (after Brazil and China), overall cattle-herd productivity improvements could reach 8 percent.[7]

However, implementing these technologies has proved to be expensive, and they are not yet well understood or embraced by farmers. Moreover, health challenges vary greatly by region and species, so a silver bullet is unlikely. Innovative business models and commercial investment will be required to overcome these barriers: for example, the global technology company Fujitsu has developed an algorithm-based "connected cow" service to make milk production more profitable.[8] We expect more commercial investment in coming years, given the continued decline in the cost of such technologies and their multiple applications, including new vaccinations and advanced diagnostics.

GHG-focused breeding

New breeding programs using sophisticated genetic-selection capabilities can help curb enteric fermentation, potentially reducing overall emissions by 500 MtCO2e at virtually no cost by 2050. Today, breeding for methane efficiency has achieved a 20 percent variation in methane production. More GHG-focused programs will be possible as increasing demand for animal protein continues to drive growth in the animal genetic-products market (worth $4.2 billion in 2018).

While genetic-breeding programs are still in their infancy, government and industry are leading the effort to drive adoption. In November 2019, a consortium funded by the New Zealand agricultural sector and the country's government launched a "global first" genetics program to breed sheep that produce less methane per mouthful of grass.[9] Even with such programs, large-scale adoption throughout the industry will require economic incentives: market payments or credits for methane reductions.

To implement solutions at scale, additional investments will be needed in genetic-selection capabilities to address the immaturity and lack of breed-specificity of most genetic programs.

[5] See Forsgren et al., "Harnessing momentum."
[6] A 1.5-degree pathway is an estimate of the extent of change required by each sector of the global economy to curb increases in greenhouse-gas emissions sufficiently and limit temperature increases in the years ahead to 1.5 degrees Celsius above preindustrial levels—a level of increase that, scientists estimate, would reduce the odds of initiating the most dangerous and irreversible effects of climate change.
[7] "Study to model the impact of controlling endemic cattle diseases and conditions on national cattle productivity, agricultural performance and greenhouse gas emissions," ADAS, February 2015, randd.defra.goc.uk.
[8] "Akisai Food and Agriculture Cloud GYUHO SaaS (cattle breeding support service)," Fujitsu, fujitsu.com.
[9] "Sheep farmers now able to breed 'low-methane' sheep," Pastoral Greenhouse Gas Research Consortium, pggrc.co.nz.

New breeding techniques, such as those using CRISPR-Cas9,[10] could lower barriers to entry for innovators and allow for more specificity.

A new agricultural ecosystem will be needed to mitigate the increase in agricultural GHG emissions while meeting the world's food needs. In the near term, the reduction of emissions will depend largely on today's technologies and opportunities. But next-horizon technologies (such as gene editing, novel feed additives, and aerobic rice) are also needed. Players in industries ranging from automotive and energy to pharmaceuticals have important roles to play. It will take a village to feed our global village.

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[10] A new technology that allows editing of DNA sequences.

Using artificial intelligence in the fight against food waste

AI can help accelerate the move toward a circular economy in the agricultural sector.

by Anna Granskog, Eric Hannon, and Chirag Pandya

Roughly one-third of all food is wasted before it is consumed by people. The methane emissions that result are 86 times more potent in driving temperature increases than CO2 emissions are, when looking over a 20-year time frame.[1] Emerging applications for artificial intelligence (AI) are helping to create opportunities for "designing out" food waste in the value chain: from farming, processing, and logistics to consumption. In effect, AI can accelerate the transition to an agricultural circular economy, in which growth is decoupled from the consumption of finite resources. Circular-economy principles, which historically have taken root slowly and gradually, rest on designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. Here are three areas where AI has the potential to jump-start a circular economy in agriculture, while potentially unlocking more than $100 billion in value for players globally.[2]

Efficient farming practices

AI can help farmers avoid expensive and time-consuming field trials by identifying the best-performing regenerative agriculture practices. For example, CiBO Technologies uses data analytics, statistical modeling, and AI to simulate field trials and agricultural ecosystems under different conditions. Global stakeholders could learn to improve profitability and sustainability by exploring possible outcomes virtually without the risk of damaging the environment or sacrificing yield. Combining AI algorithms with robotic technologies can further automate and increase control in the farming process. For instance, AI can be used to interpret images of crops, such as strawberries, to help determine when food should be harvested; the harvesting, in addition, can be done with autonomous robots. This might reduce food waste in the field, and it could enable more accurate yield forecasting by improving information along the supply chain and by maximizing storage and cooling facilities.

Reducing food waste

AI algorithms can help with food sorting during processing by analyzing images and data from cameras, X-rays, lasers, and near-infrared spectroscopy. The ability to automatically sort nonuniform produce, such as carrots and potatoes, can reduce waste by sorting for best use, size, shape, and quality, removing a manual process that can be time consuming, expensive, and inaccurate. Some companies, such as Wasteless, are helping supermarkets and other retailers sell food before the expiration date by using AI-enabled tracking and dynamic pricing. In institutional and restaurant settings, new tools are now being used to capture, track, and categorize data on food waste. What's more, algorithms can forecast and predict sales, enabling restaurants, retailers, and other hospitality institutions to connect supply to demand more effectively.

[1] Francois-Marie Breon et al., "Anthropogenic and natural radiative forcing," *AR5 climate change 2013: The physical science basis*, Intergovernmental Panel on Climate Change (IPCC), 2013, fifth assessment report, Chapter 8, ipcc.ch.

[2] For more, see *Sustainability blog*, "How AI can unlock a $127B opportunity by reducing food waste," blog entry by Clarisse Magnin, March 27, 2019, McKinsey.com.

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Repurposing inedible nutrients

Even if all surplus food were redistributed, a large volume of inedible by-products, along with food waste, would continue to be generated. Could these organic materials contain value that could be repurposed? The Massachusetts Institute of Technology's Senseable City Lab and the Alm Lab, for instance, are offering a glimpse of the potential with their Underworlds prototype smart-sewage platform. The platform combines physical infrastructure and biochemical measurement technologies with artificial intelligence to interpret and act on findings about the pathogens in human sewage; eventually this knowledge could repurpose sewage for use in regenerative food systems.

AI is poised to play an important role for agriculture in the transition to a circular food system. It could revolutionize the way food is grown, harvested, distributed, and enjoyed. As more data sources become available and as computational capabilities grow, AI could help match food supply and demand more effectively, improve supply-chain efficiency, and curb overproduction, overstocking, and waste.

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Making fisheries sustainable—and profitable—with advanced analytics

Data and digital technologies could transform a traditional industry while helping stem the damage to ocean ecosystems.

by Julien Claes, Elin Sandnes, and Antoine Stevens

Gathering data and applying the power of advanced analytics can help tackle problems in surprising ways. The distressed state of the oceans is a case in point. Decades of overfishing is depleting the oceans at an alarming rate, at a time when the emerging world increasingly depends on seafood for protein. Finding a more sustainable means of fishing while pre-serving ocean ecosystems is a sprawling problem. The fishing industry is feeling the effects: today, it takes five times the effort to haul in a catch as it did in 1950.[1] We looked at how fisheries, government authorities, and food companies could deploy advanced analytics to improve monitoring and raise the efficiency of their operations. In addition to giving the fishing industry new tools for more profitable, sustainable operations, there's also a climate bonus: reeling in a ton of fish protein has less than a tenth of the greenhouse-gas intensity of equivalent protein harvested from ruminant livestock.

Oceans in danger

The demand for fish is growing twice as fast as the world's population growth rate. As boats trawl for a profitable haul, they are moving into new and deeper waters. Yet the catch is declining, with aquaculture rising steadily to meet demand (Exhibit 1). The effect on the ecosystem is stark: half of the world's fish species stocks are overexploited, rebuilding, or collapsing (Exhibit 2). This degradation in biodiversity comes on top of the effects of climate change, which are warming oceans and changing their chemistry.

Recognizing the threats, national governments have moved to strengthen and improve management and regulation. Yet regional gains often are negated by overfishing or illegal catches in adjacent zones. Many of today's efforts, including reporting of catches, industry information sharing, and regulatory enforcement, could be bolstered by tighter collaboration.

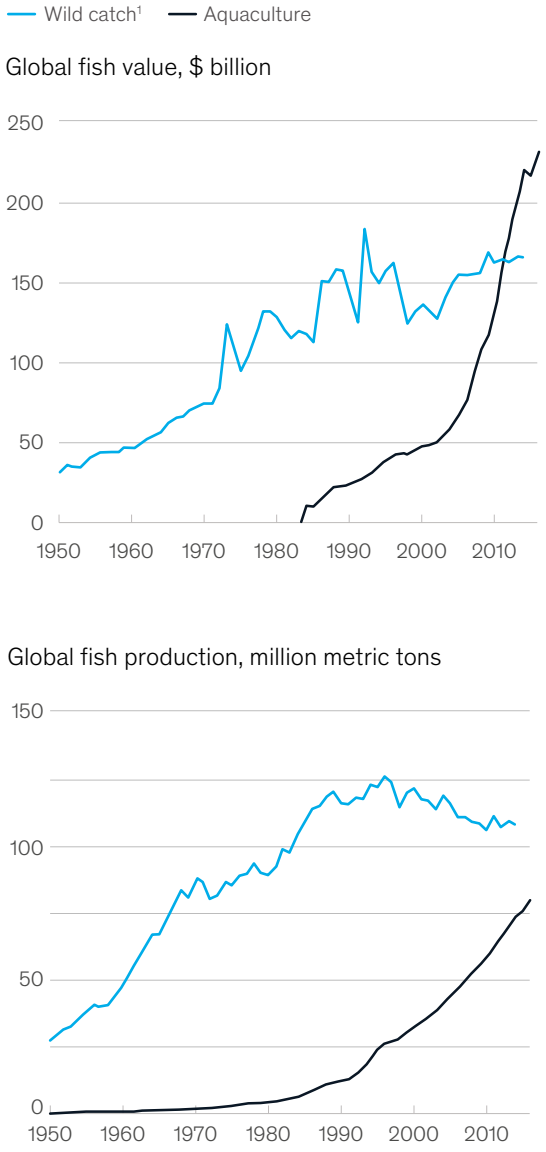
A bounty of data

Much like agriculture onshore, the fishing industry is geographically dispersed with operators large and small. Farmers plow their fields guided by data on weather and soil conditions. While most fisheries still operate in a traditional way, something similar is starting to take shape in fishing. Radar and optical sensors on satellites can pick up patterns in the ocean environment such as temperature and signals of fish movements. While that information is valuable for fisheries, it also helps authorities track boat locations and movement. Camera-equipped drones, meantime, operating not only in the air but undersea, give some boats today a more comprehensive view of nearby fishing conditions. Looking forward, advanced sensors and monitors could automatically collect data on the gear used, species caught or discarded, volume of hauls, and more that's often done by fishermen. Governments, meanwhile, have pushed for better data to help keep watch on illegal fishing, mandating that larger vessels be equipped with monitoring systems that transmit location, speed, and direction.

[1] Measured in kilowatt-hours expended.

Exhibit 1

As wild-fish capture has declined, aquaculture has risen to meet demand.



[1]Excludes aquatic mammals; alligators, caiman, and crocodiles; seaweeds; and other aquatic plants.

Over time, much more information could be integrated with Internet of Things technologies that link sensors to satellite- and land-based communications networks. Crunching the data by using advanced analytics and machine learning would ultimately help balance competing interests—helping fisheries manage a risky, volatile business while providing authorities with better information for policing and shaping sustainability policies.

Turning the tide with analytics

Let's look on deck. Boat captains with larger commercial fisheries have used technologies such as sonar, though many still rely on intuition, experience, and basic observations to navigate and detect fish. Contrast that with what's potentially ahead: fish detection supported by targeted analytic models that could provide daily forecasts for entire fishing territories, helping to track species that are in high demand. And Internet of Things sensors that monitor ocean conditions could help boats define optimal, energy-efficient routes.

Then there's the catch itself. Fishermen often have low visibility into what's in their nets until it's pulled onboard—leading to waste. Intelligent sensors of the future will allow crews to automatically and continually monitor parameters such as species and fish size. One analytics tool that larger companies already are using factors in sea temperatures and plankton clusters to model where fish will be, lowering costs for targeting desired species and reducing waste. Poorer regions stand to benefit as well. Fishermen in emerging markets are already gaining greater access to market information by using their cell phones.

On shore, fisheries managers often plan operations hobbled by data scarcity—using landed catches that furnish little forward visibility. Analytics tools promise to offer a more dynamic view of fleets, allowing managers to guide boats and continually monitor stocks. Automatic scanning and intelligent systems that monitor product quality could replace manual sorting of catches. Quality and traceability loom large, as sustainability-conscious consumers demand greater transparency into how and where fish are caught. What's ahead?

Researchers are investigating tagging fish using radio frequency identification (RFID) and certifying catches with distributed ledger technologies (blockchain).

For authorities, analytics can help bridge a different gap. Information on fishing activity is partial at best, and coordination among multiple stakeholders—governments, industry, and NGOs—is challenging. That said, sharing the flow of information from advanced monitoring technologies would give authorities a real-time vision of global fishing activities. It would also help them design more efficient surveillance plans across territorial waters. Decentralized, reliable information-management systems requiring little human intervention could ease adoption. One example: analytics-software tools can flag when a boat slows down in a no-take zone, alerting authorities to the suspicious behavior. NGOs are helping to change mindsets. To promote sustainability research, Global Fishing Watch distributes information gleaned from government and satellite data on more than 65,000 fishing vessels. Over time, shared, detailed catch data from cameras and image-recognition software powered by artificial intelligence will help governments fine-tune regulations and fishing quotas more dynamically to manage ocean resources.

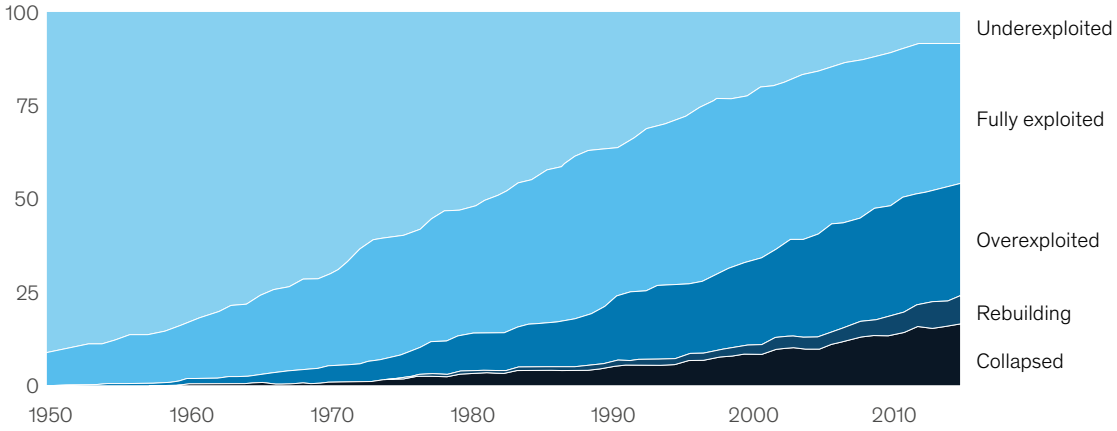
Looking ahead

Our modeling research suggests that for fisheries, there are financial incentives for analytics-guided strategies. We found that optimizing fishing activity over an entire season, monitoring of equipment to minimize downtime, identifying fuel economies from analyzing navigation data, and implementing

Exhibit 2

Nearly half of the world's fish stocks are overexploited, rebuilding, or have collapsed.

Status of global wild-fish stock,[1] %



[1]Stock status is evaluated by looking at the trends displayed by the lines separating the categories, rather than the vertical % values, due to the imprecise/changing definitions of the categories. Rebuilding stocks are stocks recovering from collapsed status.

Source: Sea Around Us, University of British Columbia and the University of Western Australia, 2014

information-based labor efficiencies could reduce industry costs by $11 billion, or just under 15 percent of today's spending.

For governments, one obstacle will be confronting geopolitical challenges. Some bad actors will continue efforts to game a system where the regulatory map has gaps and where some nations benefit by turning a blind eye to wayward fisheries.

Better data and analytics capabilities should move the enforcement needle, helping pinpoint hot spots where illegal fishing continues and identifying chronic offenders for enforcement action. The benefits of data sharing and better analytics tools, meanwhile, will continue to align the interests of fisheries and governments for better resource management. An era of precision fisheries will be key to sustaining the oceans' riches.

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The quest for sustainable proteins

Concerns about health, animal welfare, and climate are bolstering interest in a range of alternative proteins.

by Jordan Bar Am, Zafer Dallal Bashi, and Liane Ong

Meat has always been a protein mainstay for human beings—the main source in developed markets and a rising one in developing markets as they get richer. In recent years, meanwhile, consumer awareness and interest in alternative-protein sources has grown steadily. That's particularly true in wealthier countries, where a desire for better health and animal welfare, along with environmental concerns, are shaping preferences. On the last point, our colleagues have shown that proteins produced from ruminant livestock (cows and sheep) are 30 times more greenhouse-gas intensive than those from vegetable proteins. In fact, if cows were classified as their own country, they would emit more greenhouse gases than any country except China.[1]

Sources of alternative proteins include a mix of plant-based proteins (soy, pea), new animal sources (insects), biotechnological innovations (lab-cultured meat), and mycoproteins (derived from fungi). Several entrants in the alternative-protein industry are rolling out new technologies and ingredients, looking to lock in leading positions in a growing market. (For interviews with executives and entrepreneurs at companies breaking ground in alternative-proteins, see "The future of food: Meatless?," on McKinsey.com.) Consumers tend to find the recent protein innovations appetizing, and companies are fueling awareness with aggressive marketing efforts.

While aggregate consumption of meat-based proteins worldwide continues to grow, a shift in preferences may be one reason (among several) why meat's overall growth rate is expected to decline by half over the next decade. Sales of plant-based food (the largest source of alternative protein) rose 17 percent in the United States in 2018,[2] and the use of alternative protein as a food ingredient is predicted to continue growing. Alternative proteins, of course, are still a small slice of the market for meat ($2.2 billion compared with approximately $1.7 trillion, respectively[3]). But innovation is rife. The share of new products released with an alternative-protein claim grew from 2 percent to more than 5 percent of the market from 2007 to 2016, according to market researcher Mintel, while consumer interest in alternative-protein products and diets, as measured by online-search results, has increased markedly in many cases.

A look at four types of alternative proteins highlights trends in demand and innovation and suggests where meat protein trends might be heading.

Pea protein

Pea protein is expected to lead the alternative-protein market in the short and medium term, though the product faces certain challenges. The past few years witnessed a limited supply of pea protein caused by a shortage in processing

[1] See Daniel Aminetzah, Nicolas Denis, Kimberly Henderson, Joshua Katz, and Peter Mannion, "Reducing agriculture emissions through improved farming practices," May 2020, McKinsey.com.
[2] Caroline Bushnell, "Newly released market data shows soaring demand for plant-based food," the Good Food Institute, September 12, 2018, gfi.org.
[3] Food and Agriculture Organization of the United Nations, June 3, 2019, fao.org.

capacity. Producers of mainstream products such as veggie burgers will likely use soybean protein, where input costs are lower and supplies are more stable. However, high-end products will likely use pea protein to cater to consumer expectations of a niche ingredient, which is a product that touts health claims and is for sale at a premium price.

Cultured meat

Lab-grown cultured meat seeks to mimic the muscle tissue found in animals and has the same protein profile (and taste). The industry has received funding from a variety of sources including industry players. The cultured-meat industry is well positioned for the future, even with major technical challenges to overcome, including the difficulties in the development of an immortal cell line and recycling of blood ingredients, both of which help keep costs down. Scientists have been working on this protein since 2013, when the first lab-grown burger made its public debut. The price of cultured meat has already decreased significantly in the past nine years (the first lab-grown hamburger cost $325,200 in 2013 and then decreased to around $11 in 2015, with estimates indicating that costs will soon drop to about $2.30 to $4.50 a pound).

Insect and mold protein

Crickets are the most common source of edible insects and a good source of protein. They have long been a dietary staple in many areas of Asia, Latin America, and Africa. Some producers are milling crickets for flour. However, it is currently cost prohibitive to isolate protein from the flour as the cost of the crickets is high, making the process difficult to scale. Some food producers are exploring grasshoppers as an edible protein, and a range of insect proteins are likely to be suitable for use in animal feed. Mold protein, meanwhile—or mycoprotein—is typically composed of whole, unprocessed, filamentous fungal biomass, commonly known as mold. It is mixed with eggs to create a meat-like texture for commercial products. It has been around since the 1980s and is produced through fermentation of biological feedstock. Mycoproteins are sold as a meat substitute primarily in Europe, and interest is growing in the US market as well, though consumer interest is still dampened by negative perceptions.

Animal protein will likely continue to dominate the market, driven by key advantages such as customer familiarity. However, there is room at the table for plant-based products, as evidenced by growing shifting customer concerns around traditional meat protein.

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Addressing climate change in a post-pandemic world

The coronavirus crisis holds profound lessons that can help us address climate change—if we make greater economic and environmental resilience core to our planning for the recovery ahead.

by Dickon Pinner, Matt Rogers, and Hamid Samandari

A ferocious pandemic is sweeping the globe, threatening lives and livelihoods at an alarming rate. As infection and death rates continue to rise, resident movement is restricted, economic activity is curtailed, governments resort to extraordinary measures, and individuals and corporations scramble to adjust. In the blink of an eye, the coronavirus has upended the world's operating assumptions. Now, all attention is focused on countering this new and extreme threat, and on blunting the force of the major recession that is likely to follow.

Amid this dislocation, it is easy to forget that just a few short months ago, the debate about climate change, the socioeconomic impacts it gives rise to, and the collective response it calls for were gaining momentum. Sustainability, indeed, was rising on the agenda of many public- and private-sector leaders—before the unsustainable, suddenly, became impossible to avoid.

Given the scope and magnitude of this sudden crisis, and the long shadow it will cast, can the world afford to pay attention to climate change and the broader sustainability agenda at this time? Our firm belief is that we simply cannot afford to do otherwise. Not only does climate action remain critical over the next decade, but investments in climate-resilient infrastructure and the transition to a lower-carbon future can drive significant near-term job creation while increasing economic and environmental resilience. And with near-zero interest rates for the foreseeable future, there is no better time than the present for such investments.

To meet this need and to leverage this opportunity, we believe that leaders would benefit from considering three questions:

— What lessons can be learned from the current pandemic for climate change?

— What implications—positive or negative—could our pandemic responses hold for climate action?

— What steps could companies, governments, and individuals take to align our immediate pandemic response with the imperatives of sustainability?

What follows is our attempt at providing some initial answers to these questions, in the hope that they will inspire ideas and actions that help connect our immediate crisis response with priorities for recovery.

Potential lessons from the current pandemic

Understanding the similarities, the differences, and the broader relationships between pandemics and climate risk is a critical first step if we are to derive practical implications that inform our actions.

Fundamental similarities

Pandemics and climate risk are similar in that they both represent *physical shock*s, which then translate into an array of socioeconomics impacts. By contrast, financial shocks—whether bank runs, bubble bursts, market crashes, sovereign defaults, or currency devaluations—are largely driven by human sentiment, most often a fear of lost value or liquidity. Financial shocks originate from within the financial system and are frequently remedied by restoring confidence. Physical shocks, however, can only be remedied by understanding and addressing the underlying physical causes. Our recent collective experience, whether in the public or the private sector, has been more often shaped by financial shocks, not physical ones. The current pandemic provides us perhaps with a foretaste of what a full-fledged climate crisis could entail in terms of simultaneous exogenous shocks to supply and demand, disruption of supply chains, and global transmission and amplification mechanisms.

Pandemics and climate risk also share many of the same attributes. Both are *systemic*, in that their direct manifestations and their knock-on effects propagate fast across an interconnected world. Thus, the oil-demand reduction in the wake of the initial coronavirus outbreak became a contributing factor to a price war, which further exacerbated the stock market decline as the pandemic grew. They are both *nonstationary*, in that past probabilities and distributions of occurrences are rapidly shifting and proving to be inadequate or insufficient for future projections. Both are *nonlinear*, in that their socioeconomic impact grows disproportionally

and even catastrophically once certain thresholds are breached (such as hospital capacity to treat pandemic patients). They are both *risk multipliers*, in that they highlight and exacerbate hitherto untested vulnerabilities inherent in the financial and healthcare systems and the real economy. Both are *regressive*, in that they affect disproportionally the most vulnerable populations and subpopulations of the world. Finally, neither can be considered as a "black swan," insofar as experts have consistently warned against both over the years (even though one may argue that the debate about climate risk has been more widespread). And the coronavirus outbreak seems to indicate that the world at large is equally ill prepared to prevent or confront either.

Furthermore, addressing pandemics and climate risk requires the same fundamental shift, from optimizing largely for the *shorter-term performance* of systems to ensuring equally their *longer-term resilience*. Healthcare systems, physical assets, infrastructure services, supply chains, and cities have all been largely designed to function within a very narrow band of conditions. In many cases, they are already struggling to function within this band, let alone beyond it. The coronavirus pandemic and the responses that are being implemented (to the tune of several trillion dollars of government stimulus as of this writing) illustrate how expensive the failure to build resilience can ultimately prove. In climate change as in pandemics, the costs of a global crisis are bound to vastly exceed those of its prevention.

Finally, both reflect "tragedy of the commons" problems, in that individual actions can run counter to the collective good and deplete a precious, common resource. Neither pandemics nor climate hazards can be confronted without true *global coordination and cooperation*. Indeed, despite current indications to the contrary, they may well prove, through their accumulated pressures, that boundaries between one nation and another are much less important than boundaries between problems and solutions.

Key differences

While the similarities are significant, there are also some notable differences between pandemics and climate hazards.

A global public-health crisis presents *imminent, discrete, and directly discernable dangers*, which we have been conditioned to respond to for our survival. The risks from climate change, by contrast, are *gradual, cumulative, and often distributed dangers* that manifest themselves in degrees and over time. They also require a present action for a future reward that has in the past appeared too uncertain and too small given the implicit "discount rate." This is what former Bank of England Governor Mark Carney has called the "tragedy of the horizon."[1]

Another way of saying this is that the *timescales* of both the occurrence and the resolution of pandemics and climate hazards are different. The former are often measured in weeks, months, and years; the latter are measured in years, decades, and centuries. What this means is that a global climate crisis, if and when ushered in, could prove far lengthier and far more disruptive than what we currently see with the coronavirus (if that can be imagined).

Finally, pandemics are a case of *contagion* risk, while climate hazards present a case of *accumulation* risk. Contagion can produce perfectly correlated events on a global scale (even as we now witness), which can tax the entire system at once; accumulation gives rise to an increased likelihood of severe, contemporaneous but not directly correlated events that can reinforce one another. This has clear implications for the mitigation actions they each call for.

[1] "Breaking the tragedy of the horizon—climate change and financial stability—speech by Mark Carney," Bank of England, September 29, 2015, bankofengland.co.uk.

Broader relationships

Climate change—a potent risk multiplier—can actually contribute to pandemics, according to researchers at Stanford University and elsewhere.[2] For example, rising temperatures can create favorable conditions for the spread of certain infectious, mosquito-borne diseases, such as malaria and dengue fever, while disappearing habitats may force various animal species to migrate, increasing the chances of spillover pathogens between them. Conversely, the same factors that mitigate environmental risks—reducing the demands we place on nature by optimizing consumption, shortening and localizing supply chains, substituting animal proteins with plant proteins, decreasing pollution—are likely to help mitigate the risk of pandemics.

The environmental impact of some of the measures taken to counter the coronavirus pandemic have been seen by some as a full-scale illustration of what drastic action can produce in a short amount of time. Satellite images of vanishing pollution in China and India during the COVID-19 lockdown are a case in point. Yet this (temporary) impact comes at tremendous human and economic cost. The key question is how to find a paradigm that provides at once environmental and economic sustainability. Much more easily said than done, but still a must-do.

What could happen now?

While we are at the initial stages of a fast-unfolding crisis, we can already start seeing how the pandemic may influence the pace and nature of climate action, and how climate action could accelerate the recovery by creating jobs, driving capital formation, and increasing economic resilience.

Factors that could support and accelerate climate action

For starters, certain temporary adjustments, such as teleworking and greater reliance on digital channels, may endure long after the lockdowns have ended, reducing transportation demand and emissions. Second, supply chains may be repatriated, reducing some Scope 3 emissions (those in a company's value chain but not associated with its direct emissions or the generation of energy it purchases). Third, markets may better price in risks (and, in particular, climate risk) as the result of a greater appreciation for physical and systemic dislocations. This would create the potential for additional near-term business-model disruptions and broader transition risks but also offer greater incentives for accelerated change.

There may, additionally, be an increased public appreciation for scientific expertise in addressing systemic issues. And, while not a foregone conclusion, there may also be a greater appetite for the preventive and coordinating role of governments in tackling such risks. Indeed, the tremendous costs of being the payor, lender, and insurer of last resort may prompt governments to take a much more active role in ensuring resilience. As for the private sector, the tide may be turning toward "building back better" after the crisis.[3]

Moreover, lower interest rates may accelerate the deployment of new sustainable infrastructure, as well as of adaptation and resilience infrastructure—investments that would support near-term job creation. And lastly, the need for global cooperation may become more visible and be embraced more universally.

If past is prologue, both the probability of such shifts and their permanence are likely to be proportional to the depth of the current crisis itself.

Factors that may hamper and delay climate action

Simultaneously, though, very low prices for high-carbon emitters could increase their use and further delay energy transitions (even though lower oil prices could push out a number of inefficient, high-emission, marginal producers and encourage

[2] See Andrew Winston, "Is the COVID-19 outbreak a black swan or the new normal?," *MIT Sloan Management review*, March 16, 2020; and Rob Jordan, "How does climate change affect disease?," Stanford Earth, School of Earth, Energy & Environment, March 15, 2019.
[3] María Mendiluce, "How to build back better after COVID-19," World Economic Forum, April 3, 2020, weforum.org.

governments to end expensive fuel-subsidy regimes). A second crosscurrent is that governments and citizens may struggle to integrate climate priorities with pressing economic needs in a recovery. This could affect their investments, commitments, and regulatory approaches—potentially for several years, depending on the depth of the crisis and hence the length of the recovery. Third, investors may delay their capital allocation to new lower-carbon solutions due to decreased wealth. Finally, national rivalries may be exacerbated if a zero-sum-game mentality prevails in the wake of the crisis.

What should be done?

In this context, we believe all actors—individuals, companies, governments, and civil society—will have an important role.

For governments, we believe four sets of actions will be important. First, build the capability to model climate risk and to assess the economics of climate change. This would help inform recovery programs, update and enhance historical models that are used for infrastructure planning, and enable the use of climate stress testing in funding programs. Second, devote a portion of the vast resources deployed for economic recovery to climate-change resilience and mitigation. These would include investments in a broad range of sustainability levers, including building renewable-energy infrastructure, expanding the capacity of the power grid and increasing its resilience to support increased electrification, retrofitting buildings, and developing and deploying technologies to decarbonize heavy industries. The returns on such investments encompass both risk reduction and new sources of growth. Third, seize the opportunity to reconsider existing subsidy regimes that accelerate climate change. Fourth, reinforce national and international *alignment and collaboration* on sustainability, for inward-looking, piecemeal responses are by nature incapable of solving systemic and global problems. Our experiences in the weeks and months ahead could help inform new paths toward achieving alignment on climate change.

For companies, we see two priorities. First, seize the moment to decarbonize, in particular by prioritizing the retirement of economically marginal, carbon-intensive assets. Second, take a systematic and through-the-cycle approach to building resilience. Companies have fresh opportunities to make their operations more resilient and more sustainable as they experiment out of necessity—for example, with shorter supply chains, higher-energy-efficiency manufacturing and processing, videoconferencing instead of business travel, and increased digitization of sales and marketing. Some of these practices could be expedient and economical to continue, and might become important components of a company-level sustainability transformation—one that accompanies the cost-efficiency and digital-transformation efforts that are likely to be undertaken across various industries in the wake of the pandemic.

When it comes to resilience, a major priority is building the capability to truly understand, qualitatively and quantitatively, corporate vulnerabilities against a much broader set of scenarios, and particularly physical events. In that context, it will also be important to model and prepare for situations where multiple hazards would combine: it is indeed not difficult to imagine a pandemic resurgence coinciding with floods or fires in a given region, with significant implications for disaster response and recovery. The same holds true for public entities, where resilience thinking will have to take greater account of the combination and correlation of events.

For all—individuals, companies, governments, and civil society—we see two additional priorities. First, use this moment to raise *awareness* of the impact of a climate crisis, which could ultimately create disruptions of great magnitude and duration. That includes awareness of the fact that physical shocks can have massive nonlinear impacts on financial and economic systems and thus prove extremely costly. Second, build upon the *mindset and behavioral shifts* that are likely to persist after the crisis (such as working from home) to reduce the demands we place on our environment—or, more precisely, to shift them toward more sustainable sources.

By all accounts, the steps we take in the decade ahead will be crucial in determining whether we avoid runaway climate change. An average global

temperature rise above 1.5 or 2oC would create risks that the global economy is not prepared to weather. At an emission rate of 40 to 50 gigatons of CO2 per year, the global economy has ten to 25 years of carbon capacity left. Moving toward a lower-carbon economy presents a daunting challenge, and, if we choose to ignore the issue for a year or two, the math becomes even more daunting. In short, while all hands must be on deck to defeat the coronavirus and to restart the economy, to save lives and livelihoods, it is also critical that we begin now to integrate the thinking and planning required to build a much greater economic and environmental resilience as part of the recovery ahead.

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