

McKinsey Quarterly



On the cusp of a new era

2023 Number 1

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Published since 1964
by McKinsey & Company,
3 World Trade Center,
175 Greenwich Street,
New York, New York 10007.

Cover artwork
by Nicolás Ortega

Portrait illustrations
by Oriana Fenwick

McKinsey Quarterly meets
the Forest Stewardship
Council (FSC) chain-of-
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Printed in the United States
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McKinsey Quarterly

Finding opportunity amid turbulence

We hope that you find every issue of *McKinsey Quarterly* vital as you confront your most critical challenges and opportunities. Now, we're delighted to offer you a new option: a digital edition with all the content and elegance of the print magazine in an engaging package that helps reduce our collective carbon footprint. This new digital edition of the *Quarterly* is available via a free, invitation-only membership. It's easy to sign up at McK.co/MQmembership, where you can learn about the other benefits of membership, including exclusive access to free downloads of our 100 most important reports. Once you sign up for your membership, we'll email you about whether you'd like to continue receiving the print edition as well.

Our digital edition is one small part of McKinsey's commitment to achieving net-zero climate impact by 2030. As the stories in this issue make clear, CEOs and business leaders across the globe are finding opportunity in the face of disruptions. As the authors of "A devilish duality: How CEOs can square resilience with net-zero promises" write, "Executives are on the spot to lay out credibly how they will deliver against the certain volatility of ongoing economic and political shocks."

Buffeted by repeated gales, leaders need the space to step back and clearly assess the environment—to discern between the trend of the minute and those shifts that are truly deep and meaningful. The authors of this issue's cover story, "On the cusp of a new era?," provide that perspective. Chris Bradley, Jeongmin Seong, Sven Smit, and Jonathan Woetzel posit that we may well be on the verge of a break from the past that is as significant as the ruptures caused by events such as the oil crisis of the 1970s and the breakup of the Soviet Union. But what would be the shape of such a new era? How would a profound global shift affect the way business leaders manage their organizations? These are the questions so many executives are asking themselves now.

Our cover story authors provide a framework for answering these queries. They look at this approaching era through the lens of five domains: the world order, technology platforms, demographic forces, resource and energy systems, and capitalization. The coming shifts in these domains will have a profound impact on almost every organization. Our story should help ensure that you ask the right questions to prepare for whatever is around the corner.

This new era will present great challenges, but it will also provide the setting for great opportunities, such as these:

- In a groundbreaking article, "The future of banks: A \$20 trillion breakup opportunity," Balázs Czímer, Miklós Dietz, Valéria László, and Joydeep Sengupta envision the future

of financial services. The industry may be on the verge of a massive reorganization in which banks and nonbanks compete on platforms across five massive arenas. It's a shift that will affect every business and every person who engages with financial services.

- Thanks to low-cost launches and other efficiencies, the space economy is ready to blossom into an industry that could transform the way we live and work. In "How will the space economy change the world?," Ryan Brukardt suggests that companies across a range of industries will need to develop their own space strategies as this longtime incubator for innovation starts becoming more accessible. Whether better satellite data for agriculture and energy or manufacturing and R&D in zero gravity, space offers a host of benefits for prescient companies.
- The lure of software continues unabated, write Chandra Gnanasambandam, Janaki Palaniappan, and Jeremy Schneider in "Every company is a software company: Six 'must dos' to succeed." Software transformations are not easy—less than 7 percent of global software revenue accrues to nontech companies. But the rewards to those organizations that pull it off are great.

If you ask José Andrés, the internationally renowned chef who is the subject of this issue's *The Quarterly Interview: Provocations to Ponder*, every emergency has something to teach us. In Andrés's own words, "It's important to bring the spirit of emergencies to the long term." The turbulence of our times offers great potential for leaders who can examine it with perspective and find opportunities for innovation and growth within it.

As always, we invite you to dive deeper into these subjects on McKinsey.com. One great way to stay connected is to sign up for the full range of McKinsey newsletters, including *Re:think*, the *Quarterly*'s most recent offering, by visiting McK.co/subscriptions. And, of course, we hope you'll sign up for our new digital edition, as either an alternative or a complement to this print edition, at McK.co/MQmembership. We welcome your feedback and hope you will be in touch: you can reach me at QuarterlyEditor@McKinsey.com.

A handwritten signature in black ink that reads "Rick Tetzeli". The signature is fluid and cursive, with a distinct script style.

Rick Tetzeli
Editorial director,
McKinsey Quarterly

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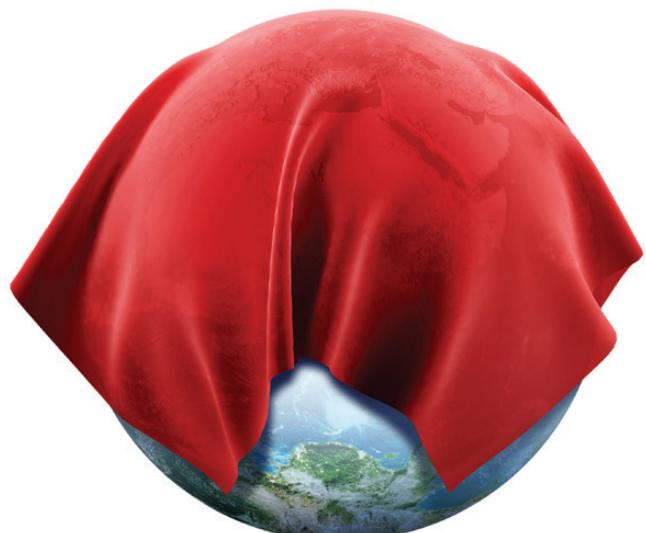
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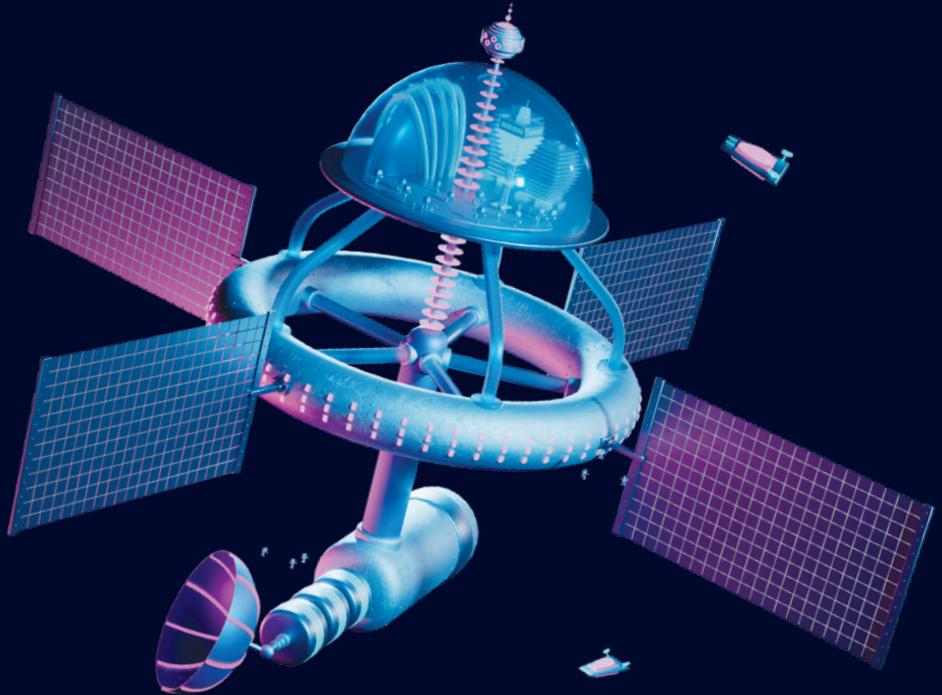
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Acknowledgments

Heather Byer, Drew Holzfeind, Pamela Norton, Diane Rice, Amanda Soto

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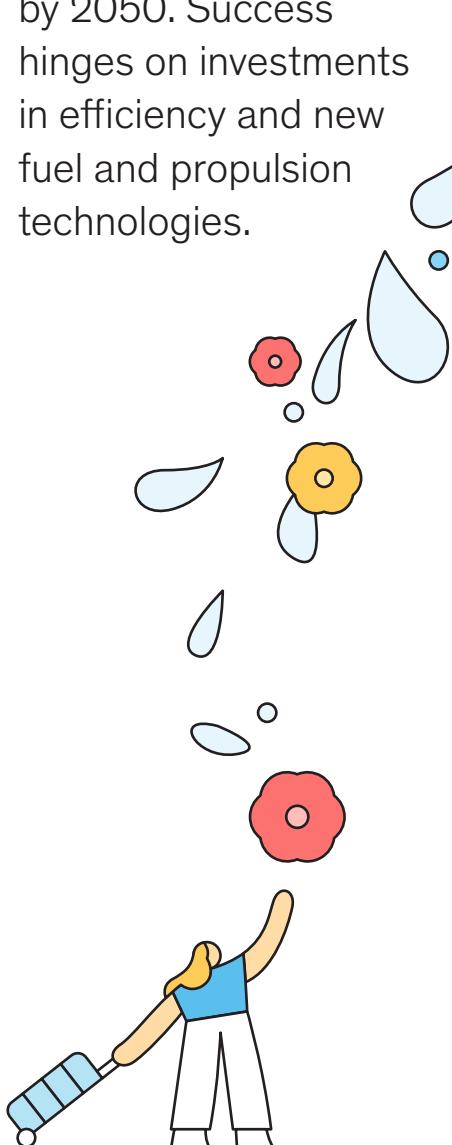
Outlook

The future of aviation in charts



Can we fight climate change— and still fly?

Global aviation can achieve zero emissions by 2050. Success hinges on investments in efficiency and new fuel and propulsion technologies.

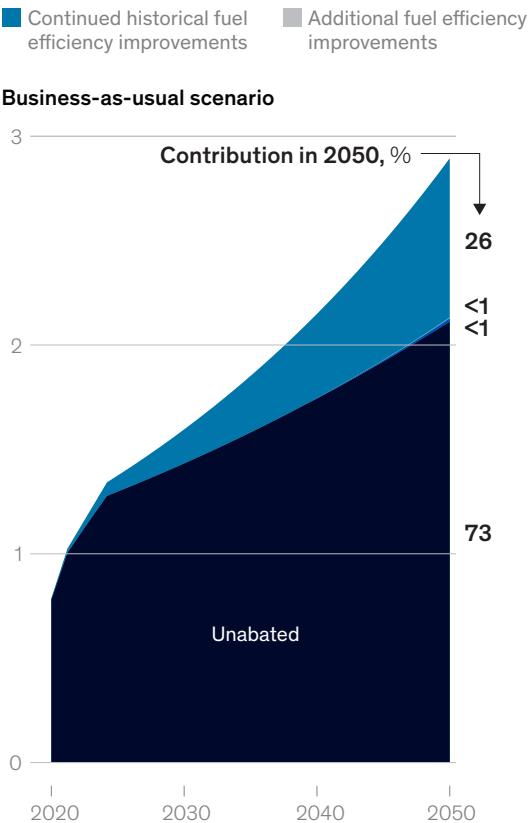


Commercial aviation accounted for roughly 2.5 to 3 percent of global CO₂ emissions in 2019. When all related factors (such as the impact of air pollution and water vapor) are included, the share could be double that or more. A growing number of airline passengers around the world are worried enough about the environmental impact of aviation that they feel shame about flying or say they plan on flying less often.

Airlines have committed to achieving carbon neutrality by 2050, a goal that will require

Global aviation can achieve net zero by 2050.

Projected aviation greenhouse-gas (GHG) emissions, by scenario, gigatons of CO₂ equivalent



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

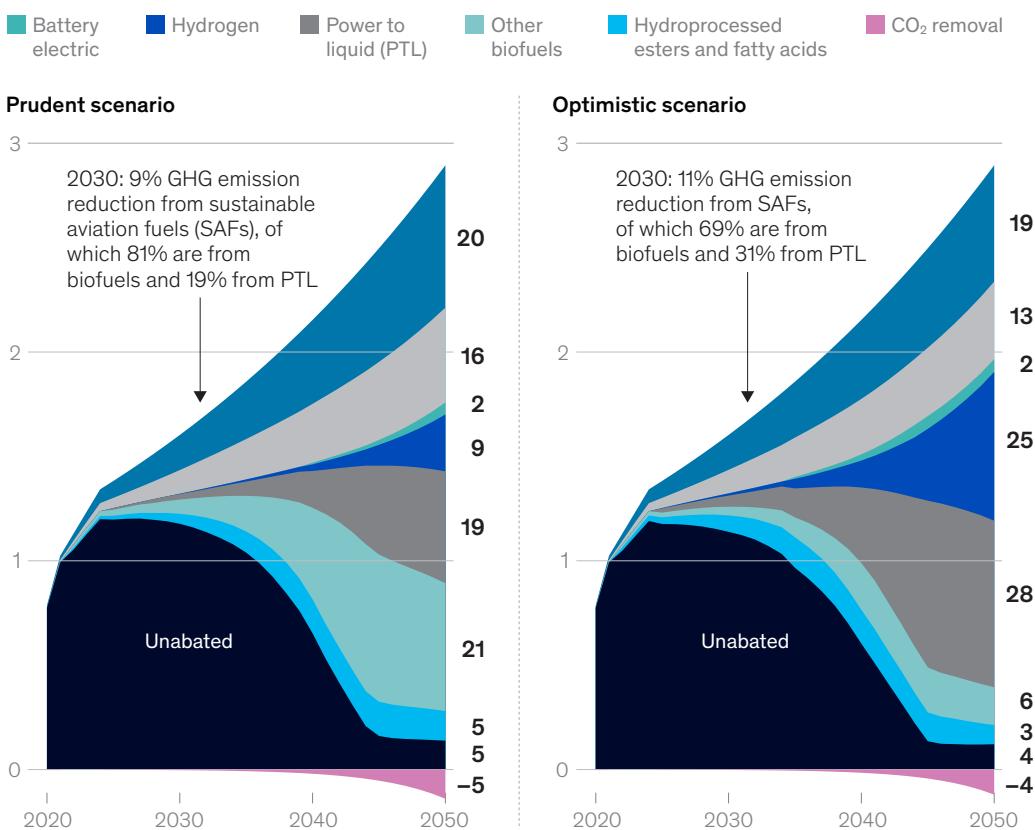
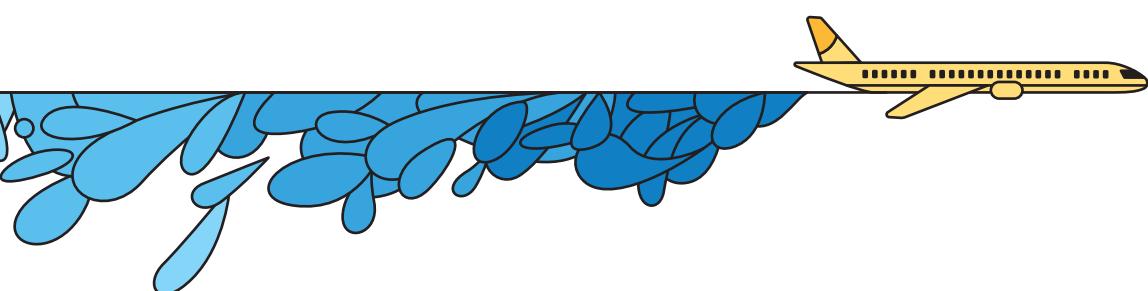
approximately \$175 billion a year (not including the capital cost of new conventional jet aircraft), on average, for the next 28 years. Around 80 to 90 percent of these investments would go to the production of sustainable aviation fuels (SAFs). To achieve carbon-neutral growth by 2030, SAF production capacity must be ramped up by a factor of five or six compared with existing and planned plants.

The remainder of the investment would go to the longer-term goal of developing battery-electric-, hybrid-electric-, and hydrogen-powered aircraft,

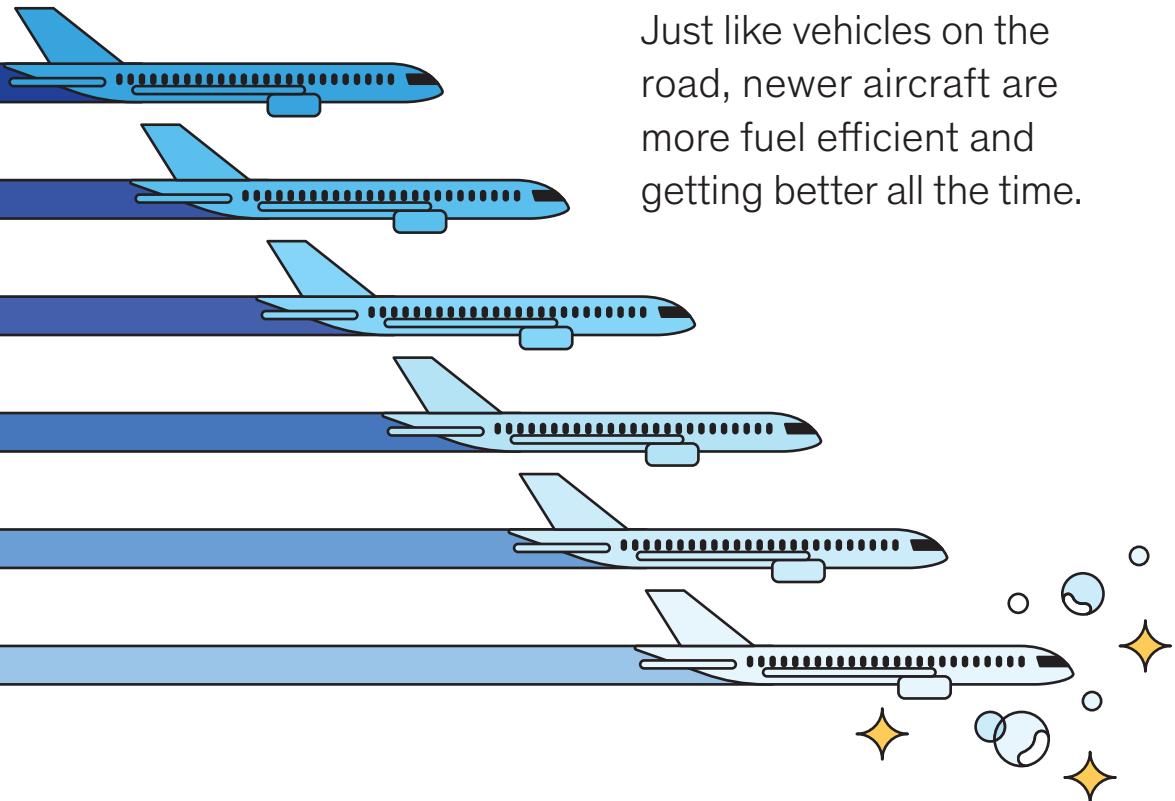
as well as the renewable-electricity and green-hydrogen production plants to power them. Electric- and hydrogen-powered aircraft could help reduce CO₂ and other types of emissions, such as nitrogen oxides and contrails.



This outlook is derived from eight articles, reports, and blog posts about aviation published in the past year on McKinsey.com.



Not all planes are created equal



Just like vehicles on the road, newer aircraft are more fuel efficient and getting better all the time.

The aviation industry achieved average yearly fuel efficiency gains—because of improvements of both aircraft and flight procedure—of 1 percent per year between 1970 and 2019, and they reached 1.5 percent per year between 2010 and 2019. A latest-generation aircraft is about 15 to 20 percent more fuel efficient than the previous generation models are. More fuel-efficient engines, lighter materials, and improved aerodynamics can be expected to help this trajectory continue.

Fuel efficiency programs, such as those involving reduced engine taxi, continuous descent approaches, and optimized routes, have contributed to making flying more efficient, and there are more opportunities in those areas for further gains. In recent years, much efficiency has been achieved by increasing seat density and the share of seats sold on a given flight.

However, those improvements can't continue forever, given the natural limit to how many seats a plane can contain or fill.

Overall efficiency improvements could increase to 2 percent per year by 2030 through additional efficiency gains, including improved operations, optimized approach and departure procedures, reduced vertical-speed inefficiency, improved congestion management, and single-engine taxiing, as well as other efforts, such as retrofits and new engine and aircraft designs. If these efficiency targets are achieved, the global aircraft fleet could be around 40 percent more fuel efficient in 2050 than in 2019.



This outlook is derived from eight articles, reports, and blog posts about aviation published in the past year on McKinsey.com.

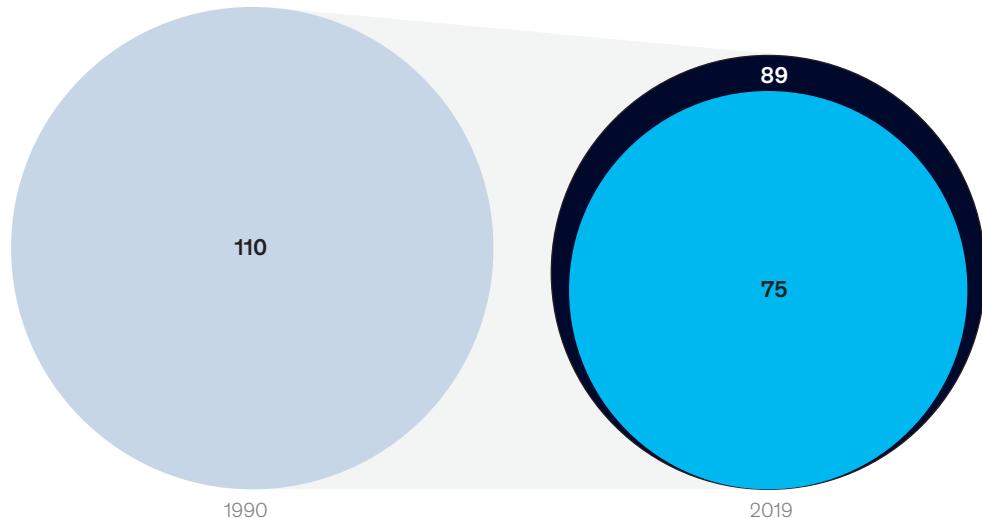


Today's global fleet is more efficient than in the 1990s, with the newest aircraft around 15 to 20 percent more efficient than the average.

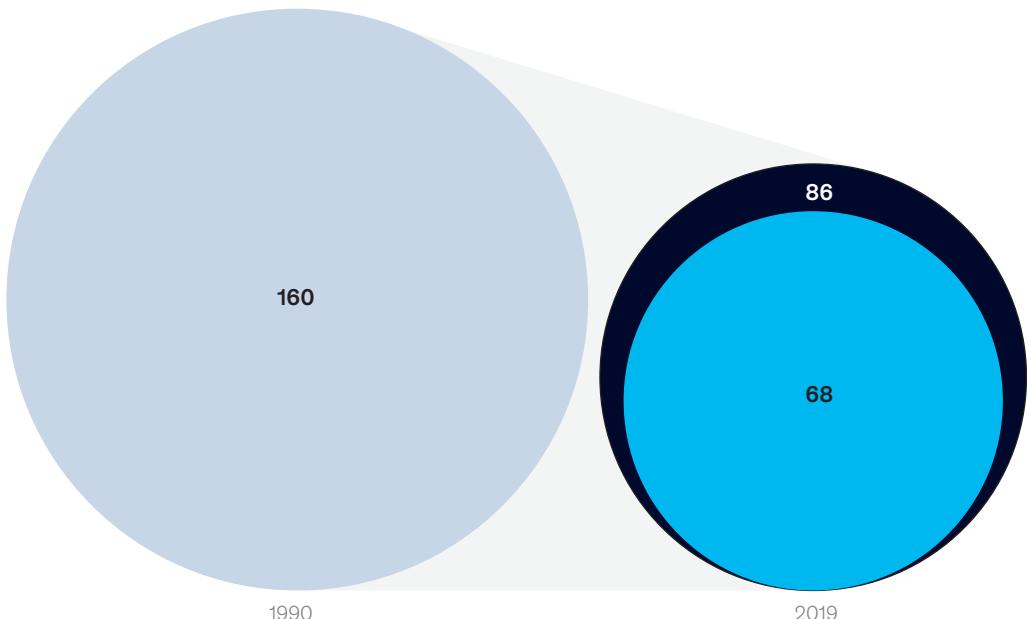
CO₂ intensity as proxy for aircraft fuel efficiency, gigatons of CO₂/revenue-passenger-kilometer

● Typical aircraft ● Global aircraft fleet average ● Most efficient aircraft

Wide-body aircraft



Narrow-body aircraft



Note: Uses average fuel economy for wide- and narrow-body aircraft, which were responsible for ~80% of commercial aviation CO₂ emissions in 2019, and indicative values for older and newest aircraft in fleet.

Source: International Council on Clean Transportation; Mission Possible Partnership; McKinsey analysis



Aviation fuel 2.0

Fuel efficiency can take aviation only so far. The industry also needs to ramp up alternative-fuel production.

SAFs have the potential to reduce net emissions by as much as 70 to 100 percent versus fossil fuels. SAFs are in limited use today because of their high cost and complexity, but a scale-up is under way. Over the next decades, SAFs will play a key role in decarbonization.

SAFs broadly consists of two categories. One is derived from biomass that is grown or harvested from other processes, including hydroprocessed esters and fatty acids (HEFA) and other biofuels. The other, the power-to-liquid process, starts with hydrogen that is combined with carbon—from direct air capture or from industry off gases—to synthesize fuel. Abundant green electricity

would be needed for this, and direct air capture of carbon is far from industrial scale at this point, so challenges remain.

All scenarios for achieving emissions reductions depend on building hundreds of plants to produce SAFs. Given project lead times of about five to six years, the project planning required to supply the 2030 demand level is feasible but needs to start now.



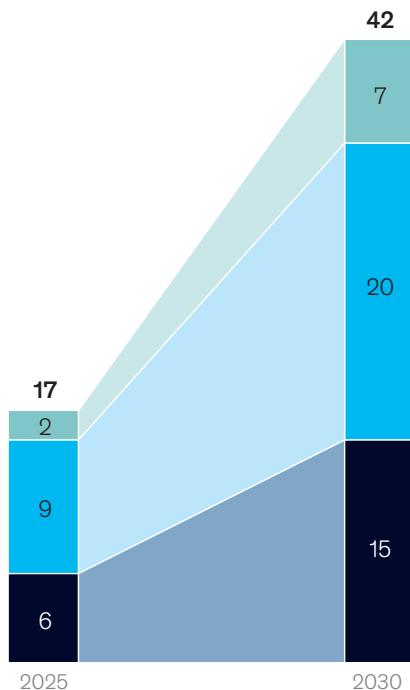
This outlook is derived from eight articles, reports, and blog posts about aviation published in the past year on McKinsey.com.

Aviation could be powered by biofuels and fuels created by power-to-liquid processes.

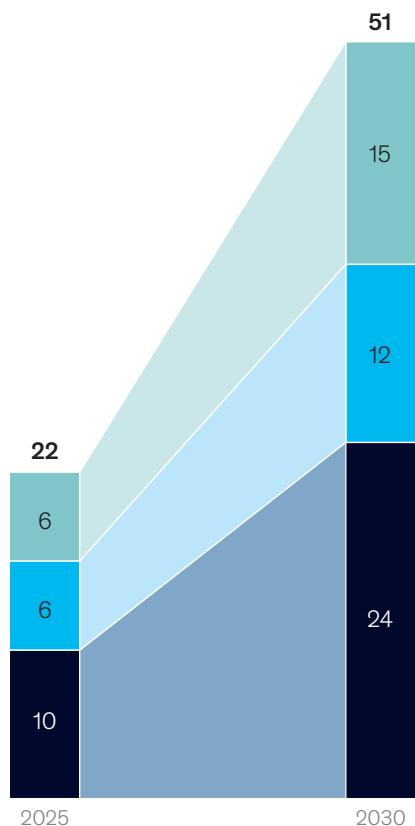
Projected volume of sustainable aviation fuel, by scenario, metric megatons

■ Power to liquid ■ Other biofuels ■ Hydroprocessed esters and fatty acids

Prudent scenario



Optimistic scenario



Note: Assumed plant output for aviation fuel: 0.3 million metric megatons/year for power to liquid and hydroprocessed esters and fatty acids; 0.065 million metric megaton/year for other biofuels.

Source: Mission Possible Partnership; McKinsey analysis



Sustainable aviation fuels, produced from biofuels and power-to-liquid processes, have the potential to reduce net emissions by 70 to 100 percent versus fossil fuels.

Novel propulsion: Another flight path

In the future, aviation could achieve emission reductions through green propulsion technologies, such as battery-electric, hybrid, and hydrogen power.



electric- and hydrogen-powered aviation hold the promise of more sustainable flying, as well as significant economic opportunity.

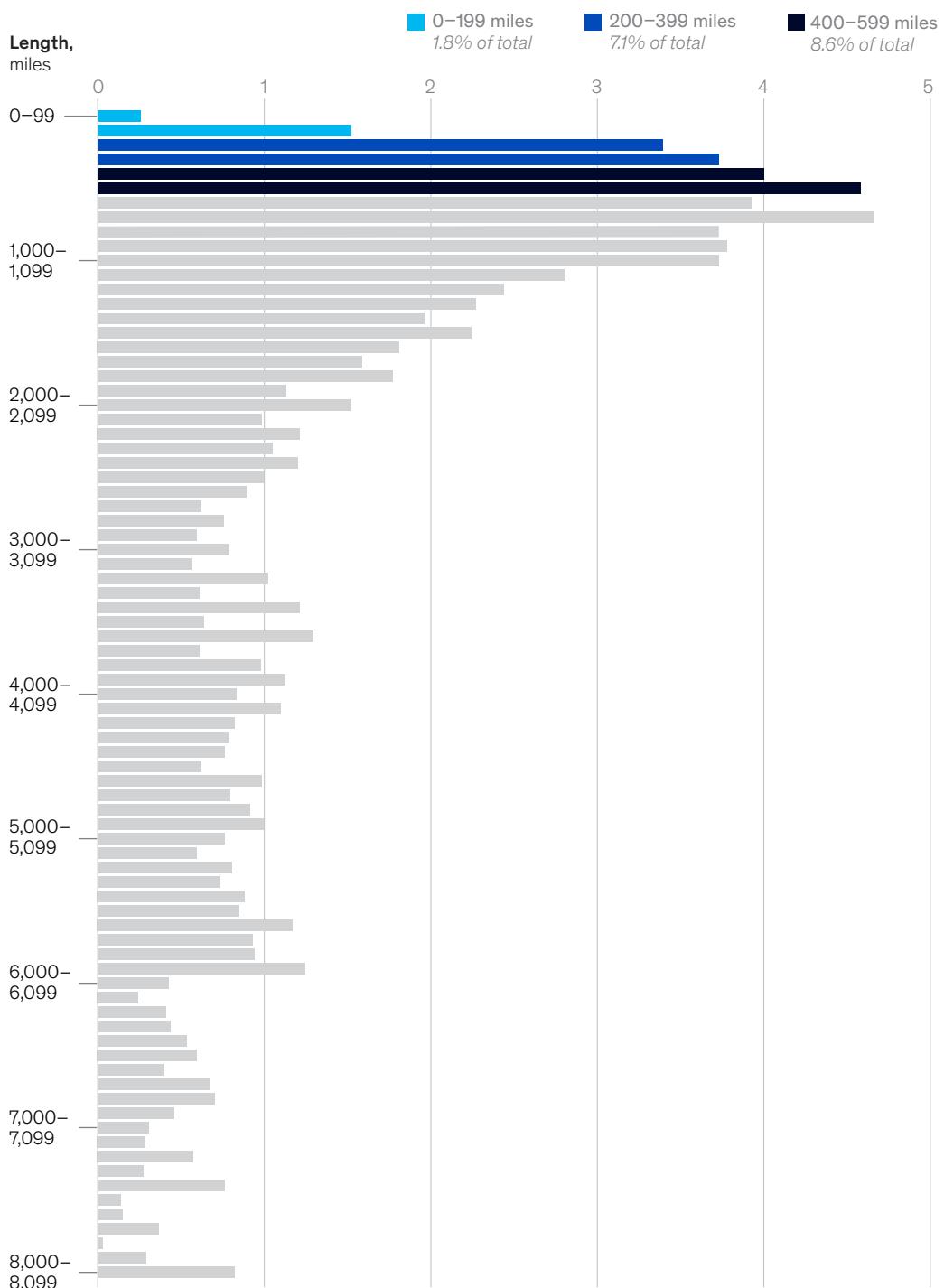
Several companies are already developing hybrid-electric-, battery-electric-, and hydrogen-fuel-cell-electric-powered options for aircraft that carry nine to 19 passengers and are completing short-distance trips of fewer than 600 miles. Short-haul flights account for more than 17 percent of total airline emissions, making them an important target for decarbonization efforts.



This outlook is derived from eight articles, reports, and blog posts about aviation published in the past year on McKinsey.com.

More than 17 percent of global commercial-aviation CO₂ emissions could be addressed with lower-carbon technologies, such as green novel propulsion.

Share of global commercial-aviation CO₂ emissions in 2019, by flight stage length, %



Source: European Environmental Agency; International Energy Agency; OAG Aviation Worldwide; McKinsey analysis

On the cusp of a new era?



by Chris Bradley,
Jeongmin Seong,
Sven Smit, and
Jonathan Woetzel



Current economic and political turbulence could presage the start of a new era that's structurally very different from the past, with a modern narrative of progress.

The past two and a half years have been extraordinary. The unnerving combination of a global pandemic compounded by energy scarcity, rapid inflation, and geopolitical tensions boiling over has people wondering what certainties are left. Today's events might even feel like a cluster of earthquakes that is reshaping our world.

Similar “earthquakes” have struck in the past: in the years surrounding the end of World War II (1944–46), during the period preceding the first oil crisis (1971–73), and at the time of the breakup of the Soviet Union (1989–92). Like a real earthquake, each changed the global landscape with the sudden release of powerful underlying forces that had been building up around a fault line over time. Each earthquake preceded a new era—a prolonged period during which the underlying global landscape or terrain remained relatively consistent. The eras that played out in the post-war period—the postwar boom (1945–71), the era of contention (1971–89), and the era of markets (1989–2019)—combined to make up one of the most transformative times in human history (Exhibit 1).

Are we now on the cusp of a new era presaged by the recent earthquakes? To us, the current moment resonates most with the aftermath of the oil shocks in the early 1970s: an energy crisis, a negative supply shock, the return of inflation, a new monetary era, rising multipolar geopolitical assertion, resource competition, and slowing productivity in the West. The aftershocks of the era of contention came in many waves and took almost 20 years to resolve. Can people do better than in the past, writing a new narrative of progress more quickly?

This moment is different from other “tremors,” such as the Asian financial crisis in 1997, the dot-com bust in 2000, and the global financial crisis in 2008. Most of those were on the demand side and were largely contained in a region or a sector. Today, however, the world faces a supply-side crisis, which is inherently physical rather than psychological, against a backdrop of a shifting geopolitical landscape.

Moreover, today's earthquakes have largely come as surprises, shaking the world after a 30-year era of relative calm. In truth, for us (and, we suspect, for most of our readers), our professional lives have played out on a consistent global landscape—one where the many implicit assumptions we hold about how the world works are now under direct challenge.

The world starts the next era (if, indeed, one is about to unfold) from a point fundamentally different from which we started the prior one. The world at the turn of the 1990s had a much more obvious gap between the developed and the developing worlds: huge populations poor in energy and resources, more people living in rural areas outside the orbit of global markets and capital, more people uneducated, and more people disconnected from one another and from the world's information.

After that, the world has converged much more into a globalized economy, with rapid catch-up growth for billions of people, and the world has managed peacefully to keep the gains. Without question, today's world is better. But with that growth, there has also been much more disruption to established constituencies, more pangs of imbalance, and more powerful new players asserting their place at the global table.

If the world is indeed in the early throes of a seismic shift, leaders must both prepare for the possibility of it and position themselves to shape it. In this article, we suggest a framework to imagine the new era. We try to build a map for it by looking at five domains: the world order, technology platforms, demographic forces, resource and energy systems, and capitalization.

The world order

The unipolar and settled world of the most recent era is shifting profoundly.

The world is becoming multipolar and proactive

Here's one example: the gap between the share of global material capability held by US-aligned powers and the share held by China is fewer than ten percentage points, which is smaller than the share gap between US-aligned powers and the Soviet Union during the Cold War. A second example is the slow spread of democracy: the share of the world living in a democracy topped 50 percent in the 1990s but stalled thereafter.

Those deeper trends have been accelerated and highlighted by a series of tremors in recent years. In February 2022, China's rise as an economic power reached a crossroads as its GDP overtook that of the European Union. At the end of March 2022, India passed the United Kingdom to become the world's fifth-largest economy by GDP. At the same time, peace in Europe—and the global economy—was rocked by Russia's invasion of Ukraine. Western-led condemnation was swift, but China, India, and 33 other nations abstained from a UN resolution to condemn Russia. Additionally, the COVID-19 pandemic delivered the largest global economic shock since World War II and prompted an overall expansion of the state just about everywhere, at least for the period of the pandemic, as public intervention and leadership came roaring back.

Increasing multipolarity may support a trend toward realignment into regionally and ideologically aligned groups

Global integration through flows of trade, people, capital, and, increasingly, intangibles remains a force in the world. However, some underlying trends have been evolving. For example, trade intensity has stabilized. After growing rapidly from the mid-1990s to the global financial crisis in 2008, merchandise trade as a share of GDP has remained flat over the past decade. Technological realignment may be seen too. There has been a decline in global interoperability and a splintering of the technology stack as the availability of major platforms and technologies increasingly depends on political lines that are drawn.

Again, these trends have led to some tremors in the past two years that signal regional realignment. In trade, for example, as many regional trade agreements were made in 2021 as in the previous five years combined. The Regional Comprehensive Economic Partnership, a free-trade agreement among Asia-Pacific nations, came into force in January 2022, creating the world's largest trading bloc. In geopolitics, as a consequence of the Ukraine war, Finland and Sweden's accession to the North Atlantic Treaty Organization (NATO) is being ratified, marking the largest addition to NATO's material capability since 2004.

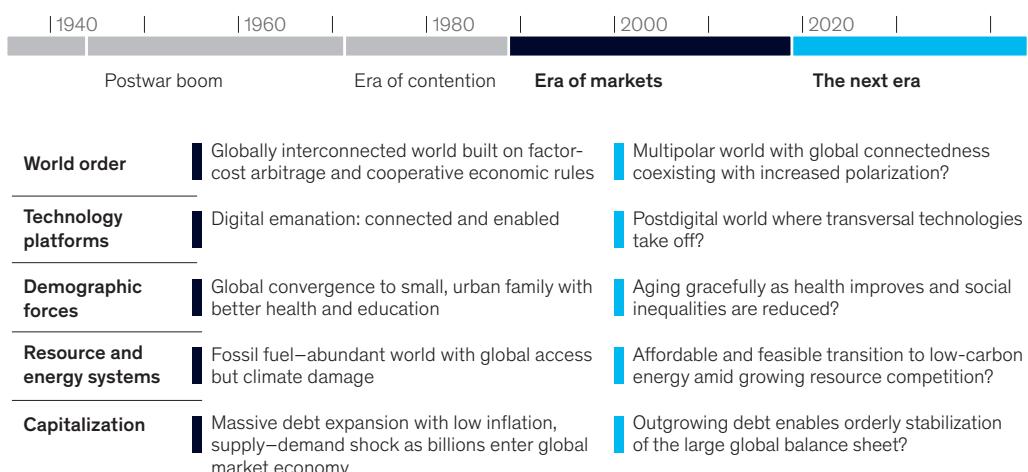
Years of relative moderation in internal and international politics may give way to more political polarization, both internally and among blocs

Internationally, a persistent gap separates liberal democracies and some more autocratic regimes. Moreover, since Russia's annexation of Crimea in 2014, the number of active economic sanctions—a marker of tension among nations—has hit an all-time high. This has occurred against a backdrop of increasing strain among people and institutions,

Exhibit 1

The world may be transitioning to the next era.

The recent global landscape and open questions for the next era



Source: McKinsey Global Institute analysis

particularly in the West. The polarization of US politics has been well studied. Between 2010 and 2020, polarizing political parties nearly doubled their share of the popular vote. The number of citizen protests is on the rise. Liberal democracy faces not only increasing internal tensions but also opposition from rising powers with alternative ideologies.

Unresolved questions

The following are some unresolved questions regarding the world order:

- *What might the multipolarity of the world look like in practice?* Will the economy remain global in nature, and will the world find new, workable mechanisms to cooperate beyond the economy? At one end of the spectrum, there could be a gradual transition to a multipolar order in which blocs develop autonomous control over limited, strategically important resources and capabilities—such as energy systems and semiconductor manufacturing—while global collaboration continues more generally. At the other end, there could be a more abrupt transition to much more limited collaboration among blocs across all dimensions, combined with heightened geopolitical tensions.
- *How effectively will global and local institutions and leadership adapt to and shape this different world order?* On the one hand, global institutions could play a pivotal role in managing an orderly transition. Domestically, they could make the appropriate decisions and investments to thrive in a growing world. On the other hand, global institutions could be sidelined by international blocs, while shortsighted domestic decision making could lead to a misallocation of resources, exacerbating the strain on society.

Technology platforms

A new set of trends is shaping tomorrow's technology landscape.

Key drivers of previous eras may slow in the coming years

Certain drivers, such as Moore's law and the spread of digital, might slow. The physical limits of Moore's law are being approached—consider the atomic limit of transistor size—while the expense of adhering to Moore's law is growing exponentially. However, new dimensions of semiconductor innovation may extend advances in computing power. A deceleration in hardware innovation may lead to greater emphasis on software development.

In the era of markets, cell phones and the internet far outspread fixed-line phones and PCs in adoption. However, a saturation point may be near. While smartphones will become the norm even in the least developed countries, global growth in volume will end as demand falls in the West. Indeed, the number of smartphone shipments has been in decline globally since 2018.

A set of transversal technologies may shape the next era

New and emerging transversal technologies, such as applied AI, bioengineering, and immersive-reality technologies, are attracting up to hundreds of billions of dollars of annual investment, often with double-digit investment growth rates (Exhibit 2). These technologies may counteract the slowdown suggested earlier. For example, developments in quantum computing may spur the next big S-curve of development.

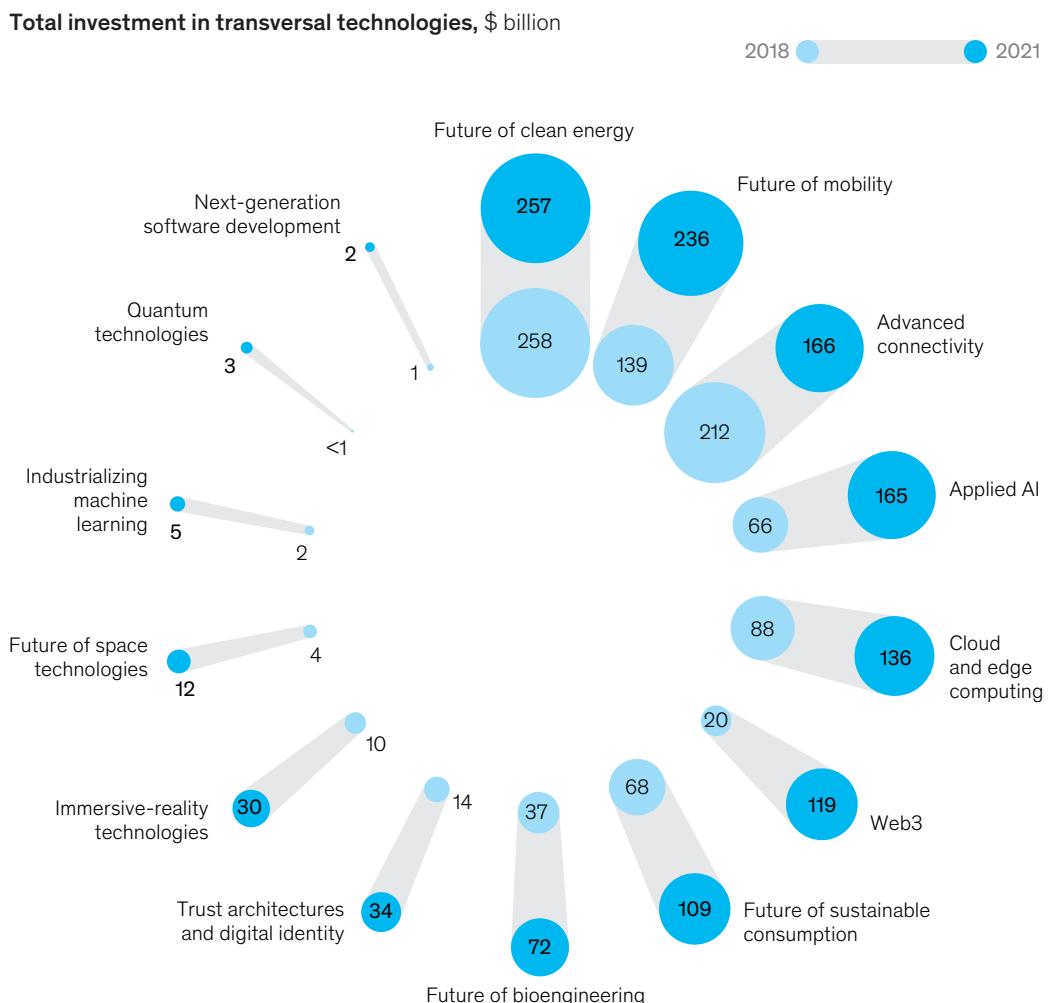
And in the digitally saturated world, frontier technologies (such as the metaverse) will begin to enter the mainstream. Focusing on AI in particular, the wide range of potential applications has led some to claim that it will underpin a Fourth Industrial Revolution. AI innovation, as measured by AI-based patent applications, grew at a rate of more than 75 percent a year between 2015 and 2022. Accelerating the preexisting trend, the COVID-19 pandemic propelled even faster adoption of AI and automation.

Technology may move to the forefront of geopolitical competition and power

Technology is permeating nearly every sector of the economy, determining competitive dynamics. Geopolitics are shifting in unpredictable and potentially challenging ways, making strategic autonomy in critical technologies an ever-more-salient topic. A race for

Exhibit 2

Investment is flooding into 14 transversal technologies.



Source: McKinsey Technology Trends Outlook 2022

AI primacy among major powers is under way, with many recently questioning the belief that the United States leads its peers in AI capabilities.

There is competition for influence in global standard-setting bodies. Consider, for example, China's ambition to take a more leading role through the China Standards 2035 strategy. There are concerns about the security implications of globalized hardware flows, as well as the selective block on exporting the world's most sophisticated chip-making machines, which are produced by only a single company in the Netherlands. And cyberattacks as a tool of state power have increased. Between 2020 and 2022, 320 state-sponsored cyberattacks were publicly reported, which was nearly as many as in the full decade prior.

Unresolved questions

The following are some unresolved questions regarding technology platforms:

- *What impact will the next wave of technologies have on work and social order?* AI technologies will present both opportunities for and challenges to the nature of society and work, the balance between digital and physical domains, the financial system, and the interplay among humans and machines. Many forecast that AI may lead to job disruption rather than job destruction. However, the threat of losing good jobs and the risk of leaving behind certain groups remain. Depending on the choices made, a smooth transition to an AI-augmented world could be engineered, or technology could fracture the social order.
- *How will technology, institutions, and geopolitics interact?* Technological innovation has become the crucible of global competition. Emerging questions concern the nature and extent of data localization, the balance—and sharing—of critical technological capabilities among powers, the role of technology in changing institutions, and the future frameworks for standard setting. Potential future paths range from healthy competition among powers under a broad framework of shared standards and breakthroughs to a decoupled world with a concentration of technological power held within blocs.

Demographic forces

An aging world is shifting in a variety of ways.

A young world will evolve into an aging, urban world

The world is aging as never before as a result of declining fertility rates and rising life expectancy. Globally, the world has reached the plateau of “peak child”—it’s unlikely that there will ever be many more people under the age of five alive than there are today. This demographic shift isn’t confined to the West: it’s set to become an Asian phenomenon too. In China, for example, the working-age population is already falling, and the old-age dependency ratio is projected to surpass that of the United States in the next 15 years.

Africa, conversely, will be the source of more than half of global population growth in the coming decades. By the early 2030s, the continent is expected to have a larger working-age population than will China or India and a median age of 20. As Africa, the young continent, continues to grow even as populations elsewhere shrink, could it finally enter into a sustained period of rising prosperity?

The world will continue to urbanize. In 2021, the world hit “peak rural”—all future population growth is projected to come from urban centers as rural populations decline. Again, urban growth will come from outside the West. Whereas Europe and North America are projected to gain 13 large cities by 2035, Africa and Asia are expected to gain around 50 and 100, respectively.

The age of communicable diseases may give way to an age of noncommunicable diseases

An aging world brings a shift from communicable diseases to often chronic noncommunicable diseases (NCDs), the sizable impact of the COVID-19 pandemic notwithstanding. In developing countries, the rates of death and disability related to NCDs have been falling. However, an aging population means that the absolute size of the NCD burden has been surging—a change for which developing countries are often ill equipped. In some high-income countries, most notably the United States, death and disability rates related to NCDs are increasing. Indeed, the combination of the NCD burden and the COVID-19 pandemic—which has led to an estimated 18 million excess deaths globally—contributed to a 2.7-year drop in life expectancy in the United States between 2019 and 2021, regressing to the average life expectancy seen in 1995. The combination of the NCD burden and rising old-age dependency ratios is likely to increase demands on the welfare state, putting further upward pressure on health expenditures and pensions.

Inequality within countries may increasingly challenge the social fabric

Inequality inside nations is another challenge. Within countries, the ratio of the top 10 percent measured by income and the bottom 50 percent is at the highest level since its peak at the start of the 20th century. In the United States, trust in government is at historic lows. In Europe, citizens' trust in government is at stable lows. The link between rising inequality and falling trust in institutions may not be causal. Nonetheless, a narrative is increasingly circulating that the economic benefits of society are captured by elites and enabled by reinforcing institutions.

Unresolved questions

The following are some unresolved questions regarding demographic forces:

- *How will countries, institutions, and individuals adapt to demographic changes?* Managing the transition to an older society will require investment in and supporting structures for an equitable balance. There are choices to be made, for example, about the extent to which society prioritizes adding years to life and life to years—taking the view of health as an investment—rather than investing in other demands on expenditure. In other words, the world could age gracefully, with healthy, productive later years becoming the norm, or old-age dependency could impose heavy social and economic costs on the young. Moreover, it's unknown how shrinking working-age populations (in China and Europe, for example) and growing ones (in Africa and India, for example) will affect economies.
- *How will capital and institutions respond to rising inequality?* Here, too, a spectrum of outcomes is plausible. Institutions and policies could facilitate a more equitable and inclusive distribution of the fruits of society in the interest of sustainable growth, and the narrative on inequality could be tempered. On the other hand, intracountry inequalities could continue to rise, exploited by destabilizing political forces that undermine the perceived legitimacy of institutions.

Resource and energy systems

An energy transition brings new challenges.

Spending will shift to replacing fossil fuels, but overall investment may struggle to keep pace with growing energy needs

The near-term energy landscape will be shaped by recent underinvestment. At its heart lies a paradox: the current pace of renewable-energy infrastructure investment is too slow for the goals of the Paris Agreement to be met, but if those goals aren't achieved, then current investment in fossil-fuel infrastructure is too low to make up the shortfall. Between 2014 and 2022, investment in energy infrastructure stagnated (Exhibit 3). Spending on renewables would need to increase at four times its rate from 2015 to 2022 to be on the path to achieving net-zero emissions. Oil drilling hasn't responded to recent high prices as markedly as it has in the past, likely because of concerns about fossil-fuel investment. Indeed, recent years have seen a shortfall of more than \$1 trillion of investment in energy infrastructure versus 2014 levels, with a 33 percent drop in fossil-fuel and nonrenewable-power investment over the period.

That is in stark contrast to the additional annual global investment of as much as \$3.5 trillion in low-emission assets estimated to be needed to achieve net zero. Increased investment in renewables, fossil fuels, or both will be needed to meet global energy requirements. A combination of underinvestment and catch-up investment in both renewable- and fossil-fuel-energy infrastructure could produce a prolonged period of higher prices. Even before Russia's invasion of Ukraine, the trend of underinvestment manifested in the form of high price signals across energy commodities in late 2021.

Resilience, feasibility, and affordability concerns may challenge the velocity of the transition to net zero

Energy security will become a key consideration in countries' energy mix. In the short term, securing supply in the face of the energy shock triggered by Russia's invasion of Ukraine may trump the goal of net-zero carbon emissions by 2050. For example, €10 billion of investment in liquefied natural gas infrastructure is foreseen in Europe over the coming years to reduce reliance on pipeline gas. However, renewables will also play a role in bolstering energy security.

When the current shock resolves, the trend toward increasing political commitments to net zero will likely resume. However, amid economic uncertainty, the strength of commitment to the spending required to achieve net zero is less certain—as are the technical feasibility and affordability of doing so. By some estimates, the amount of land needed for decarbonized electricity production may need to increase two- to threefold. That would entail an incremental global footprint similar in size to Mexico.

By the end of 2020, the world had grid-level battery capacity to store only around one minute of its global electricity consumption. And electricity accounts for only 20 percent of global energy consumption. The picture is no brighter in other sectors: only two of the International Energy Agency's 55 clean-energy-progress indicators are on track; in its aggregated rating system, fuel supply, transport, buildings, and industry sectors aren't on track.

Meanwhile, demand for currently irreplaceable steel, cement, ammonia, and plastics—together accounting for 25 percent of fossil-fuel-related emissions—will continue to grow as the world completes its development pathway. Of course, for those organizations that can make use of the trends and implement solutions to these gnarly problems, a big business prize awaits.

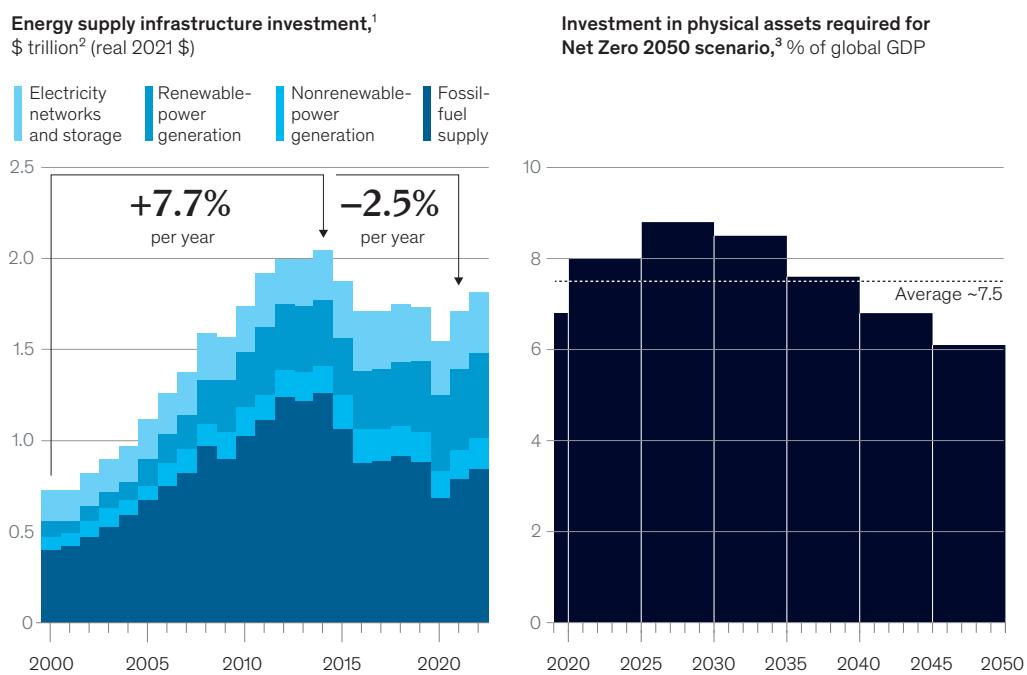
Critical resources for the future economy may become increasingly important in economics and geopolitics

In recent years, supply–demand imbalances for critical minerals, such as cobalt, have radically changed price signals and driven substitution and innovation. To meet demand for copper and nickel alone, an estimated \$250 billion to \$350 billion of cumulative capital expenditure may be required by 2030. Some estimate that to enable a 50 percent fleet replacement with electric vehicles by 2050, consistent with a net-zero scenario, global production of lithium and cobalt would have to increase approximately 20-fold and nickel 30-fold. Copper supplies, too, are expected to come under strain.

Exhibit 3

Investment in energy supply has stagnated, and more is needed.

A history and projection of energy infrastructure investment



¹Using the International Energy Agency (IEA) infrastructure classification. Electricity networks and storage includes power grid infrastructure and batteries; renewable-power generation includes solar, wind, and other renewables; nonrenewable-power generation includes coal, oil, gas, and nuclear-power generation; fossil-fuel supply includes upstream and midstream infrastructure for supply of coal, oil, and gas. Infrastructure investment in clean-fuel supply represents less than ~1% of total spend and has been excluded from the analysis. Note that end-use energy infrastructure (eg, retrofitting buildings to improve efficiency) is not included in the energy supply totals.

²2000–14 investment figures and categorization are estimates based on the IEA *World Energy Investment* (2016) report, using an implicit GDP price deflator to adjust to 2021 dollars.

³Annual spending on physical assets for energy and land-use systems in a Network for Greening the Financial System Net Zero 2050 scenario. Source: IEA *World Energy Investment*, 2016, 2022; "The net-zero transition: What it would cost, what it could bring," joint report from McKinsey, McKinsey Global Institute, and McKinsey Sustainability, Jan 2022; McKinsey Global Institute analysis

The need for critical minerals presents multiple challenges. Sources and processing capabilities for many minerals are highly concentrated in just a few countries. For example, China produces most of the world's rare-earth elements and refines most of its lithium and cobalt. The concentration of demand for critical minerals may only heighten competition among global powers. Diversification is possible, but it takes time and very significant, sustained investment. Moreover, processing requires technologies and human capital that may take many years to develop.

The environmental and social tolls associated with some of these developments pose yet another hurdle to a number of potential projects. And while many want the world to decarbonize, few want the mine that provides the necessary minerals to support this goal to be dug in their backyard. In late 2021, Serbia, citing environmental concerns, revoked the mining license for what would have become one of the world's largest lithium mines.

Beyond the issue of minerals, the invasion of Ukraine highlighted how millions—particularly the world's most vulnerably situated—rely on global flows of food. Key grain crops are perhaps surprisingly concentrated in just a few breadbasket regions. The top ten grain exporters accounted for around 70 percent of global exports in 2019. The Middle East and North Africa region, for instance, relies on imports for 60 percent of its grains (and its wheat largely comes from Ukraine and southern Russia).

Moreover, key fertilizers are highly concentrated in just a few producer countries. In the case of potassium chloride, which accounts for most potash fertilizer, around 80 percent of exports originate in Belarus, Canada, and Russia. That leaves importing countries vulnerable to disruption. The issue of food security was already climbing the global agenda because of early evidence of the impact of climate change on global food supplies, and disrupted supplies in Europe have served only to accentuate susceptibilities.

Unresolved questions

The following are some unresolved questions regarding resource and energy systems:

- *How will the world navigate an affordable, resilient, and feasible path to climate stability?* Net zero by 2050 is an ambition unprecedented in scale. Achieving it will depend on significant investment. The incremental annual global investment required is estimated to be as much as \$3.5 trillion. It will also require rapid cross-sectoral innovation. To drive the required investment and innovation, supportive economic and political frameworks need to be in place. Again, many outcomes are on the table. Global collaboration and effective investment could spur innovation and deliver an affordable and resilient path to net zero. Conversely, progress could stall and innovation could founder, leading nations, individuals, and the biosphere to undertake a difficult adaptation to a climatically different world.
- *What dynamics will play out among groups that have critical resources and those that don't?* The salience of that question derives from recent global events, but it's one that has been asked for centuries. In the most recent era, market-based systems and global interconnectedness have supported relatively peaceful and efficient exchange. One path to the future enables that to continue, bolstered by improved mechanisms to

address local environmental and human impacts. Another path leads to imbalances in the concentrations of power whereby either resource owners or resource buyers pay disproportionate and disruptive costs, economic or otherwise.

Capitalization

Big shifts will shape the global economy.

Economic growth rates may normalize

Around one billion people have lived in economies enjoying hypergrowth in recent decades. In the next era, it's unlikely that there will be more top-gear catch-up growth from large economies, because the world has converged to the same productivity curve. Although China's GDP overtook that of the European Union in early 2022, its economy moved out of the top gear for growth for the first time in almost 40 years. Meanwhile, productivity growth has continued to slow in advanced economies, falling to its lowest level in the postwar period. Capital-labor ratios—as approximated by the agricultural proportion of labor—in emerging economies are converging with those in the West. Lower growth and productivity may contribute to a global economic slowdown, and the end of the large, positive supply shock in global production may make inflation even harder to rein in.

Growing leverage and credit may evolve into balance sheet stress

Economies could be under pressure to deleverage historically high levels of debt. Total debt in advanced economies is at its highest levels since the end of World War II—in G-20 nations, the ratio of total debt to GDP is more than 300 percent. The postwar deleveraging approach, namely to outgrow the debt, may be more challenging in the context of low productivity growth.

Looking beyond public debt, on the global balance sheet, asset values relative to income are nearly 50 percent higher than long-run averages are. The rise is underpinned by real estate, which accounts for two-thirds of global net worth. These high valuations are at risk of reverting to their historical means.

The tremors here are already widely felt. In some economies, inflation had already hit 40-year highs by September 2022, triggering a rise in nominal interest rates alongside historically high debt levels—raising the specter of an inflationary recession, but this time with radically higher leverage in both the public and private sectors. And there are signals that the current economic climate is destabilizing emerging markets, which are especially vulnerable to changing global economic conditions.

The OECD century is giving way to the Asian century

The shift is driven by a confluence of factors across domains, but its significance may be felt most in how it will shape the drivers of supply, demand, finance, and wealth. That confluence of factors includes the multipolar world order, with China as a major power. It includes the demographic shift toward Asia—in 2030, India, China, Indonesia, and Pakistan will represent four of the world's five largest working-age populations. And it includes the shift in GDP growth; Southern Asia was the world's fastest-growing region in GDP from 2015

to 2019. While a continued shift toward Asia appears likely, future Asian models for economic success, and how they might differ from the Western paradigm, are less clear.

Unresolved questions

The following are some unresolved questions regarding capitalization:

- *Will the next productivity engine to drive growth be found?* Labor productivity growth in G-7 nations decelerated for almost the entirety of the era of markets. The world could identify and fire up the next productivity engine and double down on growth enablers, or a slower rate of growth could become the norm.
- *Will the rise and rise of the global balance sheet be reversed?* Increasing leverage could be blunted or sustained by outgrowing debt or could lead to a difficult deleveraging across economies. Similarly, the growing global balance sheet could be sustained by accelerating GDP growth or increasing savings rates. Alternatively, asset prices could revert to the historical mean through a painful devaluation.

How can leaders think about the road ahead?

Looking at a future that could be less cohesive or less prosperous may invite pessimism, but looking back over the past 80 years gives us a compelling case for optimism too. Negativism shouldn't overwhelm effective decision making. In Western societies, in particular, a chronic bias toward pessimism and a lack of faith in the liberal order seem endemic. Yet the post-war period brought unprecedented progress and global development. Even now, when so many challenges have coincided in just a few short years, there are firm reasons to think that the future will be bright.

First, many issues can be addressed now, at least in part, with current technologies if the world can prioritize them systematically and focus efforts on the issues in the circle of control. In the case of the net-zero transition, for instance, leaders could address methane emissions first before moving on to other aspects of the climate challenge. In health, they could prioritize quick wins, such as embracing the Choosing Wisely campaign that's spreading around the world and aims to reduce low-value medical care. It's better to start taking action rather than be deterred out of fear of not achieving everything now.

A second source of optimism is that many breakthrough technologies are moving from science fiction to reality—for example, the creation of small, modular nuclear reactors. The first US final certification of such a design was announced in 2022. Another example: the CRISPR gene-editing tool is migrating from lab to bedside to tackle cancer and genetic disorders, such as sickle cell anemia and thalassemia.

Third, local bright spots act as beacons for the path forward. Take, for instance, Finland's education system, which leads the world with its less regimented, more locally empowering approach to learning. Another example: the Netherlands has developed an effective, nurse-led model of holistic, continuous care for the elderly. Perhaps the most compelling example of effective action in the teeth of a deep global challenge was the response in many parts

of the world to the COVID-19 pandemic. Effective vaccines were developed faster than ever as the public and private sectors collaborated closely.

Even in the face of war, governments and businesses have shown that they can mobilize, cooperate, and shift gears when the stakes are high. Just one instance of that is Germany's fast-track creation of liquefied natural gas infrastructure to reduce its energy dependency on Russia.

If we are indeed in the early throes of a seismic shift, what questions should leaders be asking themselves? They need both to prepare for the possibility of a new era and to position themselves to shape it:

- ***Preparing for the next era.*** Am I prepared for trends that could go in multiple directions? What shifts would leave me and my organization most exposed? What no-regret moves can we make that will insulate our business from unpredictability? Which leading indicators can act as early-warning signals for an upcoming change of direction?
 - ***Shaping the next era.*** How active should I be in trying to set the course through the unresolved questions? How can I help steer toward better outcomes?
-

It may be tempting to let pessimism diminish aspirations and allow paralysis to jam up decision making. The truth is, however, that a new narrative of progress can be shaped for the next era. As the famous adage goes, "Nobody can go back and start a new beginning, but anyone can start today and make a new ending." **Q**

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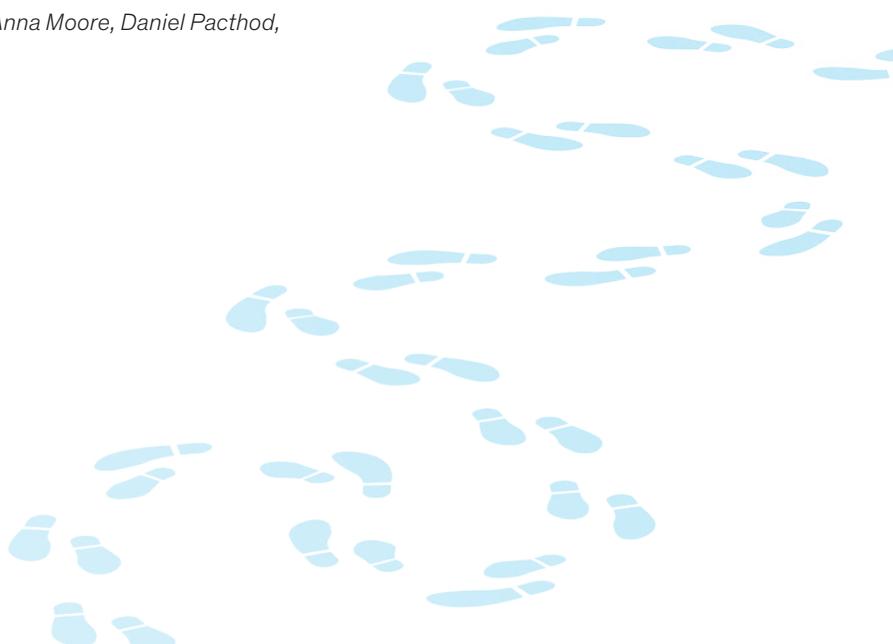
The authors wish to thank Kanmani Chockalingam, Anna Grebenchikova, and Camillo Lamanna for their contributions to this article.

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A devilish duality

How CEOs can square resilience with net-zero promises

by Bob Sternfels, Anna Moore, Daniel Pachthod,
and Humayun Tai





What a difference a year makes. In November 2021, business leaders showed up in force in Glasgow at the UN Climate Change Conference (COP26), pledging to take on the challenge of reaching net-zero greenhouse-gas-emission goals by 2050. While no one believed that the path to net zero would suddenly become easy, commitments made to target nearly 90 percent of CO₂ emissions for reduction signaled that the private sector was truly engaged. Then major new headwinds began swirling: surging inflation, war in Europe, energy insecurity, and a potential global recession. Still, governments pressed ahead, passing major climate legislation packages in Europe and the United States. More than 3,000 companies have made commitments on net-zero pathways.

At the time of COP26, McKinsey released a perspective on the requirements needed to secure a net-zero carbon emission transition. It was clear, given the challenges to deploying capital at scale, managing economic dislocations, and scaling up supply chains and infrastructure, that the path would not be linear and would include slowdowns and backstepping. Ultimately, sustainable systems are more value creating than traditional ones. But countries and companies must balance trade-offs among net-zero commitments, affordability for citizens, and security of energy and materials supply.

As disruptions have intensified, the moment confronts CEOs—organizations' ultimate integrators—with a devilish duality. As net zero has become an organizing principle for business, executives are on the spot to lay out credibly how they will deliver a transition to net zero while building and reinforcing resilience against the certain volatility of ongoing economic and political shocks. The zigs and zags of present conditions will tempt some leaders with exclusive choices—doubling down on fossil fuels, for example, at the expense of new and emerging renewable technologies. Leaders will face multiple calls on their attention, as well as concerns about how quickly to drive a sustainability agenda forward.

We believe that the right response to such challenges has always been a matter of “and,” not “or”—that is, maintaining focus on the long term while adjusting in the face of present conditions rather than opting for one or the other. A resilient stance, being prepared to withstand shocks and poised to accelerate into a changed reality, permits companies to weather not just the current moment but also the future storms that are likely to come their way in a world of rising risks.

The task is neither simple nor easy. Yet there is also good news: today’s reality is that sustainability, economic competitiveness, affordability, and national security dovetail as never before. To make the most of the situation, CEOs can shape strategy around resilience now to tap value-creating businesses tomorrow as the world continues to head toward net zero in the long run. In this article, we present five core actions to help meet the dual imperatives at the heart of a new sustainability strategy.

Stormy weather

The path to net zero was always going to be fraught with complexities. Recently, several “weather fronts” have emerged, posing significant challenges to leaders across both the private and public sectors.

Energy availability and security

The Russian invasion of Ukraine and the resulting energy crisis in Europe are reminders that, fundamentally, disruption in energy markets can wreak havoc on the global economy. In response, countries are boosting the use of fossil fuels, including coal and gas, and extending the life of conventional energy infrastructure, which is under growing pressure.

Physical risks are proliferating. Europe saw a record-breaking heat wave last summer. Floods devastated Pakistan last autumn, and tropical storms raged across Japan, the Koreas, and China. In the United States, Texas saw an unprecedented grid failure in 2021, with a near miss in California last year. There are important choices to be made, some of which entail trade-offs between climate mitigation and climate adaptation—for example, rebuilding versus relocating and investing in cooling versus keeping energy consumption down—all of which occur within a limited envelope of infrastructure funding.

Affordability

Prices are rising across the globe, driven by the energy crisis in Europe, the growing food crisis resulting from the invasion of Ukraine, and a recovery from the COVID-19 pandemic that has been faster than expected, and, though welcome, has put pressure on supply chains. The outlook is ominously recessionary.

There is a growing perception that net zero comes at the expense of affordability, with a zero-sum trade-off. The universal problems of supply chain and talent shortages complicate the equation, particularly as deployment for the new assets and infrastructure needed for the net-zero transition pick up. This, in turn, could result in price spikes for the key inputs needed for the net-zero transition. Companies also face growing challenges in securing the parts, labor, and specialized skills they need to execute on net-zero commitments. From heat pumps to recycled textiles and insulation installers to carbon management data scientists, companies are struggling to match supply to customer demand.

Governance and regulation

A key tenet of any orderly transition to meeting net-zero goals is demonstrating ongoing governance and cooperation among public- and private-sector institutions, meeting commitments, and maintaining public support for progress toward cutting greenhouse gases. The war in Ukraine has already reduced the potential for such cooperation. Also, the United States is seeing growing backlash against standardized environmental, social, and governance (ESG) reporting requirements and skepticism of ESG funds that some criticize as punishing fossil-fuel producers and hurting local economies. The outlook for aligned standards, requirements, and public support is becoming murkier.

Shaping a resilient sustainability strategy

There is an increasingly popular view that leaders will need to navigate a zero-sum trade-off between addressing climate action headwinds and sticking to their commitments for achieving an orderly net-zero transition. However, while the path to net zero will not be a straight line, and some regions will step back commitments for the short term, the long-term trajectory remains intact.

More important, these discontinuities also create opportunities—and imperatives. We believe that the potential is great to shape a resilient sustainability strategy that creates a virtuous cycle of managing short-term shocks; bolstering prospects for an affordable, clean, and secure energy future; and improving the long-term competitiveness and value creation of companies. In part, this is because competitors may be tempted to pause during this period of turbulence. That creates a chance for those who stay the course to gain strategic distance:

- ***Energy independence via accelerated use of renewables and clean power and capture of the full potential of energy efficiency and distributed electricity.*** Diversifying the energy supply with renewables, green hydrogen, and green power promotes national energy security and economic competitiveness. In Europe, the invasion of Ukraine and the effort to develop a future free of dependence on Russian gas has prompted Europe to raise its commitment to renewables (alongside imported natural gas in the medium term and possibly nuclear power in the longer term). Of course, energy market resiliency must be built in tandem—for example, by rewarding the firming of capacity in power markets as the share of intermittent power generation grows. Even prior to the invasion of Ukraine, industrial policy across the larger European economies was focusing on clean-energy tech as a source of national competitiveness. Examples include European clean-tech export policies, support for rare-earth minerals needed for new climate tech, and national funding to drive local new-energy industrial growth (such as the US Infrastructure Investment and Jobs Act). Companies that operate in this space or serve those in it have clear long-term growth prospects.
- ***New value from existing systems.*** It is becoming increasingly apparent that it may be possible to repurpose existing methods of carbon-intensive production with additional enabling technologies to future proof them for a sustainable future. Numerous examples—such as retrofitting existing industrial production facilities for carbon capture, use, and storage (CCUS); using hydrogen blends in methane carriers; and employing direct air capture (DAC)—are emerging to lower carbon intensity and transform existing systems into cleaner alternatives. Owners and operators of this infrastructure that invest in future proofing through CCUS, DAC, or other tech stand to make significant gains. Repurposing rather than stranding these assets will not just enable affordability and system resiliency but also provide incumbents with greater confidence that decarbonizing their legacy assets is feasible.
- ***Sustainable materials transition.*** The energy transition requires a materials transition. Projected electric-vehicle demand, for example, will raise demand for cobalt, copper, lithium, nickel, and rare-earth minerals, putting further upward pressure on pricing across these commodity classes. Commitments to decarbonize automotive, consumer goods, packaging, and other sectors are also already driving supply–demand shortages in aluminum, plastics, and steel. We expect, for example, a 50 to 60 percent shortage of same-cycled plastics compared with demand in 2030, driving significant green premiums. If supply eventually meets demand, early movers will most stand to gain. With the current commodity cycle at a peak, cash can be reinvested in nascent materials opportunities that will be in clear demand in the longer term.

- **New sources of capital.** Investors and incumbents have started a new wave of capital deployment toward net zero, including investments in new materials, new climate tech, and more adaptive supply chains. These investments are increasingly following a “private equity plus” model, with heavily involved investors helping build new green challengers from the outset. Countries and regions with hard-to-abate sectors are also increasingly important sources of climate tech and transition capital as they seek to decarbonize while preserving economic growth. These ventures are in their early stages as voluntary and policy-driven demand materializes and grows. But they demonstrate that while there is some ESG-related backlash, a broader set of clean investments are continuing to grow.
- **Voluntary carbon market (VCM) development.** A critical pillar of enabling net zero and financing asset decarbonization is the ability to value carbon with liquidity. VCM will be critical. Although the situation is unsettled now, we see expanded dialogue and more concrete actions toward establishing VCM at the country and private-financing levels. For example, several Southeast Asian governments are shaping national voluntary carbon exchanges, and company commitments to voluntary carbon have grown.
- **Reshaped value chains and reindustrialized nations.** In some developed economies, game-changing policies are supporting new net-zero value chain plays. The US Inflation Reduction Act commits \$370 billion in climate spending, targeting the creation of new sustainable industries across the country and accelerating clean tech, such as green hydrogen. Another US legislative measure, the Bipartisan Infrastructure Law, is poised to prompt reindustrialization, replacing value chains based on internal-combustion engines with electric- and battery-based alternatives. In the European Union, the Fit for 55 and REPowerEU packages will create new winners across industries and reshape value chains in a way that brings affordability to the fore. New forms of public–private partnerships will therefore also need to take shape. Instilling more control within regions and individual countries will enable them to protect against price shocks for citizens.

Done well, pursuing these opportunities should create a virtuous cycle for economies among affordability, decarbonization, energy security, job creation, and resilience. Renewable energy is one obvious example with the potential to promote energy security, create high-quality jobs, and reduce emissions in tandem. New sources of capital and VCM could make sustainable investments more affordable, bringing them to market sooner, and successful delivery of these projects would in turn boost returns and attract further capital. Sustainable materials could facilitate the energy transition while creating new value from existing systems and infrastructure. And so on. These examples illustrate the power and possibility of the “and”—a flywheel-like effect that enables meeting security, socio-economic, and sustainability goals in parallel.

Across these opportunities, incumbents are positioned to succeed more often than not. Every incumbent player, especially in hard-to-abate sectors, has two sets of opportunities: decarbonizing while extending fossil-fuel-based core business (potentially earning green premiums as a result, as early movers in sustainable materials already are) *and* building new sustainable businesses. Incumbents can use existing cash flows and strong balance

sheets to fund new sustainable businesses that lay the foundation for future growth. They can afford to invest for the long haul and place bets across multiple new clean technologies—another advantage when the end point is clear but the precise path to get there is not.

Resilience today and value tomorrow: Five actions for CEOs

The pressure to demonstrate real progress on and create true value through sustainability is growing. The world has, however, entered an era that is increasingly challenging for CEOs and business leaders to navigate. There is a new strategic paradigm—one with reasonable certainty of where the world needs to be in the medium and long terms and tremendous volatility in how and when it will get there.

Leaders must build resilience to today's shocks to build tomorrow's champions. Some approaches will be easier than others and offer a good starting point.

Accelerate capital deployment with a private equity mindset

Leading with resilience while navigating toward net zero means participating early in the materials transition and green-business-building wave to secure exposure to promising innovations. Earlier-cycle investments have higher risk but also higher returns because they benefit from early policy funding, greater willingness for counterparties to participate (for example, through sustainable aviation fuel contracts, which guarantee demand from airlines that allows investment in supply), new talent, and the opportunity to gain first-mover advantage in nascent and emerging value chains.

In many industries, there will be multiple sustainability winners. For example, we expect both hydrogen-fueled and electric vehicles to be part of the 2050 ground transport system. This is another reason to consider an investor mindset—spreading bets across multiple potential investments earlier. Companies can further manage their transition risk by aggressively pursuing operational decarbonization measures that already pay for themselves (for example, through energy efficiency) while making longer-term investments in sustainable infrastructure and building new businesses. Pursuing energy efficiency and rapidly scaling distributed clean heating (for example, via heat pumps) will become a critical lever in Europe to manage the energy crisis.

Play offense through a sustainable value creation strategy

Two objectives should be paramount: to extend and decarbonize the core business and to build new sustainable businesses in reshaped value chains. This would represent an “Apollo 11 moment” in many industries—a moon shot requiring not just incremental improvements but wholesale rethinking of how to build, operate, and maintain every sector of the economy. Leaders need to make quantum leaps to meet the moment by getting smart on climate tech fast, engaging with the innovation ecosystem, and leveraging their engineering and business-building talent. Similarly, a focus on sustainability—and ESG measures, more broadly—is defensible, pragmatic, and needed. CEOs can articulate their approach to ESG topics proactively by focusing on them as part of resilience and value creation, not simply as part of “right to play” and risk mitigation.

Go beyond net zero

CEOs should also look to make their companies net nature positive. Actions include moving ahead in the game on biodiversity, demonstrating stewardship of shared water and air resources, ensuring a responsible supply chain, and contributing to a just transition, among other steps. Adaptation investments to address physical risks will also be critical. Companies able to weather the storm, literally, will have a material advantage.

In some instances, sustainability aims come into conflict—for example, lithium brine operations are less carbon intensive than hard-rock extraction but consume far more water. CEOs will need to weigh current trade-offs carefully and invest in innovation that meets multiple aims, “squaring the circle” in an increasingly complex ecosystem. The bar is rising on sustainability; companies need to have a plan on these and other factors.

Build the partnership and ecosystem muscle

CEOs should realize that the challenge of maintaining resiliency while driving toward net zero is too great to go it alone. New public–private partnerships will be needed because many of the emerging energy and materials value chains will require full ecosystem development. Consider, for example, clean-fuel consortiums, such as those developing around hydrogen hubs, and shared CCUS networks. There are also opportunities to partner with competitors on shared tech road maps to mitigate tech risk and to better direct innovation funding.

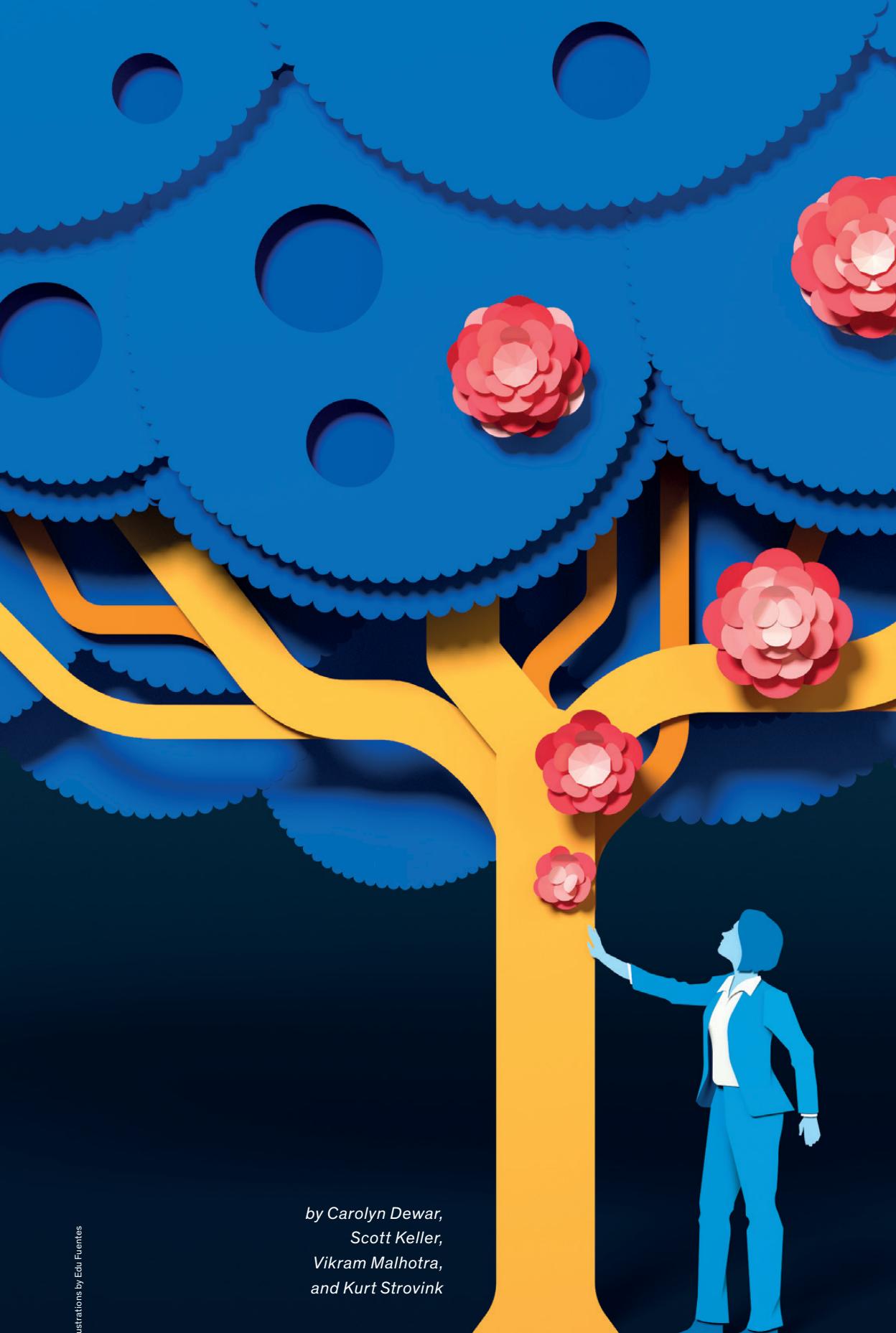
Aggressively reskill leadership teams, boards, and frontline workers

As companies embrace a sustainable future, they will need new skills. Sustainable fashion, for example, requires fully rethinking design, manufacturing, procurement, marketing, and waste management processes while also better tracking carbon emissions and circularity. Talent across the organizations will need to reskill to meet these new demands. Companies need to identify the skills needed for their more sustainable business models and work toward acquiring them and building them internally.

Navigating the current turbulent period for the net-zero agenda may require temporary responses that, in some cases, may look like setbacks. They need not be. CEOs who understand the virtues of strategic resilience know that addressing immediate hardship and building a sustainable future can—and should—be pursued at the same time. By maintaining vision, moving nimbly, playing offense, and embracing opportunity instead of recoiling from risk, leaders can improve the future of their businesses and the planet. **Q**

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*by Carolyn Dewar,
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Starting strong: Making your CEO transition a catalyst for renewal

The best CEOs use the first six to 12 months of their tenure as a moment of great personal transition and institutional renewal. There are four keys to success.



“It is when we are in transition that we are most completely alive.”

—William Bridges

Some experiences in life you simply can't prepare for. You can imagine how you might feel and what you might do, but you can never actually know how you will respond to a situation until it happens. Falling in love, becoming a parent, and facing one's mortality all fit into this category. In the workplace, your first interview, first day on the job, and first time given the responsibility of managing others are of this ilk. For a select few who successfully climb the corporate ladder, becoming CEO can be added to this list. As Bill George, former CEO of Medtronic and current Harvard Business School professor, puts it, “No one is prepared to become CEO, no matter how much they think they are. You have to grow into the job. You think you know how to run a business, but that's really more the COO role.”

What makes the top job so different from the leadership roles that come before it? To start with, new CEOs discover quickly that they are accountable for *everything*, that their reporting relationships have changed dramatically, and that the job is extremely lonely.

Dick Boer, former CEO of the Dutch food giant Ahold Delhaize, explains how accountability changes: “As the company CEO, it's solitary. You can't say, 'Look, I can't do it because . . .' No. It's you. You can't blame anyone anymore for anything. It's you to blame.” Ecolab's former CEO Doug Baker illuminates the uniqueness of reporting relationships: “Our synapses are designed for one boss. Our whole career, we have had one boss, and now, all of a sudden, you've got 13 versions of a boss. Oh, and by the way, they don't come to work every day, like all your other bosses did.” Microsoft CEO Satya Nadella reveals where the loneliness comes from: “Nobody who works for you sees what you see. And nobody you work for sees what you see. That's the fundamental problem of a CEO, which is you see it all, and nobody else around you sees it, so you can get very frustrated.”

For these reasons and many others, no one should assume that they have it all figured out when transitioning into the role of CEO. In fact, one-third to one-half of new CEOs are considered to be failing within 18 months of taking the role, and more than 90 percent of those CEOs confess that they wish that they had managed their transition differently. Those who get it right realize early on that they will need to lead differently than they did on the way to the top. They know that their success will depend on whether they can reinvent themselves by rewiring the many work habits they built up over decades (on average, new CEOs have worked for 24 years before taking the role).

Savvy CEOs recognize that the renewal opportunity isn't just for them but for the entire organization. A transition of leadership creates what German American psychologist Kurt

Lewin refers to as an unfreezing moment for the institution. According to Lewin's theory, organizations exist in an equilibrium state largely constrained (frozen) by resistance to change and group conformity. Movement becomes possible only when there is a jolt to the system (an unfreezing). Such jolts often come in the form of a crisis—such as when GM CEO Mary Barra used the company's ignition switch crisis as a catalyst for needed culture change. A CEO transition creates a similar opportunity—albeit without the crisis—to reset an organization's aspirations and ways of working.

The best CEOs don't miss the opportunity to make their first six to 12 months (not just the vaunted 100 days) both a personal transition of great import and a profound moment of institutional renewal. While each leader will act in ways befitting their unique situation, there are at least four common ingredients for success:

- not making it about you
- listening, then acting
- nailing your firsts
- playing "big ball"

Don't make it about you

In the 1980 book *Transitions: Making Sense of Life's Changes* (De Capo Press), the late author and consultant William Bridges wrote about the difference between transition and change. According to Bridges, change is something that happens to people. Transition, on the other hand, is internal: it's what happens in people's minds as they go through change. Change can happen very quickly, while transition usually occurs more slowly. The distinction is subtle but vital to understand for a new CEO who is pursuing both personal and institutional renewal.

The day you become CEO, you undergo an enormous amount of change. For one, all the attention becomes laser-focused on you, often in ways that distort reality. Says Brad Smith, former CEO of the accounting software giant Intuit, "It's no secret that we all get ten inches taller and our jokes get funnier the day we assume the role." At the same time, your power gets magnified. "Every time you say or do something," says DBS Bank CEO Piyush Gupta, "it's got a massive consequential effect. The whole company pivots."

All this attention and power can quickly create a celebrity CEO phenomenon where the transition becomes all about you. Successful CEOs don't let this happen—they keep their minds focused on the institution. As former Itaú Unibanco CEO Roberto Setúbal explains: "All CEOs need to ask themselves, 'What do you want to be remembered for—as a great person or a person who made the company great?' If you want to make the company great, then you must think about the company first, yourself second. It's human nature to want to be recognized, so it's not easy to put the institution ahead of yourself."

Former Mastercard CEO Ajay Banga reinforces the point with a memorable analogy: "You want them to not remember you. You want the company to be successful where it's headed. You do not own the business unless you created the company and were Steve Jobs or Bill

Gates, and then they *should* remember you. Guys like us, we're just stewards of the system in a ship sailing through the sea. You have to make sure that the boat doesn't sink while you're there and that during the voyage it picks up a couple of extra sails and some new engine technology. You make the boat work better. But you don't brand the boat with your name and call it the *Ajay Banga* boat."

Such advice sounds laudable in theory, but what does it mean in practice? Taking this approach starts with asking different questions, which then lead to different answers. For example:

Topic	'It's about me'	'It's not about me'
Vision	What legacy will I leave?	What organizational purpose do I serve?
Leadership	What are my nonnegotiable expectations of others?	Who does the company need me to be?
Team	Who on my team will complement my weaknesses?	What conditions will I need to put in place to maximize my team's success?
Change	What is broken that needs fixing?	How will we respect our past while accelerating or disrupting our future?
Engagement	How will I get the organization on board with my vision?	How will I engage the organization in creating our shared vision?
Measurement	How will I know if I'm successful?	How will we know if we're winning?

Microsoft's Nadella embodies the "it's not about me" mindset by ascribing a meaningful portion of his success to his predecessor. "My dad, a civil servant in India, always used to talk about institution builders as those people whose successors do better than they did themselves," he says. "I love that definition. I feel that if the next CEO of Microsoft can be even more successful than I am, then maybe I've done my job right. If the next CEO of Microsoft crashes and burns, that may result in a different verdict. That's why I think too much credit is given to me and not enough to Steve [Ballmer, Nadella's predecessor] for what he set in motion. I don't think I would have been able to achieve what I've achieved if not for his work."

Israel Discount Bank's former CEO Lilach Asher-Topilsky used a daily ritual to remind herself that the job was not all about her: "Every morning, when I went to my office, I entered the room, looked at my chair, and reminded myself that people were going to walk in and talk to the chair. 'I sit in this chair now, but I have to remember that I have to be humble. I have to remember that everyone is the same. I sit in this chair, and it makes me powerful, but tomorrow, I'm not going to be in this chair.'"

Listen, then act

When a new CEO takes over, anxiety levels can run high within the organization. Everyone wants to hear what the new person thinks, what will change, and what the change will mean for them. With people overanalyzing every word and move the new CEO says and makes, the urge to decide, declare, promise, and explain is strong. The best leaders in transition know that it is better to listen and find out what is really going on before making broad declarations or premature moves. Of course, context matters—in a turnaround situation, there will be a premium on action—but in most contexts, successful leaders subscribe to Albert Einstein's edict of "if I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes understanding the problem." Practically speaking, this ethos translates to the following practices:

1. Start with a broad-based listening tour.
2. Create a fact-based "one version of the truth."
3. Lock in a short list of bold moves.
4. Communicate those moves in an elegantly simple, engaging manner.

On a listening tour after being announced as the next CEO, Intuit's Smith asked the same three questions of board members, investors, fellow CEOs, and employees: "What are the greatest opportunities we haven't yet capitalized on? What are the greatest threats that could end this storied franchise if not addressed? What is the one thing I could do to screw it up?" Examples of other powerful questions you might consider asking are: What do you hope will change? What should *not* change? What aren't people telling me that I need to know? What am I not hearing that I should be hearing? Lockheed Martin's former CEO Marillyn Hewson explains why such questions are uniquely powerful during the transition period: "People tell you things because you're the newbie that they're not going to tell you two or three years from now."

The perceptions you pick up during your listening tour should be validated with facts where possible and augmented by analytics that can help answer tough questions about the state of the business. The goal is to create one version of the truth that you can use as a baseline for the organization's aspirations and against which to judge its future performance. Ed Breen, the CEO of DuPont and former head of Tyco and General Instruments, discusses his methodology: "As a CEO, when you go into a company, even if you've been in the company and you get promoted to CEO, you need to take a good, clean look at everything: return metrics, cash conversion—all the key metrics. Then you can see where you sit vis-à-vis a really good company that has a business model like yours, and you can ask, 'Well, why aren't we there? If they can be there, why can't we be there?' There's always a way to get there." Financial and operational metrics are key, but so are metrics on talent, teamwork, culture, and stakeholder perceptions.

Once you have a strong, fact-based understanding about what is needed to propel the business forward, it's time to identify the biggest needle-moving actions that you will lead. What will you buy and sell? Where will you invest differentially? How will you improve

productivity? Where will you create more differentiation? How will you reallocate capital? McKinsey research shows that making even two big moves across these arenas more than doubles the likelihood of rising from mid- to top-tier performance, while executing three or more makes such a rise six times more likely. Furthermore, CEOs who make these moves earlier in their tenure outperform those who move later, so there is a premium on mobilizing the organization quickly.

You may be wondering, “If moving fast is important, why do great CEOs invest so much time in listening first?” Alain Bejjani, the CEO of Dubai-based conglomerate Majid Al Futtaim, explains this paradox of going slow to go fast: “We aimed to have the most inclusive process possible. Doing so built a broad sense of ownership, and we also found that some of the most insightful answers came from people we wouldn’t normally have approached for input, which in hindsight would have been a significant loss.” Best Buy’s former CEO Hubert Joly reinforces the point: “Of course you have to create a plan, but you have to cocreate it. It doesn’t need to be perfect—the key is to create energy and manage energy.” Bejjani’s and Joly’s experiences are supported by social science that suggests that people are up to five times more motivated to execute initiatives that they have had a hand in creating versus ones that have been handed down from on high.

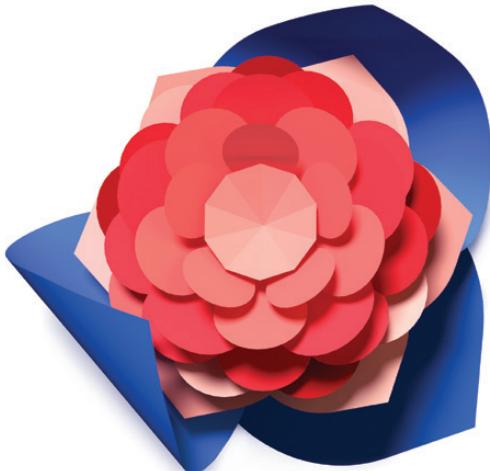
A powerful tool to mobilize the organization in the desired direction is to distill the company’s transformational vision and strategy down to an elegantly simple “one pager.” Says DBS Bank’s Gupta, “We put together a one-page visual we call the ‘DBS House.’ On it is everything: our vision, strategy, values, targets, etcetera. It allows us to all talk the same language about what we want to do and, more importantly, what we do not want to do.” Similarly, Ivan Menezes, the CEO of beverage maker Diageo, carries around a one-pager called the “Diageo Performance Ambition” that has the company’s purpose and vision at the top and then lays out the company’s six strategic pillars—written in simple English with no jargon. Menezes describes why it’s so useful: “Whether you’re on a bottling line in Kenya or doing sales in Vietnam, you can find yourself on the page and know where you could make a difference. It’s very helpful in depicting the clarity of the strategy and the change that is needed.”

Nail your firsts

In a famous social-science experiment conducted in 1946 by psychologist Solomon Asch, participants were given one of two sentences. The first began, “Steve is smart, diligent, critical, impulsive, and jealous.” The second read, “Steve is jealous, impulsive, critical, diligent, and smart.” Although both sentences contained the same information, the first one led with positive traits while the second one started with negatives. When asked to evaluate what they thought of Steve, subjects who were given the first sentence evaluated him more positively than those given the second. This is an example of what social scientists refer to as the “primacy effect,” and it’s why the adage “you never get a second chance to make a first impression” matters—first impressions tend to last.

Early in your tenure, everyone, even those you have worked with for years, is forming their first impression of you as *the CEO*. Getting your first impressions right will send strong messages about how you intend to lead differently (from the previous CEO, as well

Getting your first impressions right will send strong messages about how you intend to lead differently and the renewal opportunity you see for the organization.



as versus how you have led in previous roles) and the renewal opportunity you see for the organization. Applying the following four principles will go a long way to ensuring that your first impressions are positive:

- Understand people's "why."
- Keep to a single narrative.
- Err toward complete candor.
- Prepare intensely for moments of truth.

If you know what motivates a person and can connect at that level, the chances are greater that you will make a positive and lasting impression. "It goes beyond just listening to what they say," Lockheed Martin's Hewson shares. "If you take time to understand why they're saying what they're saying, you can [then] help shape their longer-term thinking." Netflix CEO Reed Hastings gives an example of how understanding the "why" of the press shapes his actions: "They want to be truth tellers, but they are forced to be entertainers." Hastings makes it a point to give reporters a bit of both and can convey his message more effectively as a result.

Jacques Aschenbroich, former CEO and current board chairman of the global automotive supplier Valeo, hews to the second principle: "What I present to the board of directors is exactly the same that I present to our shareholders, exactly the same that I present to leaders, exactly the same that I present to the unions." Israel Discount Bank's Asher-Topilsky expands on the point: "When something happens, internally or externally, you continue to communicate in the same way." On the one hand, adopting a single narrative is liberating—one CEO confided in us, "I'm not smart enough to have two versions of the truth!" On the other hand, you'll need to brace yourself for having to endure, in the words of Proctor & Gamble's former CEO A. G. Lafley, "excruciating repetition."

Asher-Topilsky speaks about the third principle—candor: "Don't overpromise. Be frank about the problems, not just the opportunities." Even if

you are uncomfortable in the moment, such sincerity lays the foundation for real trust and credibility. To facilitate this level of candor with the board, Diageo's Menezes starts meetings in an executive session (just him and the board) with a list of seven or so things that are going well, matched by an equal number that *aren't* going well. Doing so offers his directors a better perspective on what he's dealing with, which allows them a chance to give better guidance. US Bancorp's former CEO Richard Davis shares how this translates to communicating with investors: "I often said, 'Look, you deserve the truth, and we deserve for you to believe us. So when we tell you that things are going amazingly well, you will remember us telling you when they weren't.'"

Successful CEOs prepare intensely for important moments of truth, such as the first time they have their team together, their first board meeting, their first investor presentation, and their first quarterly earnings report. In these situations, it's important to heed the words of US college football coach Paul "Bear" Bryant: "It's not the will to win that matters—everyone has that. It's the will to prepare to win that matters."

Aon CEO Greg Case learned this the hard way. When he took the top job at the professional-services giant, he was told he had to present at an investor day that was scheduled to take place a month after he arrived. Having come in from the outside, he knew there wasn't time to prepare a thoughtful, compelling, and meaningful view of the future strategy of the firm. Case recalls, "Had I been more seasoned, I would have said, 'We're going to cancel that.' But I didn't know any better. So I said, 'OK, we'll get ready.' It was a massive fire drill from hell."

Case also shares the hard-gained lesson that new CEOs should treat early interactions with individual board members as moments of truth. "Spend more time, substantial amounts of time [with them] early on as a new CEO," he advises. "It's absolutely essential that your board understands you, and you understand them individually. It builds trust and transparency. I wish I'd spent more time early on." Former Caterpillar CEO Jim Owens describes the practical application of this advice: "For the first six to nine months, I personally met with each board member at their place of business, took time to have dinner, got to know them a little better, and talked about the business in depth."

Getting your first impressions right doesn't guarantee success, but it does increase the odds. As in golf, putting the first shot on the fairway is the way you want to play.

Play big ball

"Play big ball, not small ball," advises Sandy Cutler, the former CEO of the power management company Eaton. "By that I mean spending time on things that no one else can in ways that magnify your effectiveness without getting mired in things that don't make a difference."

This advice may sound like common sense, but it's too often not common practice for new CEOs who suddenly find themselves accountable for everything and to everyone. Mastercard's Banga confesses, "The first two years were really hard. I started badly, because I was trying to do everything—communicating, getting to know people, leading change, finding the people I could build new relationships with, and getting them to carry

my message.” His life quickly spun out of control. “I was traveling as well. It was hard to sleep. I’d come back to my hotel room in Asia at 11:00 at night, and I’d have 100 emails from the US waiting to be answered. And I’d promised my team that I’d respond to every email and every phone call within 24 hours.”

Like Banga, many new CEOs enter the role thinking that they will go hard for the first 90 days and then back off a bit. That’s easier said than done. “I didn’t know whether I’d be successful, and so I went 100 percent, totally all in,” divulges former LEGO CEO Jørgen Vig Knudstorp. “My health suffered quite badly. I went to a checkup, and the doctor said, ‘You have the fitness of a 65-year-old.’ I was, at the time, approaching 40. I then started becoming a bit more sensible.” That experience is a cautionary tale—as a new CEO, you should be disciplined about playing big ball from day one.

To play big ball throughout their tenure, new CEOs can put three foundational elements in place early:

- ***Time management:*** Set clear boundaries and stay extremely disciplined.
- ***Talent:*** Put “A” players in critical roles, move on “C” players, and help “B” players succeed.
- ***Operating rhythm:*** Combine accountability with urgency and targeted coaching.

At Mastercard, Banga learned to become extremely careful about how he used his time: “If you, as CEO, can’t figure out what matters to you, and if you are not willing to make the time for it, then it’s your problem. No one can help you.” He set boundaries and adopted a color-coding system in his calendar. The time he spent for travel, with clients, with regulators, in internal meetings, and so on were each assigned a different target time allocation and color. “If I wasn’t spending time in the right places in any of these areas, a quick look at the calendar would make that abundantly clear,” he shares. “One of my chief of staff’s primary jobs was to make sure that the balance of meetings was correct.”

Flemming Ørnskov, CEO of the skin care company Galderma, shares the hardest part of getting balance: “The thing I had to learn was to say no. When someone calls me and says, ‘I want you to be the keynote speaker’ or ‘Don’t you want to do this off-site?’ or ‘let’s do a dinner,’ saying no feels uncomfortable initially because people mean it in a friendly way. But to say no politely is important.” Ørnskov is highly disciplined about making what he says yes to as productive as possible. “I really prepare for meetings and make sure the agenda is tight and focused,” he explains. “I read the prereads; I think about it; I start and finish meetings on time. All meetings start and end with a recap of action items and follow-ups.”

The second area to get right early is talent management. GE CEO H. Lawrence Culp shares why: “Your people decisions are really where all your leverage is. As a CEO, you absolutely have to get those right.” The best CEOs create a short list of roles (30 to 50) that will have the most impact on driving their company’s strategy. Then they make sure those roles are filled with A players. They also make tough calls on C players, even those who have been loyal to the organization for decades. JPMorgan Chase CEO Jamie Dimon clarifies the rationale for this: “If we were ‘loyal’ to them by leaving them in the job, we’d be hugely disloyal to everyone else and to the company’s clients.”



Many new CEOs enter the role thinking that they will go hard for the first 90 days and then back off a bit. That's easier said than done.

Further, and often neglected, is creating the conditions for B players to up their game: role modeling, setting expectations, and providing incentives and capability-building opportunities. Having done so, if no improvement happens in a discrete time frame (months, not years), it's time for a colleague to move on. Gail Kelly, the former CEO of Westpac Banking, explains why: "It very rarely gets better if you've put the conditions in place for their success and they aren't succeeding. That's why you want to make those decisions early. It's the most elegant way of dealing with it because you can discuss that it's not the right fit. If you let it go on too long, you can't have that discussion."

The third foundational element that will enable you as CEO to play big ball is establishing a robust operating rhythm for the company. This is harder than it may seem because it also involves deciding the altitude at which you will fly. As the corporate CEO, you have business unit CEOs reporting to you who have the operating responsibility you no longer have. Although you will need to empower those people, there is a trap to avoid, as GE's Culp explains: "I've seen a lot of my peers giving their business unit CEOs a lot of room because that's what they always wanted when they were in the role. Then someone surprises them in not a good way, and they start to think differently."

For Culp, as for the best company CEOs, the key is to have a regular rhythm of reviews covering organizational, operational, and strategic issues. The altitude at which to fly is determined by the substance of those sessions. Mastercard's Banga explains: "My operating rhythm is that if you're not performing, it will be a longer operating review; we'll dig into what's going on. If you're growing market share and growing on the priorities we agreed to in the KPIs, it'll be a very short review."

Your operating rhythm doesn't just reinforce your priorities; it also sets the metabolism of the organization. As Microsoft's Nadella states, "That's a fascinating thing—what is tempo? Only the CEO

can decide that.” It’s important to set a pace that allows you to get early runs on the board. Best Buy’s Joly explains why: “The key with any stakeholder is to get the ‘say–do’ ratio right—the ratio between what we said we were going to do and what we actually did. That’s how you get credibility. If you do what you say you’ll do, they’ll want to see less of you. They’ll want you to spend your time working on the business and delivering on your commitments.”

We began by discussing how, like falling in love, transitioning into the CEO role is something you can’t fully prepare for. As such, it’s a profoundly uncomfortable but also wondrous time for those fortunate enough to have been chosen to lead at the highest levels. We also noted that the impact of the transition extends far beyond the leader. The ascension of a new CEO is an unfreezing moment that can catalyze significant institutional renewal.

GE’s Culp describes how it feels when it all comes together: “I liken it to the flow I remember when I was on my high-school basketball team. We ran fast, took care of each other, and we were successful. Running fast with incredible people working at this level—I just find it to be great fun and rewarding in a whole host of ways.”

By not making it about you, listening then acting, nailing your firsts, and playing big ball, you’ll soon hit your stride. **Q**

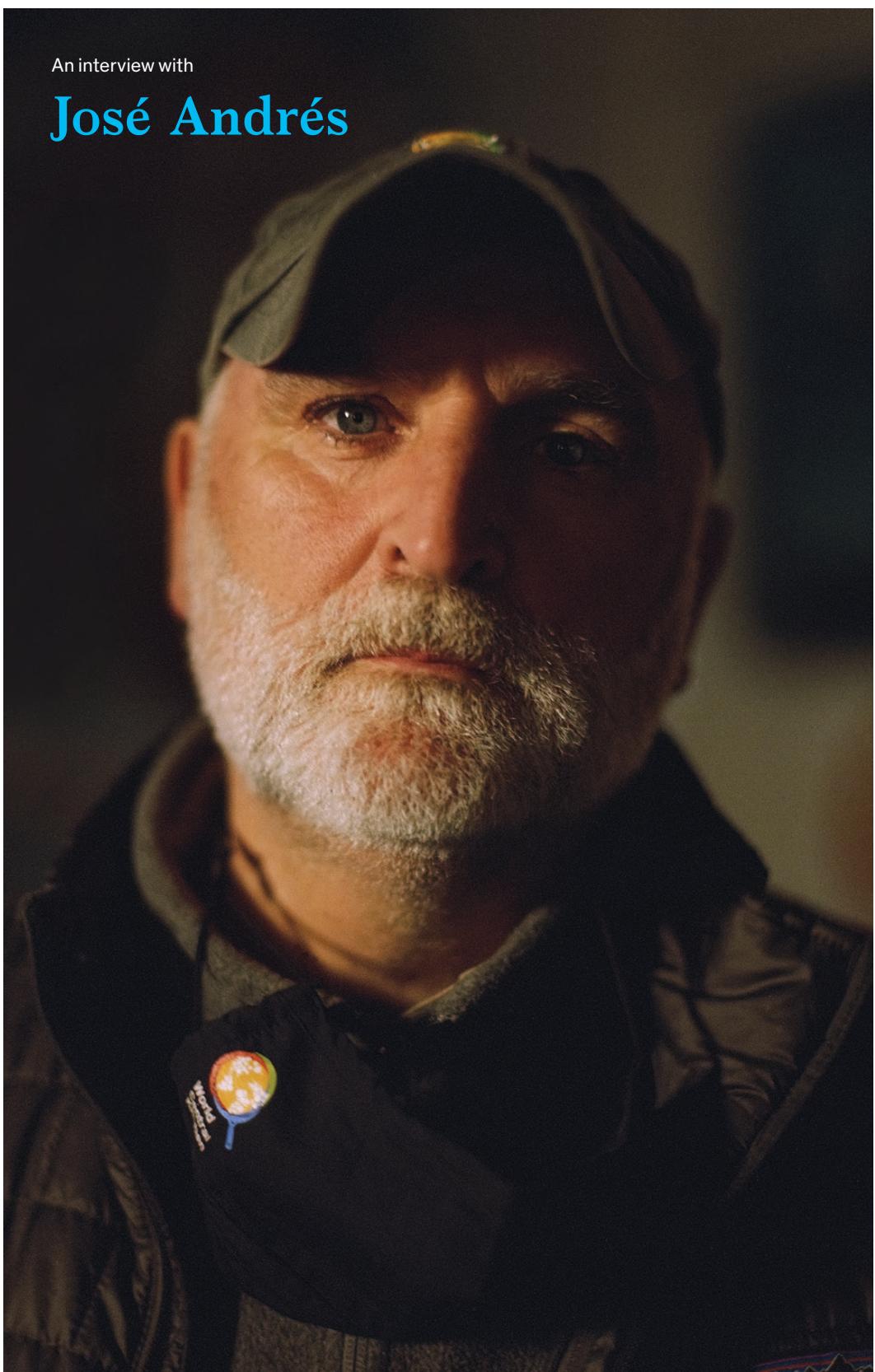
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The authors wish to thank Blair Epstein, Selin Neseliler, Lindsey Wilcox, and Jessica Zehren for their contributions to this article.

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An interview with

José Andrés



© Dylan Dugas

'It's important to bring the spirit of emergencies to the long term'

In the third *The Quarterly Interview: Provocations to Ponder*, chef and nonprofit founder José Andrés talks about embracing emergencies for what they can teach us about solving long-term problems and being effective in two different spheres.

Business leaders may feel that they have been dealing with a never-ending series of crises since the COVID-19 pandemic began in 2020. A health emergency ushered in a supply chain disruption that yielded an inflation predicament; add in higher energy prices and other upheavals, and the demands on leaders' crisis management skills are at an all-time high.

For perspective on how to thrive during emergencies, we turned to José Andrés, a Spanish-born chef whose company encompasses nearly 40 restaurants globally. Most chefs can offer some wisdom in dealing with pressure, given the relentless atmosphere of restaurant kitchens. But Andrés's expertise is unique: in 2010, he founded World Central Kitchen, a nonprofit whose mission is to deliver fresh meals to people in need during emergencies, including tornados, hurricanes, pandemics, and wars. The nonprofit estimates that in 2022, it raised and spent \$420 million, including on more than 170 million meals distributed to Ukrainians since the invasion of Ukraine.

As business leaders solve problems while also seeking growth in a challenging environment, they likely find themselves pulled in multiple directions. That's another reason we found a

conversation with Andrés timely: he estimates that in 2022, he spent two and a half months in Ukraine while simultaneously running his business, which opened seven new restaurants and bars around the United States and recently launched a media company. We wanted to know how he pursues two distinct missions and builds organizations that can thrive while he is otherwise engaged.

The chef recently joined *McKinsey Quarterly* deputy editor Katy McLaughlin for a wide-ranging discussion. An edited version of their conversation follows.

Katy McLaughlin: You published a book in 2018 titled *We Fed an Island*, about your efforts in Puerto Rico in the aftermath of Hurricane Maria. Recently, director Ron Howard released a documentary about your mission there. Both works depict you arriving to total chaos with little clue about food relief operations or how to help. Yet your organization eventually served 3.7 million meals in Puerto Rico through a network of 20,000 chefs and volunteers.

Let's talk about how you approach emergencies. How do you turn that initial turmoil and doubt into action and, ultimately, results?

José Andrés: First, you have to recognize that sometimes complex problems require really simple solutions. With World Central Kitchen, we aim to show up in places where people aren't even able to think about how to get started. And we are able to go at the beginning of an emergency, when it's really important. The only thing you have to do sometimes is activate teams and start providing relief in the different areas that need relief: generators to hospitals, water to the people, food to the people, electricity. It's the same every time.

Katy McLaughlin: *OK, so step one is to prioritize action steps over meticulous planning. What comes next in an emergency response?*

José Andrés: The only thing I like about emergencies—why I like to go—is they force us to solve short-term problems of food and water with so much energy and efficiency. In emergencies, you see me try new ways of doing things.

For example, around mid-March 2020, after I came back from San Francisco, where we were

helping feed people on the first cruise ship that arrived with COVID-19 cases in America, we felt that we had developed expertise in feeding during COVID-19 outbreaks before anybody else was even talking about COVID-19 in a big way.

I announced that I was transforming my restaurants in Washington, DC, into community kitchens [used to prepare food for free distribution to the needy]. I did that in the early days with my restaurants, paid for by us personally, meaning by my for-profit company.

We did that for a few weeks. We could use food that we had on hand, and we kept people working, and we kept paying them. It also proved my concept, and this became the blueprint for what World Central Kitchen did across America to serve thousands of meals.

Katy McLaughlin: *In sum, emergencies prompt you to try short-term solutions, which, if they work, you can apply to bigger problems. It sounds like emergencies can be high-pressure idea incubators.*



Andrés working in a community kitchen serving Ukrainian refugees in April 2022.

© World Central Kitchen

José Andrés: We don't solve all the problems people have. We solve short-term problems of food and water. But if we could apply the same mentality to the long-term hunger and food issues we face, wow, there wouldn't be one child hungry anymore in America, for sure, and in the world.

And that's why I like emergencies. It's important to bring the spirit of emergencies to the long-term running of social programs. The big problems? They have to be fixed with the boots on the ground. We need more leaders with boots on the ground, making things happen where the problems are.

Katy McLaughlin: *Is it correct to say that another part of your approach is leveraging infrastructure that is already in place when you arrive at a disaster zone? You don't go into a region and set up a central cooking and distribution center. Instead, you provide money, logistical support, and ingredients to sometimes hundreds of existing food businesses, and they supply the meals that get distributed to the needy.*

José Andrés: That's right. In Ukraine, we've been working with over 500 restaurants, caterers, and food trucks. On August 11, 2022, I met with Ukraine's president, Volodymyr Zelenskyy, to talk about our operations there. I was very proud for him to know that World Central Kitchen is not a foreign organization: this is Ukrainians taking care of Ukrainians. He was very aware, you know. He was very amazed at the quickness and the speed and the reach. I was very happy that I was able to bring some of the Ukrainian team members to the meeting who are the ones running the show.

Katy McLaughlin: *I want to switch gears and explore how you divide your focus between two very different endeavors. Many of your restaurants are high end and expensive. Your nonprofit is about providing basics to sometimes desperate people. Pursuing these different tracks must require the right talent on your teams,*

as well as a keen awareness of where you're needed most.

First, give me a sense of how much time you're out in the field with the nonprofit.

José Andrés: In Ukraine, my team will have to count the days, but I think I would not be wrong if I told you I have spent about 75 days there, and probably more. Did I activate myself in Beirut [after a large port explosion in 2020]? I was there 24 hours later. I activated myself in India when we went to feed people at multiple hospitals, all at the same time [during the pandemic]. I went to Beira, Mozambique, after the typhoon [in 2019]. I went to many of the big California fires. Did I go to the volcano in La Palma, Spain, myself [in 2021]? Yeah.

Katy McLaughlin: *Sometimes, you're in places where the infrastructure has been destroyed, and you're communicating with your home office by satellite phone. How is the organization structured so that the show can go on?*

José Andrés: Sam Bakhshandehpour [José Andrés Group's president] is the one who, day to day, runs the entire company. But then we have different people in the different verticals. I believe in fairly flat structures, not such pyramidal ones. When things are pyramidal, and if I'm at the very top, nothing will move, because they are waiting for me. If the structures are flatter, it means there are more people in charge in different areas, so nobody waits for José.

I have an entire team just for restaurant and bar openings. [In a separate conversation, Bakhshandehpour added that the openings team is part of a central function that provides finance, brand and business development, design, human resources, and service support to all the company's restaurants.] In this pandemic, if anything, my team got bigger, not smaller. I've always invested a lot in the people. I remember in the old days, I'd rather make less money but

have more people than make more money and have less people.

We have a lot of people who worked for us, left us, went out, got more experience, and came back. And that always gives me a lot of joy. We also have people who we hire from within. We have some people who have been working with us for 28 or 29 years.

Katy McLaughlin: *How do you maximize your own contributions to both enterprises—considering that you can't be on-site all the time?*

José Andrés: I'm highly incapable of doing many of the functions that a restaurant company can do. But that's why I surround myself with people who are capable. I know my weaknesses very well.

I don't concentrate much on one thing for too long. Sometimes, I'm very impatient because life is short, and I like things now, if possible. You know, the repetition, day to day, is something

that some people are amazing at and that they enjoy. Me, I don't enjoy that. I enjoy that the repetition is what allows success in the private business and in the nonprofit. But I'm not the best guy to make sure that happens.

One of my things is that I'm always going to find new cities or towns and villages or people who need help. And then once you make contact, you create the systems to keep bringing them food. I like to keep making sure that everybody is taken care of. That means exploring new places. This is what I do in my private business, too. I try to explore the new things. That's how I am. I'm fulfilling my role.

Katy McLaughlin: *Who in your organizations can you not live without?*

José Andrés: Life has taught me that everybody's important and nobody's important. And this starts with me. If I disappear tomorrow, if I am no longer here, I hope people will miss me, but I know my family will keep running



Andrés in the kitchen of one of his restaurants, which range from high end to casual and serve cuisines including Spanish, Mexican, and Middle Eastern.

© Josh Telles

because my wife is the one who has kept the family going, and my daughters are in a great place. I know my friends, if anything, will be even stronger friends, and they will keep giving support to my family unit. I know my business will be run because it's run by people who are better than me, and they know how that company functions. World Central Kitchen will keep running because it's made out of unbelievable people. So everything can keep running without me.

What I mean is that I'm thankful to everybody because without everybody, I wouldn't be who I am. But at the same time, I realize that everything I have done can run tomorrow without me, and nobody will even notice I'm gone. This is something I'm proud of. And I think we all should try to run our lives the same way.

Katy McLaughlin: You were nominated for the Nobel Peace Prize in 2019. In 2020, you posed on the cover of Time magazine, which has twice named you one of the world's 100 most influential people. In 2021, Jeff Bezos granted you his \$100 million Courage and Civility Award.

It sounds helpful—to both the business and the nonprofit—to have your profile, but I wonder if there are any downsides. How do you make sure that others are empowered? Does everyone just try to figure out, “What would José do?”

José Andrés: I disagree with you. A lot of philanthropies carry the name of one person, but I didn't call World Central Kitchen "José Andrés." World Central Kitchen goes far beyond me. It's an organization that is of the people. We have an independent board. Obviously, I am part of the board because I think I should be, because it is still a very young organization. It still needs to be shaped into what we are going to become.

In the company, obviously, it's my company. I'm the biggest shareholder. In the areas I've shown I'm good at, I hope people will ask, "What would José do?" In the same way, I ask myself what



Strawberries and milk, a dessert served as part of a roughly 20-course, \$295-per-person meal at Andrés' restaurant minibar, a ten-seat restaurant in Washington, DC, that has two Michelin stars. Photo: © Rey Lopez.

'The only thing I like about emergencies . . . is they force us to solve short-term problems of food and water with so much energy and efficiency.'



A chef's recipe for a successful emergency response

1

Once
disaster strikes,
arrive first.

2

Prioritize action
over meticulous
planning.

3

Leverage existing
infrastructure.

4

Test short-term
solutions.

5

Iterate
successful ideas.

6

Apply emergency-level
intensity to long-term
challenges.

someone will do when I know somebody's an expert in something. But that's not the important question. The important question is: Will people stand up to me and tell me what they think?

Katy McLaughlin: *And will they?*

José Andrés: I think people second-guess me all the time. I don't think when I speak my mind that I do it just to impose. I speak my mind because I have an opinion, too. We've always allowed everybody to speak their mind. Obviously, José Andrés Group is my organization. It's my company, but if my board kicked me out because I didn't show up to the board meetings, I would probably vote in favor with them.

Katy McLaughlin: *Tell us about the impact of inflation and supply chain issues on your businesses.*

José Andrés: With inflation, you adapt. Unfortunately, you have to raise the prices accordingly to pay the bills. We've had supply chain issues impact our Spanish olive oil and cheeses—we've had problems. In the end, restaurants are like brokers for our clients, for our guests. You buy the best possible food, and you sell it at a certain cost so that you can make money, you can pay the employees, you can pay the rent, you can pay to keep the lights on, and you can give a good value to your guests. With inflation, you just go up accordingly and make sure that you are not subsidizing the dining experience of your guests.

Katy McLaughlin: *World Central Kitchen has pledged to raise and spend \$1 billion to provide meals to victims of climate-change-related events over the next decade. You opened seven restaurants and bars in 2022, have nine concepts planned for 2023, and are cochairing the President's Council on Sports, Fitness, and Nutrition, among other projects. Do you ever feel overwhelmed or stressed, and if so, how do you cope?*

José Andrés: I get more than stressed; I would say I get frustrated when things don't happen. And when I see that certain things become more complicated than they have to be, I get anxious. We could be eradicating hunger in America, and we could be eradicating hunger in the world.

I think food banks are needed, but they highly need to be reinvented. People shouldn't be waiting in a car for hours to get a bag of food. There needs to be another way that gives dignity to people and, in the process, helps create riches in the poor neighborhoods where they live.

We don't even know how much big governments in every rich country or the UN dedicate to eradicating hunger. I have a feeling there's a lot of wasted money. One of the shortfalls of the democracies that we are living in today is over-promising and underdelivering. We need to start underpromising and overdelivering.

Katy McLaughlin: You sound so passionate about your nonprofit work. But Sam Bakhshandehpour tells me you're still the final word on every recipe, design, and detail—even where the chairs are set up in a restaurant. How do you stay engaged on the business side?

José Andrés: Yes, my brain is totally messed up on that. But one goes with the other. I'm also a cook who enjoys great meals and great wine. But I'm 53. I feel I still have 30, 35 good, strong years in me. Mature years. I think I'll do a lot. But now, I'm only trying to understand how I can use my time more wisely.

I feel like every time I go into anything, in a way, maybe I'm trying to gain my own credibility. Maybe in ten or 20 years, I could be a bigger voice on how we are going to end hunger in the world. But it's not going to be done without the recipes we are working on writing now. **Q**

José Andrés is the cofounder and CEO of José Andrés Group and the founder of World Central Kitchen.

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The future of banks: A \$20 trillion breakup opportunity

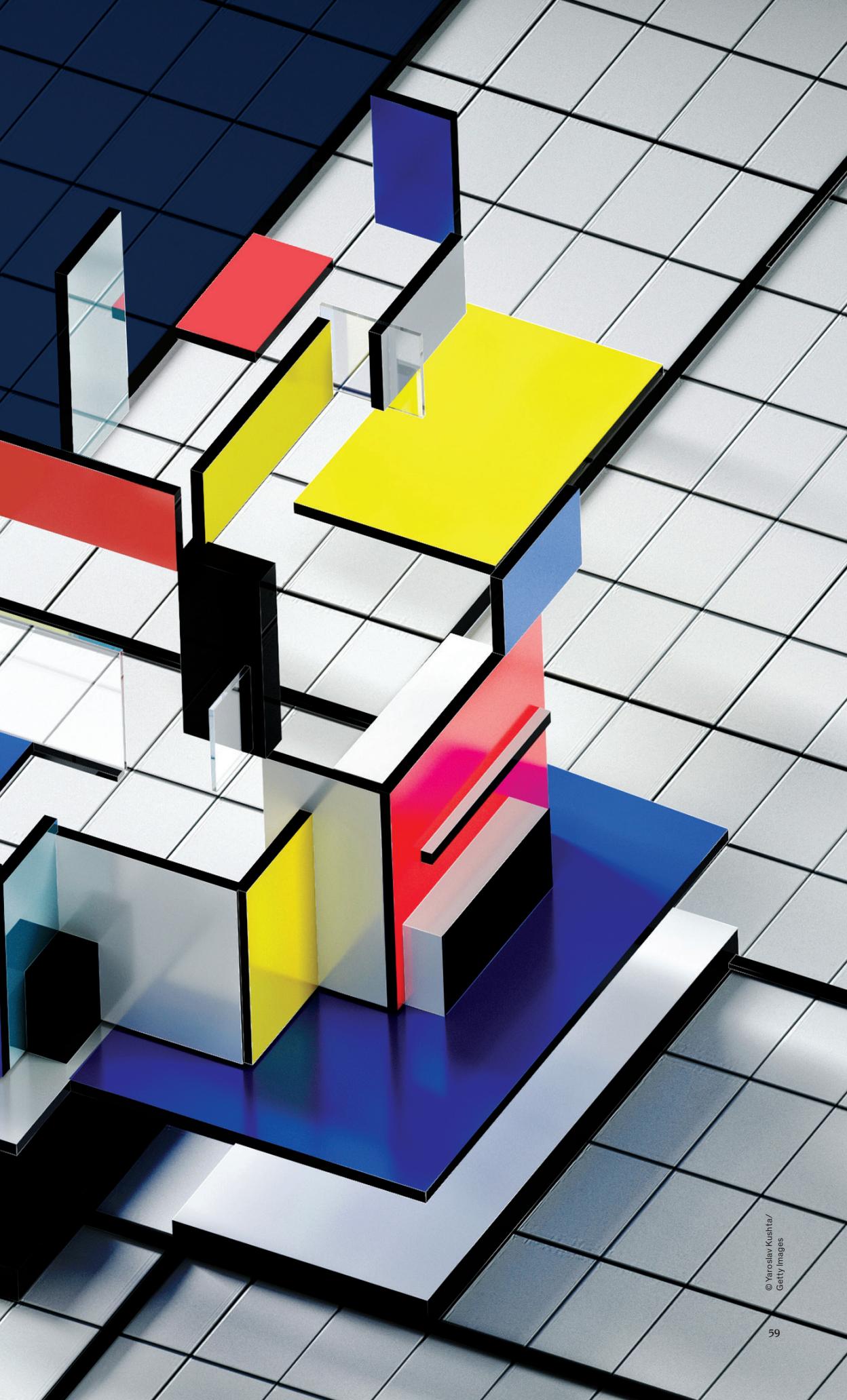
Banking is radically transforming. Many banks can thrive by fundamentally changing the way that financial services are embedded into daily life.

by Balázs Czimer, Miklós Dietz, Valéria László,
and Joydeep Sengupta

The banking sector is at a turning point. Key measures for banks are at a historical low point. The sector's price-to-book value has fallen to less than one-third the value of other industries. That gap is less the result of current profitability and more about uncertain profit growth in the future. While banks have pushed for great improvements recently, margins are shrinking—down more than 25 percent in the past 15 years and expected to fall to 30 percent, another 20 percent decrease, in the next decade.

Regulation and increasing intersectional competition are still worries, but the bigger threat is a global trend: new challenges—often from different industries and often benefiting from the kind of cross-industry





platforms behind the recent success of companies such as Amazon, Google, Microsoft, PayPal, and Spotify—with a vastly superior economic model. The market believes that banks are headed in the wrong direction, without a future-proof strategy.

We believe that the skeptics are right about today—and wrong about tomorrow. Banking is facing a future marked by fundamental restructuring. But we also believe that banks that successfully manage this transition will become bigger and more profitable and grow faster while leading to a value creation opportunity of up to \$20 trillion.

In the next era, banks can realign to compete in new arenas, organized around distinct customer needs. These arenas will expand far beyond the current definition of financial services, and they will also be hotly contested by a wide range of tech giants, tech start-ups, and other nonbanks. But this daunting reorganization, or breakup, could also provide banks with a huge opportunity: higher margins, new revenue streams, and loftier valuations. Ambitious banks can break free from stagnant valuations, thrive, and grow if they are willing to embrace the platforms of the future and make a few strategic, informed big bets.

Why break up? First, economic forces and technology have ended the run of the universal-bank model, and investors already are recognizing radical specialization to be greater than the traditional one-stop shop. By contrast, the future model relies on breaking up into four specialized platforms we will describe. Organizing around these areas will be a structural advantage.

In this article, we aim to draw a picture of what the future of banking could look like. We examine the forces currently squeezing bank revenue, value, profits, and usefulness to customers. We identify five distinct areas where banks may well have to transform to thrive.

Of course, we don't know exactly what banks will look like in the future. Regulation, technology, geopolitical shifts, and unforeseen innovations could radically alter the way that the industry develops. But we do believe that the banks that successfully manage the coming transition will use tech and data to embed themselves deeper into customers' lives with real-time services that were unimaginable just a few short years ago. The opportunity is great for those who move fast into this new future.

Banking is losing its traditional advantages

Until recently, big banks drove profits and growth by applying synergies, economies of scale, and access to huge pools of capital. This massive industry already manages an estimated \$370 trillion in worldwide assets, and its growth is accelerating. We project that global assets will grow to between \$500 trillion and \$550 trillion in the next decade.

While traditional banks have been convenient one-stop shops for businesses and consumers, many haven't evolved their products in a way that matches the tech-driven pace of change in other industries. Products such as checking accounts, loans, and even corporate advisory can seem undifferentiated. And people increasingly feel frustrated by the financial fragmentation that banks have imposed on many consumer processes. For instance,

buying a home once required navigating a confusing world of disconnected real-estate brokers, mortgage lenders, insurance companies, lawyers, renovation contractors, and so on. Our grandparents tolerated those frustrations, but they also used pay phones. There were no other options. Today, we are awash in new ways to reach and connect with consumers. Banks need to identify and engage these customers—as their newer competitors are doing.

To compete, most banks will have to embrace cross-industrial platforms. These new platforms dismantle the barriers between traditional industries, reshaping customer behavior and turning formerly linear value chains into ecosystems that fulfill customer needs in new ways. The process has already reached critical mass in industries such as healthcare, media, music, and retail, where diverse players are connected by platforms created by global leading companies that have been amply rewarded by the global capital markets. In contrast, banks have been consistently undervalued by the capital markets, making banking the lowest-valued sector in the world in 2021.

Because of cross-industrial “platformization,” banks must now compete with any organization that has the capacity and desire to offer any kind of financial services. Global tech giants such as Google and Tencent have used their platforms to offer banking services seamlessly to their millions of customers. But new competition is booming exponentially around the world.

Tech advances have eliminated size as an advantage in providing excellent services, winning customer loyalty, aggregating and analyzing data, and building networks of capital. Roughly 200 digital banks have launched since 2015, as have new brokerages such as Robinhood, wealth-advisory services such as Betterment, alternate investment banking paths such as special-purpose acquisition companies, payment platforms, and start-up capital platforms such as SeedInvest Technology.

The new competitors have raised the bar on customer expectations. Both individual and organizational customers now seek a long list of attributes from their financial-service providers. Surveys show that these desires include high levels of personalization, zero friction, and a commitment to social and environmental impact. The markets believe that the newcomers can meet their customers’ demands. As of September 2022, there were at least 274 fintech companies with a unicorn valuation of more than \$1 billion, up from just 25 in 2017. Collectively, they have a market value of more than \$1 trillion.

Many traditional banks, on the other hand, face stagnant or decreased revenue and profits. The average global banking ROE was around 9.5 percent in 2021—a significant recovery from 6 percent in 2020, but a sharp decline from 15 percent prior to the 2008 crisis. By 2030, we project that it will fall below 7.2 percent.

These falling margins are contributing in turn to weaker stock market valuations. Banking stocks trade at an accelerating discount to other industries—from a 15 percent discount in 2000 to a 70 percent discount in 2022. This means that global investors are voting with trillions of dollars *against* the future profitability and sustainability of the existing business model of universal banks.

Competitive arenas and business models are emerging in banking

The era when all financial services were dominated by monolithic banking entities is over. What, then, will arise to take its place? We believe that the future of banking will be contested by banks and nonbanks in five cross-industry competitive arenas: everyday banking, investment advisory, complex financing, mass wholesale intermediation, and banking as a service (BaaS).

While these arenas encompass the products and services provided by banks today, they will be redefined and reinvented by different customer needs. This new competitive landscape has transformative potential. In the next decade, revenues for all these arenas could grow dramatically, by as much as three to 30 times.

In each of the five arenas, we see the potential for at least two platform business models. These ten platforms aren't theoretical models. They are trends that we already see in progress among organizations that are winning better valuations in the capital markets.

Everyday banking

Everyday banking encompasses day-to-day financial services, such as checking and savings accounts, credit cards, personal loans, payment processing, and lines of credit on the traditional-banking side, for individuals and for small and medium-size enterprises (SMEs). This arena will also include e-commerce ecosystems, loyalty programs, discounts, advertising, and peer-to-peer marketplaces—making banking not a chore or obligation but something easy and even enjoyable (see sidebar “A full-fledged e-commerce bank: Kaspi Bank”). For SMEs, it will include tools to help organizations manage their finances.

The common thread of all these services is that customers want them to be hassle free, reliable, highly automated, and inexpensive in their day-to-day life (see sidebar “A multi-pronged approach: Royal Bank of Canada”). The ultimate goal for everyday banking is *invisibility*—offering services that are cheap and easy and accessible through all channels via business models such as the following:

- **Commerce marketplace specialist (CMS).** Specializing as a commerce marketplace offers everyday banking for individuals and many nonbanking services via a marketplace platform (see sidebar “Commerce marketplace specialist: From WeChat to WeBank”). It can be a single access point for anything from consumer goods and electronics to home-cleaning services and movie tickets, all connected to bank accounts, or niche solutions embedded into selected specialized journeys. A CMS uses automation and personalization to make everything simple—online, offline, and eventually in the metaverse. It will have to compete with the generalist and specialist e-commerce platforms of tomorrow.
- **Business gateway provider.** Serving as a gateway provider offers everyday banking for SMEs via an integrated online portal, aggregating services that facilitate payments, cash flow financing, accounting, taxes, and so on. It allows organizations to focus on

A full-fledged e-commerce bank: Kaspi Bank

Kazakhstan's Kaspi Bank is proof that even in a country far from the centers of global finance, it's possible to transform everyday banking. It launched an e-commerce marketplace in 2014 and home-delivery service in 2015. The bank has captured roughly half of the nation's online sales in just eight years and has steadily expanded the breadth of its offerings, all tightly integrated. There are three main pillars in its ecosystem: fintech, marketplace, and payments.

Kaspi Bank's customers have access to millions of products from 258,000 partnering merchants, ranging from low-price clothing and cosmetics to higher-price electronics, furniture, and jewelry. It enables easy, discounted shopping at retailers. The bank charges its partners a 5 to 11 percent fee, and its users pay nothing. For frequent purchases, they get cash bonuses deposited directly into their Kaspi Bank accounts—a strong incentive to make Kaspi Bank their primary bank.

The bank offers a shopping club, Kaspi Red, whose main component is credit. Financing terms are determined by user activity, including browsing and purchase history. The bank's advantage is leveraging proprietary data collected across its ecosystem and applying sophisticated analytics to them. Some credit decisions can be made within ten seconds of a completed application.

Kaspi Pay, the bank's app, enables customers to pay for household needs, make online and in-store purchases, and manage peer-to-peer payments. It bolsters the bank's profit margins by removing the intermediaries that previously handled payments for the bank. Through launching its own terminals with QR codes, the app has marginalized payment networks in the country and now has around a 70 percent share in transactions and payments. It offers current account and bill payment, including payments for taxes and public utilities. Its peer-to-peer service has drawn many new customers into the Kaspi Bank ecosystem. The platform is growing fast, with the total volume of payments up 111 percent in 2020.

The fintech pillar is the biggest driver of Kaspi Bank's revenue. It applies AI and big data to reduce the bank's risks on many kinds of loans, including small-business loans and short-term consumer loans for marketplace customers. Within its fintech area, the most widely used service is to buy now and pay later. The bank's fintech portfolio grew 42 percent in 2021, and the related average customer savings rose 34 percent.

Kaspi Bank has been especially effective in integrating its different platforms and services via its Super App, which hosts all services. The bank has introduced a travel platform for airline tickets, has moved into e-grocery, has strong offerings in government services, and is planning to add hotel and vacation packages. Its strategy as a commerce marketplace specialist is paying off, with total 2021 revenue up 46 percent.

their core activities by automating many of the basic activities of running a business. A business gateway provider will compete with online accounting platforms, software companies, and even telcos for the small-business service ecosystem.

Investment advisory

Investment advisory is the arena to provide investment and insurance products for all kinds of customers, from young people just starting to build wealth to older people who need sophisticated investments and protection to institutions. This includes financial planning, brokerages, trusts, retirement plans, and many kinds of insurance. People crave tailored advice and trust-based relationships that make them feel understood, even when dealing with virtual advisers online.

On the business side, this arena comprises the advisory aspects of investment banking and other financial-advice services. The goal for investment advisory is superb *personalization*—blending the human touch with digital efficiency through business models such as the following:

- **Personal wealth and health guardian.** Guarding personal wealth and health means offering investment and personal-protection advice in the broadest sense, including health insurance, virtual care, and life insurance. It features a blend of human experts and highly personalized AI that can guide customers through a broad range of investment and protection options. Imagine a retirement plan, aid in college savings, and protection against surprise medical costs—just a few of the services a guardian provides.
- **B2B advisory boutique.** Serving as a specialist in B2B advising means offering tailored investment advice for corporate customers, with high-level expertise in specialties such as asset management and debt options.

Complex financing

Complex financing is the arena for individual and business services that require more sophistication than everyday banking. Examples include mortgages, home equity loans, car loans, and start-up loans. Such services are complex because many kinds of players are part of each ecosystem.

While familiar, these products and services are used less frequently than others, but they have a big impact on the customer. For instance, getting a mortgage is just one aspect of buying a home, which requires navigating a maze of real-estate brokers, lenders, insurers, attorneys, and other professionals. Consumers crave a trusted expert to help them get through that maze and simplify it, weaving it into a single touchpoint.

The end goal for complex financing is *journey integration*—making these processes convenient, efficient, fast, and low cost yet also as personalized as possible from start to finish via business models such as the following:

- **Real-estate-journey orchestrator.** Serving as an orchestrator of the real-estate journey means handling the complex process of buying, renting, operating, and selling real estate for both individuals and companies and coordinating across mortgages, insurance,

A multipronged approach: Royal Bank of Canada

Royal Bank of Canada (RBC), Canada's largest bank, approached the challenge of everyday banking with an entrepreneurial mindset, building several start-ups and exploring partnerships. RBC is committed to having a presence in multiple ecosystems. The bank introduced the following initiatives, among others:

- **RBC Ventures** launched in 2017 as the bank's semi-independent venture capitalist function to find and finance new projects. It had a start-up-like culture and decision-making process separate from the core RBC business. Within two years, it reached 3.2 million Canadians with various value propositions—and prompted tens of thousands to become new RBC banking clients.
- **Ownr**—an end-to-end small-business gateway focused on start-ups—offers, for example, web design, business registration, and banking services on one platform.
- **GarbageDay** is a tool to help residents remember their garbage and recyclable collection days, seasonal tasks, and parking information. Roughly 200,000 Canadians now use it.
- **RBC Rewards** became the top program in Canada, with an app providing personalized offers. It operates now as a marketplace, with merchants not only funding rewards but also paying a markup and using the program as part of their distribution strategy.
- **NOMI**, a free, AI-driven personal financial-management tool, launched in 2017 and is now part of the main RBC app. The product has three differentiating factors: NOMI Find & Save learns transaction patterns and automatically sets aside money (up to CAD \$50 per day) for use in the future. NOMI Insights summarizes a user's banking activity, while NOMI Budgets categorizes spending into five categories and compares the user's current spending with benchmarks.

utilities, and maintenance with seamless integration. The orchestrator can compete to become the end-to-end “concierge,” integrating mortgages or rents and all other services into a subscription model.

- ***Equipment and vehicle marketplace specialist.*** Specializing in the equipment and vehicle marketplace means providing complex financing of cars, trucks, and industrial equipment for individuals and businesses. It can create marketplaces for these high-price goods and support a customer’s journey from selection to financing, insurance, maintenance, and resale.

Mass wholesale intermediation

Mass wholesale intermediation is the corporate-focused arena. It’s a combination of expertise and new, efficient systems. It includes corporate finance, cash management, portfolio management, M&A advisory, equity and debt financing, and other traditional investment banking offerings. The ultimate goal for mass wholesale intermediation is *extreme efficiency—and know-how*—which banks can pursue through business models such as the following:

- ***Automated trading and funding marketplace.*** Serving as an automated marketplace means offering mass wholesale products and services for corporate customers. This model automates large marketplaces of liquid capital via superefficient, frictionless, low-cost platforms, including “tokenization” through smart contracts.
- ***Integrated enterprise services platform.*** Serving as an integrated platform means offering corporate customers deep integration with enterprise systems such as SAP. The platform can personalize and coordinate services such as accounting, commodity trading, and enterprise resource planning.

Banking as a service

BaaS is the only arena that’s not customer facing. BaaS providers create highly efficient tech and infrastructure platforms, which they can license to customer-facing organizations. Some will offer credit to nonfinancial institutions, enabling them to act as banks; and some will bolster the balance sheets of existing financial institutions. The goal for BaaS is *utility*—giving clients robust, secure, and efficient services and liquidity through business models such as the following:

- ***BaaS utility provider.*** Providing BaaS utilities is the same kind of relationship that an anonymous food company has with companies such as Costco or Target, creating white-label products for retailers to market under their own brands. BaaS can provide regulatory know-how and back-office services, such as customer service, documentation, and HR.
- ***BaaS balance sheet provider.*** Providing BaaS balance sheets gives both banks and nonbanks access to distinct pools of capital and offers asset liability management and regulatory-required licensing for nonbanks. By bolstering the balance sheets of banks’ customers, this kind of BaaS greatly reduces their need to keep raising capital.

Commerce marketplace specialist: From WeChat to WeBank

WeBank, owned by the Chinese technology and social-media conglomerate Tencent, is an example of a commerce marketplace specialist (CMS) that leverages the strengths of big tech, especially network effects.

Tencent owns both one of the largest social-media companies and one of the largest video game companies in the world. Its instant-messaging apps WeChat and QQ have about 1.3 billion and 570 million monthly active users, respectively. Tencent is also changing how people access banking through WeBank.

WeBank's strategy is built upon "the three As." Its services are easily "accessible" via 24/7 mobile banking. They are "affordable" enough to appeal to underbanked demographics. It uses big data to target "appropriate" products and services for different customers and reduce risks to the bank. WeBank leverages the gigantic customer base and data from the Tencent ecosystem.

WeBank offers preapproved loans to qualifying users of QQ and WeChat, based on proprietary credit scores generated from Tencent data. The bank's algorithm draws a customer portrait by analyzing many kinds of customer behaviors—what and how much a user buys,

what games they play, whom they interact with on QQ and WeChat, and more—up to 200 different variables per customer. As a result, its non-performing loan (NPL) ratio was just 1.2 percent in 2021, significantly lower than the average NPL level for unsecured retail loans.

This platform-centric approach to banking enables WeBank to offer various types of loans to prospective customers from the Tencent ecosystem, supported by its partner bank network. WeBank evaluates loan risk via its advanced risk model and then sells the vetted loans to partner banks that participate in its platform for a small fee. For investing, customers can also purchase mutual funds, money market funds, or other investment products offered by various financial institutions via WeBank's marketplace.

To further enhance the efficiency of the giant platform, WeBank is committed to investing more than 10 percent of its annual revenue in top-notch IT infrastructure every year. These investments have already paid off massively: WeBank's IT cost is now only one-tenth that of other leading banks in China to achieve the same level of transaction capability.

As a result, WeBank's growth is remarkable: a 36 percent rise in revenue and 39 percent jump in profit in 2021.

An inside look at the biggest arena: Everyday banking

The new arenas will require banks or nonbanks to ramp up their presence on new platforms, create touchpoints with customers, and mine and capture data in new ways. To understand how these concepts will play out, let's examine the biggest arena: everyday banking.

Imagine that a forward-looking bank or a new fintech competitor offers an app we will call "MyLifeAssistant." MyLifeAssistant will take many existing technologies that customers find on their phones—and many still to be developed—and fold them into a single offering that addresses a whole range of users' daily needs. For instance, it might send an alert that today is the birthday of a friend, along with a gift recommendation. Users could order the gift through MyLifeAssistant and arrange for same-day shipping, or they could shop for alternatives.

Later in the day, when a user visits a local café, MyLifeAssistant might preselect their favorite coffee or lunch, giving them one-tap access to their favorite repast—with discounts and rewards. In fact, MyLifeAssistant is so easy to use that customers use it for investing, planning, shopping, socializing, and more throughout the day. As a customer keeps using MyLifeAssistant for more kinds of shopping and services, the app increasingly knows their friends, how their money is spent, and what they do in their free time. It will also follow them into the metaverse or virtual reality.

Of course, MyLifeAssistant is far more than just a simple app. In fact, MyLifeAssistant is the front-end evidence that the institution that created the app has decided to compete aggressively as a CMS. Behind the scenes, while coordinating all this activity, MyLifeAssistant is constantly adding to its database so that it can improve its future predictions via advanced analytical models.

The more appealing the app's personalized recommendations become, the more money its users will save via discounts and loyalty programs—and the more commissions the bank will earn from its vendor partners. Everyone involved benefits from MyLifeAssistant's constantly improving analytics and its ability to automate customer experiences. The more invisible and embedded its services become, the happier its customers.

There are limits. MyLifeAssistant and its parent have strong incentives not to take advantage of their customers. The more partnerships and personalized services that they offer to both individuals and businesses, the more that everyone involved benefits. The key to the parent institution's competitiveness and profitability is constantly upgrading its data analytics to improve convenience, customer care, and hypertargeted offerings—without attempting to overcharge or exploit its customers.

By processing both e-commerce and consumer finance transactions (including peer-to-peer payments, car loans, credit cards, and so on), a CMS can begin to predict what customers want even before those desires become conscious. Banks can also sharply reduce their own risks because they will know each customer's creditworthiness better than most credit rating agencies do.

Again, MyLifeAssistant isn't a banking app. It's a core component of being a CMS. It goes far beyond everyday banking services to offer tight integration with e-commerce journeys. It can serve as the hub of an ecosystem that blends banking with shopping and other highly personalized services.

A thriving CMS will offer more than mere personalization, simplicity, and affordability. It will go all the way to *invisibility*. CMSs will have more access to their customers and much more data about those customers than traditional banks have ever had. Because they will become primary touchpoints for a wide range of transactions, they can build an unbeatable edge in collecting and analyzing big data.

Excelling at this transition will require banks to look beyond their traditional metrics of success, such as margins and risk costs. They will need to focus more on performance indicators used by leading e-commerce players, such as the number of customer touchpoints and time of engagement. This business model has enormous economic upside. Any bank that successfully transitions into a CMS can multiply revenues by ten, with higher profit margins for higher-value services.

The impact of data and money regulation around the world is uncertain

The kind of transformations and competition that we have examined in everyday banking are sure to take place in each of the other four arenas. But predicting the winners, as well as how long it will take them to get there, in different countries is extremely difficult. That's because it's hard to say how digital currencies and data will be regulated in the future, especially in a world where countries and regions have such differing approaches to regulation.

It's possible that, over the next decade, customer data will become the new oil—highly regulated, jealously guarded by institutions that capture it, and a key source of business value. A more likely scenario is that customer data will become the new water—a public utility accessible to all and therefore much lower in value.

And while the advance of digital currencies is unstoppable, their regulatory future is similarly unclear. A decade from now, cryptocurrencies, easily exchanged via blockchain and other tech, might be well established as mainstream alternatives to central-bank currencies. Digital currencies might then be far more convenient for all kinds of transactions and deposits, potentially removing a main function and competitive advantage of banks. On the other hand, there might well be a regulatory backlash against cryptocurrencies, with developed nations cracking down on its misuse for illegal activities or financial warfare.

The landscape of currency could fall anywhere on a spectrum between wide open and tightly closed. However, none of the scenarios would stop what's certain to be the breakup of traditional banking. Rather, they would likely determine the shape of the industry and the winning players. If digital currencies become commonplace, banks face a tougher road. If currency isn't a factor, data take center stage and create a more even playing field.

Making things even more uncertain is the fact that banking is a “multilocal” rather than a truly global business. Banking experience and regulation differ greatly by region. The average American still uses checks and spends weeks getting a mortgage. The average Dutch citizen pays every bill from a smartphone, opens new bank accounts online, and gets approved for a mortgage in a few days. Regional rules shape what banks can and can’t do.

The next phase of banking for incumbents, challengers, and the rest of us

The successful bank of the future will be defined as a network of platforms. Few banks will capture all of the ten platform opportunities described in this article in their regions, but many will participate in multiple platforms. Given the platforms’ enormous value creation scale, getting even one right can unlock tremendous value for shareholders and broader stakeholders alike. But success will come to only those banks willing to move beyond their traditional operating models. Banks should be prepared to evolve through multiple stages on their way to becoming a platform network.

This vision of the coming shakeout may seem daunting. But the challenges are manageable taken one step at a time. The first and most important step is to commit to adapting as soon as possible. Banks and nonbanks that begin to transform themselves now will have a huge advantage over competitors that become paralyzed with indecision and confusion.

The good news is that there’s still enough time for most financial institutions to transform their business models. Additionally, the capital markets are likely to be very supportive in valuing those transformations over the next five to ten years.

For incumbent, universal banks, the key steps will look something like the following:

1. Decide which arenas and business models to focus on, based on your strengths.
2. Start to align your organizational resources—especially tech talent—for the coming shifts.
3. Start to develop and test your platform business models.
4. Redefine your purpose (including your environmental, social, and governance impact) to build stronger bonds with your customers and talent.
5. Build a more entrepreneurial culture by protecting your experimental projects from conservative pressures within the organization—and give management incentive to succeed.

For challengers looking to exploit a tech edge as a way of entering banking, the first step is to analyze which arenas offer maximum advantage based on that edge and which

platform-based business model makes most sense. These organizations will have the advantage of not being tied to the old standards and practices of traditional financial services. But they need to be mindful that this advantage doesn't guarantee success, even for companies with cutting-edge innovations.

To be clear, this transformation will take time, but leading organizations that move fast, stay ahead of the curve, and remain patient can break out of today's stagnant growth trajectory and put themselves on a strong valuation path. Many banks already are moving forward and getting recognition from the market. We believe that as more and more banks embrace this kind of transformation, the market will see the change, recognize the increasing potential, and view the industry as one with a bright future.

Ultimately, whether you are the leader of a company that depends on banking or a consumer hoping to enjoy better customer service in your life, there is a lot to look forward to. The new era of banking will arrive after a period of complex, confusing evolution, but it will ultimately raise the quality of life for anyone who interacts with any kind of financial services, including customers, employees, shareholders, and regulators—which, of course, is everyone. [Q](#)

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Shifting to a new mindset for equitable business outcomes

by Tiffany Burns

Companies that really want to make a sustainable difference when they think about equity may need to change mindsets.



Tiffany Burns is the managing partner of McKinsey's Atlanta office.

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Over the past couple of years,

we've seen a heightened interest in supporting Black consumers and businesses—

a direct result of the Black Lives Matter movement and protests after the murder of George Floyd. We've done a lot of research during this time to understand whether this support is helping and what drives continued equity gaps for Black consumers and Black founders. We've found that the support is not working as well as it should, and inequities persist.

From difficulties getting to a store to a lack of product availability to dealing with salespeople without relevant expertise or training, Black consumers feel a deep dissatisfaction. Black founders are frustrated too. Forty-five percent of American consumers think retailers should support Black-owned brands, vendors, and suppliers—but I've talked to more than 50 Black founders, and each one of them says every part of the founder experience is arduous. These founders have passion, vision, and excitement but face disproportionate obstacles to raising capital, testing products, and getting on shelves simply because they are Black.

In 2022, why should it feel so impossible? Often companies have a social-justice lens: they want to support Black enterprise efforts because it's the right thing to do. So they donate funds or launch programs. These are both important actions, but to get things right and have an impact, companies that really want to make a sustainable difference in supporting and creating equity may need to change mindsets.

The first concept a retailer should adopt is an investor mindset for equity. Executives should be asking themselves, “How can we drive ROI and increase equity? What are the things my organization can do that will allow us to drive competitive advantage, create more value for our shareholders, and drive equity?” These things are not mutually exclusive. When we looked at venture capital investment in beauty companies, we found that only 4 percent of late-stage-funded companies were Black founded. They received one-tenth the funding of their non-Black-founded peers, yet their income was 89 times higher. The ROI here is powerful: imagine what the return would look like with parity levels of investment. The more you can align your overall business strategy where both increased equity and value creation are outcomes, the more it will become a sustainable operating model.

The second thing companies should do is take a data-driven mindset and reconsider the metrics being used to make business performance decisions. Traditional metrics can be myopic and embed bias into performance outcomes, leading to missed opportunities for profitable growth. Take, for example, retail footprints. For store location, there's a historical reliance on the movement of people and foot traffic. Population density in an area might lead you to believe there's an opportunity to locate a new restaurant somewhere. And you might dismiss neighborhoods that are less dense or look like they have less movement. But in those retail deserts, the unmet need is both significant and pervasive, which opens a potentially unseen opportunity. We have data that say Black consumers are willing to pay more for healthy food, so it would still make sense to locate there. If models tell us not to make certain moves, then maybe we need new models.

Finally, companies and investors need to go beyond surface-level support. It's great that people are excited about Black brands and want to feature Black founders' stories. Everyone

showcasing what Black businesses are doing has good intentions. But race-based marketing is not enough. And we can't “tokenize” Black founders and say they make products for only Black consumers. When companies do this, they leave significant value on the table. We have to treat Black consumers as core consumers, period, and ensure that their needs are met. It's a \$300 billion opportunity, and those who can figure this out will see real growth.

At the end of the day, the Black brands that have had very significant success have had phenomenal products with resonance across the general consumer population. Product orientation also ensures that Black founders aren't pigeonholed into only the Black consumer segment. The more we can lift up good products from Black founders and make sure they have their fair share of coverage across consumer segments, the more equitable the brand landscape.

Equitable business embraces the fundamental belief that the Black consumer should be delighted. Equitable business means that a Black kid with a compelling product who wants to start a consumer business should have the same access to capital and markets as a White kid. We need to shift our outlook to say it's not about Black brands; it's about good brands. We're still far away from leveling the playing field. **Q**

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How will the space economy change the world?

Space is no longer the sole domain of governments and aerospace and defense companies. Businesses that pursue emerging opportunities now may gain a first-mover advantage.

by Ryan Brukardt

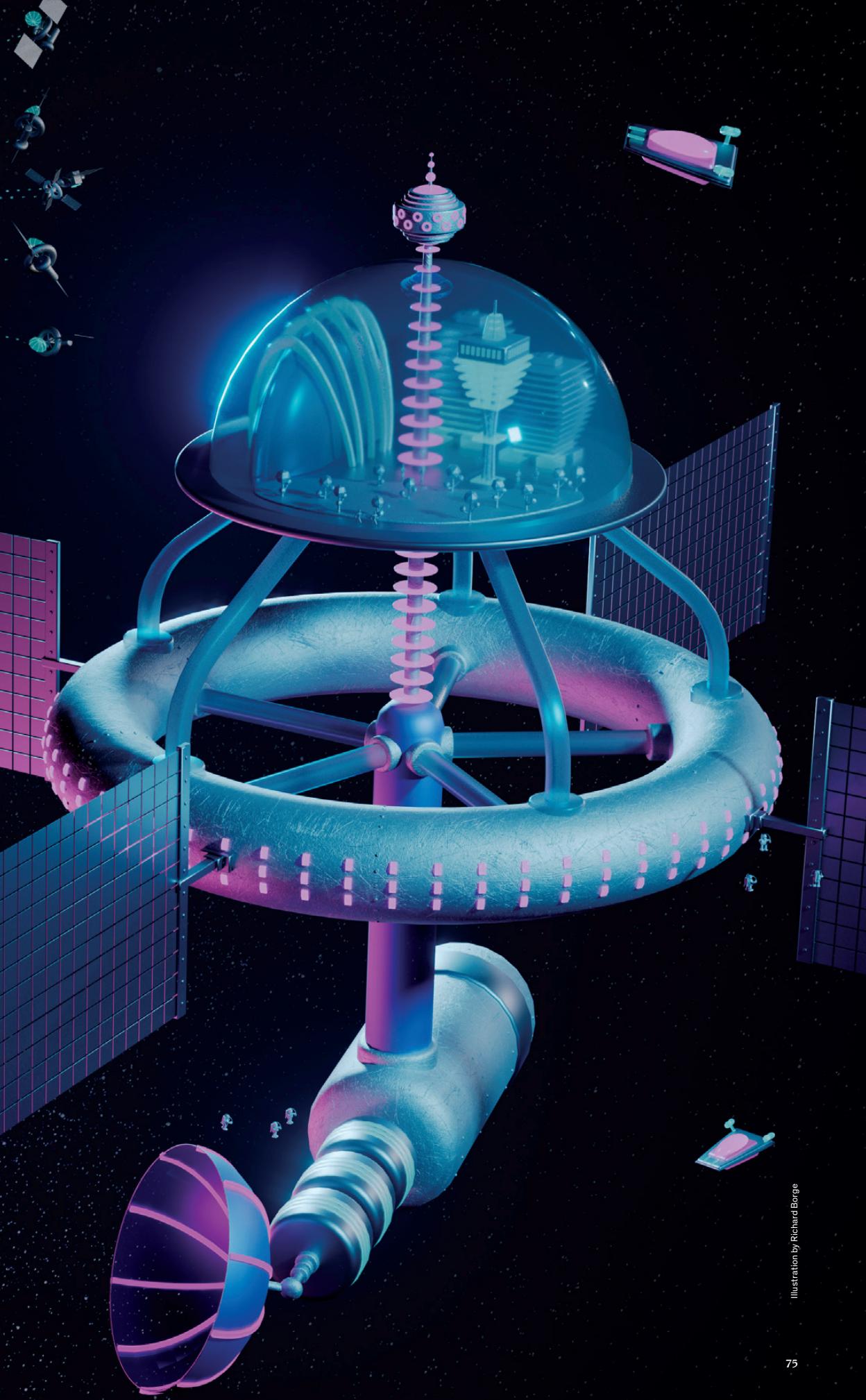


Illustration by Richard Borge

The passengers who boarded commercial flights just after World War II didn't know that air travel would begin to soar over the next decade, nor did the masses who first logged onto the internet in the 1990s realize that computers would one day provide much of their news, entertainment, and social life. And today, few people understand that the space economy—broadly defined as activities in orbit or on other planets that benefit human beings—could soon transform how they live and work.

Some hints of the coming changes are apparent, including the frequent headlines about SpaceX, Blue Origin, and other private companies launching their own rockets and deploying satellite constellations. These activities, once primarily the domain of government agencies, are now possible in the private sector because recent technological advances in manufacturing, propulsion, and launch have made it much easier and less expensive to venture into space and conduct missions. Lower costs have opened the door to new start-ups and encouraged established aerospace companies to explore novel opportunities that once seemed too expensive or difficult. The technological improvements have also intrigued investors, resulting in a surge of space funding over the past five years.

The potential for innovative space applications is immense, especially if established aerospace companies form partnerships with businesses that traditionally haven't ventured into orbit. Pharmaceutical companies might establish a lab on a space station to study cell growth, for instance, or semiconductor companies might manufacture chips in extra-terrestrial factories to determine whether any aspects of the space environment, such as the lack of gravity, improve the process. Such possibilities, which might have seemed like the stuff of science fiction a few years ago, could become an essential part of a business across multiple industries in the near future.

But how and when should companies take advantage of their greater access to space and pursue emerging use cases? And how can they decide what opportunities are most promising when the technology is so nascent? Although much remains uncertain, companies that begin exploring these questions now could gain a long-term advantage.

The benefits of the space economy—with more to come

Space has long been a potent incubator for innovation—first from governments and large telcos and now from multiple private companies as well. From the launch of *Sputnik 1* in 1957 through today, the space economy has delivered most of its value through satellite services, including communications and data and image collection and analysis. Satellites help large companies with multiple tasks, including inventory monitoring at distant locations, instant authorization of credit-card transactions, and international video-conferencing. Consumers use satellite technology whenever an online navigation system pinpoints their location, or when they make calls during plane flights or from rural locations that lack cell phone towers. And television viewers can thank satellites for beaming the signals that allow them to watch their favorite programs. The role of satellites in these activities is often overlooked—many people may think terrestrial computer networks provide the necessary connectivity—unless a glitch occurs and draws attention to the unobtrusive technology operating in the background.

In addition, satellites help world leaders address intractable social, environmental, and economic challenges. Consider a few ways that satellite data can provide insights—often more effectively and comprehensively than other sources:

- **Climate change.** More than 160 satellites monitor Earth to assess the effects of global warming and detect activities, such as illegal logging, that might contribute to the problem. NASA has used an instrument mounted on its *Aqua* satellite to monitor environmental changes, including those related to ocean water, water vapor, clouds, sea and land ice, and precipitation, for more than 20 years. Other satellites provide information that can help government agencies take urgent action on wildfires, coastal erosion, and other climate-related natural disasters.
- **Food security.** Satellite data is increasingly used to monitor crop development and potential threats to harvests, such as drought or insect invasions. The SERVIR project, a partnership between NASA and the US Agency for International Development, uses data from Earth-imaging satellites and geospatial technologies to help governments address multiple issues, including food shortages.
- **National security.** Governments, often working with companies in the private sector, can use satellite images and data to gain valuable intelligence, such as information on the movement of troops or the installation of weapons systems.

According to the not-for-profit Space Foundation, the space economy was valued at \$469 billion in 2021, up 9 percent from 2020, the highest recorded growth since 2014. Although the space economy now generates most value by enabling or enhancing activities on Earth, significant future value could arise from functions that occur entirely in orbit, such as in-orbit servicing, R&D, and manufacturing. That said, the satellite services available today will remain important and could be critical to some emerging use cases.

Finally, a tipping point

Researchers and other space enthusiasts have long discussed the potential for business activity in orbit, or even the development of space cities. But now, with lower costs and greater technological capabilities, the space economy may finally be at a tipping point, where businesses can conduct large-scale activities in space. As costs continue to drop, even more companies may contemplate space ventures; and for the first time, they might even be able to profit from forays into space.

More launches, lower costs

The costs for heavy launches in low-Earth orbit (LEO) have fallen from \$65,000 per kilogram to \$1,500 per kilogram (in 2021 dollars)—a greater than 95 percent decrease. Computer-aided design, 3-D printing, and other innovations have contributed to the cost reductions by streamlining the manufacturing process and improving supply chains. The emergence of new commercial launch providers that prioritize efficiency is also helping. For instance, engineers at these companies have developed reusable components for

In 2021, private-sector funding in space-related companies topped \$10 billion—an all-time high and about a tenfold increase over the past decade.

launch vehicles that lower costs while promoting sustainability. The recent increase in launch frequency, particularly at SpaceX, is accelerating the drop in costs.

Current R&D efforts could reduce launch costs even further. Relativity Space, for instance, plans to use 3-D printing, AI, and autonomous robotics to build a fleet of fully reusable, low-cost rockets. The first launch for these vehicles is planned for 2024 at Cape Canaveral, Florida. Similarly, SpaceX plans to conduct a full-scale, orbital test flight for its reusable *Starship* launch vehicle—the tallest and most powerful ever built—in late 2022.

Smaller satellites, bigger gains

The size and weight of satellites have fallen significantly in recent years because of various advances, primarily driven by private companies, such as the use of lighter solar panels and more efficient batteries. These changes, combined with greater use of commercial, off-the-shelf components, have decreased satellite costs and made their launch and operation feasible for many more organizations. Greater satellite demand is also improving costs because manufacturers obtain economies of scale by increasing production volume. These lower costs have helped alter the space landscape. Large government satellites, some of which cost upward of \$1 billion and tend to be deployed in orbits far from Earth, are now outnumbered by smaller commercial satellites in LEO, often deployed in constellations, that can cost \$100,000 or less.

In tandem with the cost decrease for satellites, researchers have created new technologies, such as higher-resolution sensors, that are boosting image capture, data processing, and other functions. Satellites can now collect, analyze, and transfer much larger stores of data than they could just five years ago.

Greater investment, more innovation

Public agencies, especially NASA, the US Department of Defense, and the US Intelligence

Community, have traditionally provided most space investment. While these agencies will continue to be a major source of funding, the combination of lower costs and more sophisticated technology is attracting more investment from both special-purpose acquisition companies (SPACs) and private investors—a trend that is driving innovation.

In 2021, private-sector funding in space-related companies topped \$10 billion—an all-time high and about a tenfold increase over the past decade. The percentage of global space R&D funding coming from the US government decreased from about 70 percent to around 50 percent over the same period. Meanwhile, the number of space-related start-ups funded annually increased more than twofold from 2010 to 2018. Commercial funding could surpass government funding within 20 years, a trend that government is largely embracing and that could lead to mutually beneficial public–private partnerships.

New use cases and more momentum

Although much uncertainty persists, analysts are so optimistic about space that some believe it will become a \$1 trillion industry, thanks to enhancements to existing use cases and the development of entirely new applications. Much progress, including further reductions in launch and operational costs, must be made before many ambitious space projects can become a reality, but continued technology improvements are encouraging companies to increase their investments in the space economy now. The new use cases can be divided into two broad categories: space-for-Earth applications, which facilitate terrestrial activities, and space-for-space applications, which involve activities that occur only in orbit.

Space-for-Earth applications

Satellites are becoming more sophisticated each year, allowing researchers to enhance existing use cases and develop new offerings. Many companies have recently deployed smaller, less expensive satellites in LEO—an orbit that is ideal for high-bandwidth, low-latency communications—to provide better satellite connectivity. While most past efforts to launch LEO constellations failed because of high costs, limited demand, and inadequate funding, the situation is much different today. SpaceX's Starlink has already launched an LEO constellation and has paying customers for its satellite broadband network. OneWeb and Amazon's Project Kuiper, among others, also plan to deploy LEO constellations soon. Satellite imaging, another technology frequently used in current applications, has also improved and could enable multiple new use cases by providing more detailed and accurate information.

Some of the most important space-for-Earth applications include the following:

- *Internet services in remote locations.* Terrestrial networks are often difficult or uneconomical to install in underserved or rural areas. Beyond basic inconveniences, a lack of connectivity can interfere with vital services, including provision of remote learning or online medical consultations. By providing internet services to these areas, satellite connectivity could increase educational equity and social interactions and improve public health, especially in cases where the COVID-19 pandemic still limits some in-person interactions.

- **Agriculture.** Space-based remote sensors collect a multitude of data, including images, information on weather patterns, and measures for electromagnetic waves, all of which have applications for agriculture. McKinsey's annual survey of farmers on digital adoption shows that 29 percent of row-crop farmers and 45 percent of specialty-crop farmers already rely on such data or plan to do so. The greatest value from satellite sensors for agriculture relates to yield improvement opportunities. For instance, farmers can use satellite images to identify areas that require replanting early in the season rather than conducting a manual inspection that might be time consuming and miss some areas of the field.
- **Energy.** Utilities can use satellite data to monitor vegetation that might be interfering with critical infrastructure, including power lines. By addressing the problems before they escalate, companies might avoid power outages.
- **Mining.** Satellites can support some of the most important functions at mining companies. Better connectivity might improve productivity at remote sites by helping headquarters-based experts communicate with local staff to solve problems. Satellite data can also help mining companies map emissions, monitor shipments along the supply chain, and improve exploration efforts by identifying mineral-rich areas.
- **Insurance.** Better imaging might allow more insurers to cost effectively assess risks and damages at remote locations, with improved resolution and greater image-sequencing frequency pinpointing problems more clearly and eliminating the need for in-person visits. Pilot tests of radio-frequency-based mapping, which can detect "hidden" shipping activity, could help maritime and commodities-based hedge fund customers track the movement of goods overseas.

Space-for-space applications

Many of the emerging space-for-space applications are now possible for the first time because lower costs make frequent launches and long-term missions more financially viable. Consider a few use cases that could gain traction:

- **R&D.** Space R&D is not a new application, but businesses outside the aerospace sector have not traditionally undertaken large-scale projects in this area. With lower costs and better technologies, however, this could change as companies build upon the research done to date on the *International Space Station*. Among other applications, pharmaceutical companies could develop cell cultures for predicting disease models. While these cultures develop in well-known patterns on Earth, the novel environment in space would shift growth patterns and reveal new insights. Similarly, consumer goods companies might want to develop products in space, where high levels of radiation, a near vacuum-like state, and zero gravity might improve design and manufacturing. For instance, a manufacturer of beauty products might discover new information about skin care in the harsh space environment, which accelerates aging.
- **Manufacturing, construction, and assembly.** Super-heavy launch vehicles, such as SpaceX's *Starship*, may make it easier for companies to create factories or manufacturing plants in orbit. Some semiconductor companies are already exploring the potential for

creating chips at such facilities, since the natural vacuum in space could potentially facilitate innovative thin-layering techniques by reducing or eliminating gases during production.

- **Greater exploration and habitation in space.** Innovative forms of deep space exploration, including crewed missions to Mars, might become possible if technologies such as nuclear propulsion continue to advance. Some leaders, including Jeff Bezos of Blue Origin, are already speculating that large numbers of people may even be able to live and work in space. Recent headlines about space tourism may be the first sign that space is no longer the domain of a few carefully selected astronauts.

Activity in most of these space-for-space areas is now very limited, but further technological improvements, such as laser communication between satellites and better edge processing (making sense of data in space, rather than after downloading it) could accelerate progress. Although it's still difficult to determine which use cases, if any, will gain significant traction, industry stakeholders may promote progress by considering measures that will help space companies and others navigate the new landscape. For instance, guidelines about use of orbits might help reduce the chance of collisions in space that could result in debris.

Thanks to lower costs and greater access, space is no longer the sole domain of large aerospace companies or public agencies with vast budgets. It's a place that can deliver many benefits—both on Earth and in orbit—to almost any business sector. Across industries, from pharmaceuticals to semiconductors, some companies are already expanding their space capabilities, exploring new use cases, or piloting innovative applications. In a few years, industry leaders may compare these early movers to businesses that recognized the internet's potential in the early 1990s and moved quickly to establish an online presence. The challenges ahead—both technological and financial—can't be understated, but the potential of space is also immense. Companies that ignore it, either because they are bogged down in current challenges or underestimate the opportunities ahead, might eventually find themselves scrambling to catch up to the early leaders. **Q**

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A defining moment: How Europe's CEOs can build resilience to grow in today's economic maelstrom

by Hemant Ahlawat,
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Thomas Poppensieker,
and Andreas Raggf



Can leaders lift their companies to the next frontier of resilience—not only to survive but also to thrive?

Aconfluence of crises and disruptions has darkened European skies. The energy crisis is already dire and could get worse. The war in Ukraine continues, an unabated humanitarian tragedy. The cost of life's essentials has gone through the roof—prices in some countries have risen eightfold. Business signs are weakening. In July and August of 2022, purchasing managers' indexes indicated contraction for the first time since early 2021. China, a key supplier and customer, is wrestling with its own economic problems. The effects of climate change are pronounced across the continent, with drought and extreme heat curtailing hydropower and even putting industrial production at risk. The energy crisis threatens to derail the net-zero transition. Semiconductor shortages, technological shortfalls, and labor shortages remain. The latest McKinsey scenarios, undertaken in partnership with Oxford Economics, suggest that European GDP will most likely contract overall in 2023 (Exhibit 1).

How will Europe's business leaders respond? This is a defining moment for a generation of executives who have never been tested in quite this way. Yes, today's leaders have faced down the global financial crisis, the euro crisis, Brexit, and the COVID-19 pandemic. All were challenging in their way; each crisis called for ingenuity, grit, and determination. Many business leaders met these challenges exceptionally well. But today they face a unique confluence of crises that is of another magnitude. The playbooks of the past will be only moderately helpful.

Businesses need new approaches to build the resilience required in these decisive times, through a perceptive response to current challenges, *foresight* to anticipate the next round of disruptions, and capability for *adaptation* that will set the business on a foundation for successful growth.

A defining leadership moment

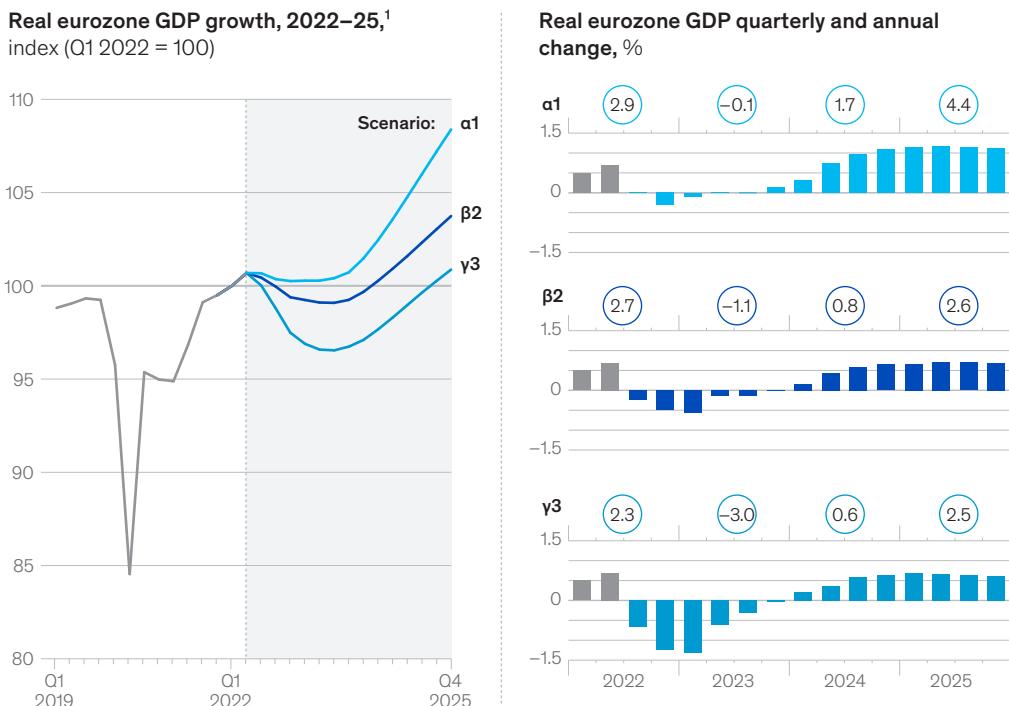
No crisis is ever the same as the previous one; neither can it be managed in the same way. Likewise, no industry is affected the same way in different crises. With the exception of pharmaceuticals, no sector showed positive returns throughout the pandemic and the more recent period of geopolitical turmoil. Moreover, in the current confluence of crises the vast majority of companies have produced negative returns.

Executives have reacted to each disruption separately but with all-consuming responses; they're fighting fires. But before they can recover from one, the next crisis is at the door. This approach is not sustainable in a context of continuous disruptions. Leaders are now discussing *resilience* as the essential condition. How can organizations arrive at a resilient stance, alert to what is over the horizon and ready to withstand shocks and accelerate into the next reality?

Some think of resilience as the ability to recover quickly, but it is more than that. *Resilience is the ability to deal with adversity and shocks and to continuously adapt and accelerate for growth.* Consequently, truly resilient organizations bounce back better than before and go on to thrive in a hostile environment. They play defense well, and they also go on offense.

Exhibit 1

Economic scenarios plot potential impact of disruptions on the eurozone GDP growth path for 2022–25.



¹McKinsey and Oxford Economics scenarios, Sept 12, 2022.

Source: National statistics agencies; McKinsey, in partnership with Oxford Economics

This is indeed a defining leadership moment. The last remotely comparable moment was the energy crisis of the early 1970s, an event that no CEO of today experienced as a leader. Here are a few of the practices that we've seen leading executives use recently:

- ***Don't follow the old rules.*** Setting up a crisis task force, for example, the go-to move in past years, is a waste of time; it will be outmoded before it is up and running. Leaders need to find a more flexible and consequently durable stance, engaging the whole organization by embedding a crisis-resistant DNA over time.
- ***Prepare for the recession, but at the same time, prepare to exit it.*** Recessions may be shallow and brief; companies can accelerate through downturns. This is essential: resilient organizations open an early lead, however small, in comparison with peers. This lead can be significantly widened during the following recovery and growth period. The early advantage can help companies succeed in the long run.
- ***Use scenarios rather than forecasting.*** Forecasting has failed to adequately capture many key events of recent decades, including slowing globalization, the COVID-19 pandemic, the supply chain disruption, and the return of inflation. Learn to plan with scenarios and triggers, regularly revisiting and adjusting them.
- ***Develop a resilience agenda.*** It should address burning short-term issues (for example, financial flows and supply chain disruptions) as well as longer-term challenges (for example, geopolitical shifts and the speed of organizational adaptations). Ensure that resilience is measured, so progress can be tracked and return on resilience investments can be maximized.
- ***Focus on resilient growth.*** Review your competitive position and finding strategic opportunities in the current environment (such as acquisitions and ideas for building new businesses).

Exemplary moves

Leading companies are already making resilience a reality, defending their franchise while also accelerating growth through the disrupted environment. Here's what they've done in the recent past:

- ***Restructuring the balance sheet.*** An automotive supplier wanted to achieve a particular credit rating, a target that required an increase in the amount of debt it could service under stress. Presenting the new capital structure to investors, equity analysts, and the rating agencies, the company was able to make an additional €3 billion in investable assets available to implement a five-year strategy.
- ***Reconfiguring the supply chain.*** To achieve operational resilience, a global electronics manufacturer with a global production footprint (more than ten plants) and a large multilayer supply base assessed the relative vulnerability of 5,000 unique supplier and plant combinations. The company identified around 100 high-risk suppliers and then discovered that 25 percent of its spending was concentrated in this segment. By reconfiguring the supplier network, the company reduced the higher-risk spending by more than 40 percent.

- **Decarbonizing core assets.** A global mining company with dozens of mines worldwide sought to embed environmental, social, and governance (ESG) along its value chain into the core business. The company defined targets and adopted strategic initiatives to create a pathway to net-zero emissions across the enterprise. Detailed decarbonization plans were developed for each site, with steps to reduce greenhouse-gas emissions by 30 percent by 2030. Once implemented, the plan will lead to large reductions in both operating and capital expenditures.
- **Derisking manufacturing analytics.** A global agriculture products leader wanted to deploy advanced analytics within its supply chain and manufacturing operations. Aware of the potential data and analytics risks this entailed, the company made derisking and safeguarding critical data and analytics through data governance and model risk management an integral part of the effort. The move built enterprise-wide confidence in analytics resilience and allowed the company to capture the full potential of the effort.
- **Planning using next-generation scenarios.** A leading automotive company created two hypothetical scenarios (a technological disruption and market breakdown), then assessed the potential impact on the business and the resilience levers that would best mitigate that impact. The analysis suggested that up to 60 percent of sales losses could be mitigated. This led to a decision to diversify geographically and reduce the risk of dependence on single sites, set up some anticipatory information mechanisms, and reduce the fixed-costs intensity in some production locations.
- **Anticipating the future.** A utility with annual costs of \$5 billion was facing rising prices from suppliers, in particular for basic materials. To address cost pressures strategically, the utility created an “inflation nerve center,” using tech-enabled analytics. The center identified spending priorities, anticipated and quantified inflationary risks, created live dashboards showing inflationary impact, and established a proactive process and set of levers to manage inflationary pressures. This helped the company understand the magnitude of inflationary risks across its cost base using an analytics-driven approach.
- **Turning a crisis into a growth opportunity.** A global pharma company addressed the recent disruptions in healthcare supply chains, services, and access to healthcare professionals. The company designed a home-delivery system to help patients with rare diseases continue receiving treatment in the safety of their own homes. It further created a partnership with a start-up company to provide patients with physical-therapy programs through virtual channels. These innovations allocate and deploy resources more effectively; they also inspired the company to undertake a groupwide agile and lean organizational transformation.

Why resilience matters: What still works and what doesn’t

Companies cannot effectively respond to the current economic crisis in precisely the same way as they did to earlier crises. But some basic lessons can be drawn from past experience. McKinsey research on the financial crisis of 2007–08 shows that resilient companies not only perform better than their peers through a downturn and recovery but also accelerate into the new reality, leaving peers further behind (Exhibit 2).

The research indicated that companies that win through resilience do three things well in a disrupted environment:

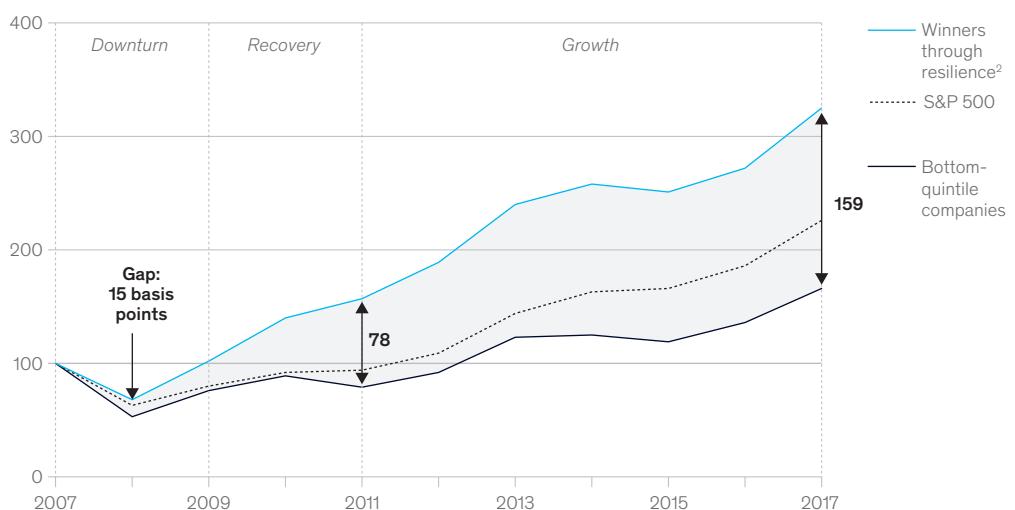
- They make faster and harder moves in productivity, preserving growth capacity.
- They create more operational and financial optionality in their balance sheets, adjusting leverage or cleaning legacies.
- They act swiftly on divestments in the downturn phase of disruption and on acquisitions at the inflection point of recovery.

Not only do leading companies do these three things well, they also do them at the most decisive time for their future well-being. They react in the downturn when it matters most and are therefore able to open an early lead in comparison with peers that can be widened significantly during the recovery and growth period. Recovery and growth periods following downturns are often longer than the actual downturn, so leading companies are well positioned to outperform the others in the long run. A turn in the cycle is a moment that requires true leadership to embark on either offense or defense. But the best-performing companies don't wait for that turn to finally reveal itself—or not. They act with intentionality and courage in the face of profound uncertainty about the macroeconomy.

Exhibit 2

Resilient companies play defense and offense simultaneously.

TSR of 1,140 global companies,¹ 2007–09 financial crisis, index (2007 = 100)



¹Calculated as average of subsector median performance. Includes 1,140 companies (excludes financial institutions groups and real-estate investment trusts).

²Defined as top geometric mean TSR quintile, by sector.

Source: MSCI; Corporate Performance Analytics by McKinsey; McKinsey analysis

The next frontier of resilience

Faced with overlapping disruptions and a complex European situation, executives need to decide where to concentrate their forces now, over the next six months, and beyond. The key questions to answer are about response, foresight, and adaptation:

- **Response.** Do I have the right capabilities, and am I acting on all resilience levers to respond adequately to the current situation?
- **Foresight.** Can I anticipate what is going to happen next?
- **Adaptation.** Am I able to adapt fast to a new situation?

To answer these questions, leaders must take a step back and apply a comprehensive resilience lens. Forward-looking companies have begun to structure their resilience agenda across the three activities—response, foresight, and adaptation. They are further differentiating their response, targeting actions in the six dimensions of the enterprise. Whether moving to defend or advance, companies may pull from a large range of resilience levers that are tailored to their specific profile, industry, and starting position. With fast adaptation, companies can meet their longer-term goals of sustainable and inclusive growth for customers, employees, investors, and the larger community.

Let's take a closer look at response, foresight, and adaptation.

Response

First things first. With severe challenges pressing, companies may have to address immediate gaps in their resilience profiles. They may face financial challenges such as liquidity constraints, or they may have to resolve disruptions in their supply chain, such as missing key inputs for their products. Before jumping into action mode, companies may take a step back and consider an initial resilience assessment to gain the needed perspectives on the six dimensions of institutional resilience (Exhibit 3).

How prepared is the company to withstand repeated shocks and disruptions? What short-term growth opportunities are within reach, and what will it take to capture them? What changes will enable the company to make that crucial pivot to accelerate into new realities? In domain after domain, and capability by capability, the assessment will discover where investment in resilience is needed and identify the actions that will close the gaps, defend value, and advance to new growth.

As illustrated in the exhibit, each of the six resilience dimensions will have its own specific set of levers that allow a company to play offense or defense. For example, in digital resilience, a robust digital, analytics, and cyber risk framework may, on the defense, help safeguard the company against digital failures or cyberattacks, while on the offense, it may pay dividends in at-scale digital transformation by ensuring robust and scalable business application of data and analytics.

It is essential that companies understand the levers available to them across the dimensions, the offensive and defensive capabilities, and the time horizon for creating impact. The

specific nature of resilience levers and their relative importance is also a function of the industry a company is operating in.

Foresight: Moving beyond targeted responses

As companies weather the storms of today, they must also anticipate and prepare for larger and possibly stranger events to come. To anticipate and respond to crises and opportunities, scenario analysis has proven to be the most effective tool, as long as it is supported by the required data and state-of-the-art analytics. Scenario narratives should be accordingly developed, stress-tested in analytics-based simulations, and connected to early-warning systems based on key indicators.

Crucial variables (including, for example, the evolution of semiconductor prices, energy costs, and the availability of critical raw materials) must be factored into the scenarios.

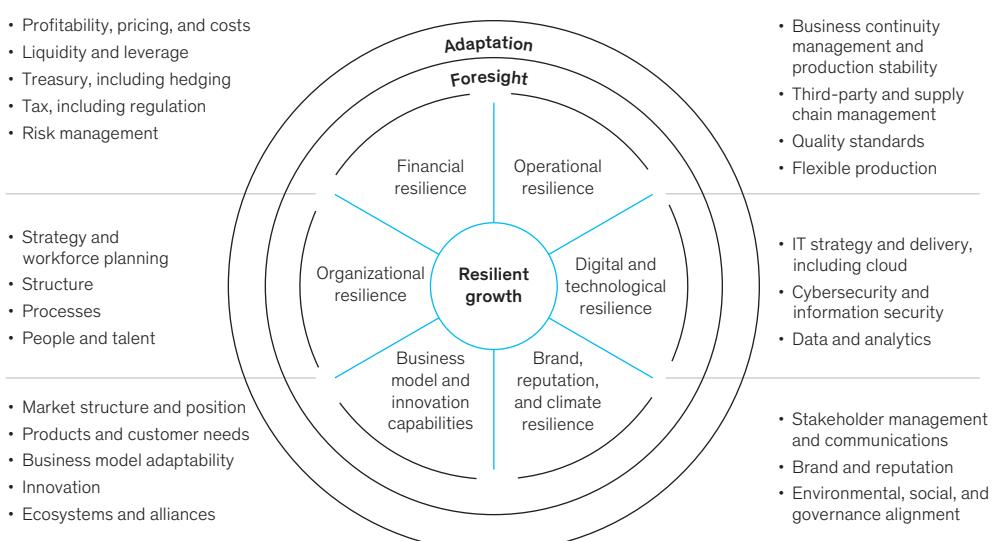
Management decisions have to be based on more than purely qualitative discussions. To understand the impact of hypothesized scenario inputs on financial outcomes (such as EBITDA, for example), an analytics-based approach can produce a reasonably accurate data-driven fact base in a timely manner.

That is the approach taken by financial institutions in response to the stringent regulation (such as stress-testing requirements) set off by the financial crisis of the early 2000s. Companies can take the approach as a starting point, widening the scope of the scenarios, thinking outside the box on possible inputs, and increasing the depth of analytics engines across a large number of industries.

It is crucial to embed such an approach—data- and analytics-based scenarios and stress-testing—into the ongoing strategic-planning process and management dialogue. This process must also be revisited regularly and assumptions and scenarios adjusted to the

Exhibit 3

The key levers of a resilient response lie across six enterprise dimensions.



changing environment. This will ensure that appropriate mitigation and management actions will be derived on a regular basis. A one-time analysis will simply not suffice.

Adaptation: Not just surviving but thriving

Foresight may help a company anticipate potential future outcomes through simulation and early-warning indicators. Only so much can be predicted and prepared for in advance, however. This is where adaptation, the third key activity of resilience, comes in. The resilient organization is flexible, able not only to react but also to adapt to new situations, especially the unforeseen ones.

Adaptation to the new environment requires deep investment in resilience. Adaptive companies are able to capture growth opportunities under adverse conditions. To confront the toughest times, leaders must possess a strong, resilient mindset, acting as role models, communicating an entrepreneurial spirit, and encouraging free thinking across an agile organization. Leaders send the right messages, providing strategic clarity and acting based on early-warning and foresight analytics. They are creating institutional resilience in the following five areas:

- ***Speed of response.*** The organizational structure and operating model is set up in an agile and flexible way to facilitate collaboration across teams, with a bias toward action over bureaucracy. Decision-making and escalation processes are fast, roles are clear, and decisions are executed effectively once made.
- ***'Owner' mindset.*** A strong sense of ownership pervades the organization. Curiosity and humility prevail; learning and adaptation are continual. Rather than avoiding challenges, people strive to innovate and explore new opportunities. The company pushes its own boundaries and questions the status quo and long-held beliefs. Individuals are empowered to think and develop in an entrepreneurial spirit, reskilling and upskilling as the business environment changes. Knowledge sharing across the organization is encouraged through cross-functional collaboration, mentorship, and open communication. Empowerment and decentralization are fostered, with only the most strategic decisions going to the senior-leadership team.
- ***Workforce planning and skill set of the future.*** To execute new, adaptive strategies, the company has done some resource planning. It finds the best people with the right skill sets and gives them the resources they need to cope with present and future needs. Resilience strength resides in an organization's people. Hear what they have to say and value their experience. Let them adapt to new realities so that talent can be strategically reallocated as needs change. The positive feedback this creates will attract more top talent to the company.
- ***Capital redeployment.*** Resilient organizations make investment decisions and reallocate capital quickly, based on changing scenarios. These decisions are taken with a forward-looking perspective on expected scenarios; the decisions are then communicated effectively across the organization.
- ***Crisis response.*** Clear and effective responses are activated in crises. Resilient companies have a well-defined and well-understood response tool kit; roles and responsibility are set. An effective, timely response is ensured by a fast-mobilizing organization. Leadership accountability is clearly defined and communicated, ensuring full alignment

on delegation of authority and escalation mechanisms in the event of disruptions. Leaders ensure that risks are assessed at all stages of the value chain, and they instill resilience throughout business operations.

From adaptation to growth

A company's own resilience assessment will help identify areas of strong resilience, which typically will serve as the catalyst for a growth initiative. Resilience has to be measured so that progress can be tracked to ensure return on resilience investments. For example, companies may act from a position of strong financial resilience with strong balance sheet and liquidity positions to create room for inorganic growth moves, particularly when target valuations are low in their industry. Or in sustainability, they may leverage an above-peer ESG position to double down on new growth opportunities. This could involve deeper transition to greener asset and product portfolios, which protect them against customer attrition as standards continue to tighten. The result for such a company will be still greater differentiation—and better position to gain market share and seek price premiums. In another situation, a strong, resilient digital backbone can help elevate companies' ambitions to adopt an aggressive digital agenda to raise their operating model and ways of working to new, more competitive levels.

The resilient company, beyond operating under "business as usual" scenarios, shows its mettle in crises and disruptions, using foresight to shift gears fast, swerve from danger, and then accelerate into new opportunity through adaptation. The enabling mechanisms are its agile organization design and decision-making structure—with clearly defined roles and responsibilities. Everyone should know what to do when storms come. Whether this moment leads to a turn in the business cycle or to a continuation of recent inflationary trends, it is a time when companies can make the kind of pivot through their resilience that strengthens their growth trajectory for the next several years.

European business leaders face a deeply unsettled economy, with potentially existential risks for those companies that enter the crisis with weaknesses in their balance sheets and business models. We've found that most senior executives are highly capable of playing defense in volatile and uncertain environments. Protection is a must, but opportunities for growth are also emerging. The exceptional leader finds the path to the next frontier of resilience, answering essential questions of where to shore up defenses and where to place bets on the future. The resilience framework we've outlined can help leaders see and understand gaps and identify growth opportunities even in the heaviest of seas. **Q**

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The authors wish to thank Christian Amberg and Amandine Bastiaens for their contributions to this article.

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Every company is a software company: Six ‘must dos’ to succeed

**As software
transforms every
industry, leaders must
turn to a new
playbook.**

*by Chandra
Gnanasambandam,
Janaki Palaniappan,
and Jeremy
Schneider*

Marc Andreessen's observation from more than ten years ago that "software is eating the world" needs an update: software *is* the world. The software industry continues to grow at a massive clip. More and more traditional companies are realizing that to compete and grow in a digital world, they must look, think, and act like software companies themselves.

Per McKinsey research from June 2022, nearly 70 percent of the top economic performers, compared with just half of their peers, are using their own software to differentiate themselves from their competitors. Fully one-third of those top performers monetize software directly.

The pressure to evolve is building thanks to three fundamental shifts. First, the accelerated adoption of digital products is driving an effort to embed software in the product and purchase experience through everything from personalization to seamless omnichannel delivery. Second, more of the value in more products and services from more industries is coming from software. For example, the average industrial company expects its share of revenue from software to double over the next three years. Finally, the growth of cloud computing, platform as a service, low- and no-code tools, and AI-based programming assistance are putting unprecedented power into the hands of billions of workers.

Yet while companies might already accept the importance of software (research shows that nearly two-thirds of companies have invested in software as a service or modern commercial software), they still tend to look at software as a capability that they can bolt onto their existing businesses. That just doesn't work. Becoming a software business requires foundational change with different skill sets, practices, leadership, and organizational structures.

It is hard to become a software company—less than 7 percent of all software revenue in the world accrues to nontech companies. But models for successful transformation do exist (see sidebar, "Three 'switch to software' models"). To understand what works, we analyzed more than 20 software transformations and spoke to a dozen senior executives who have led successful software transitions. The result: six principles that are at the core of any successful effort to become a software company.

Commit to a software culture

Every leader we spoke with underlined the fact that building a software-centric business means building a software culture. This goes way beyond adding a few software veterans and implementing DevOps (software development and IT operations). It requires building a culture that deeply values the creativity and artisanship of great engineering, elevates product leadership and a customer-first focus, and empowers a leadership team with a strong understanding of software business models and tech. Building that culture is challenging, but the CEOs and business leaders we spoke with highlighted three keys to success: leadership, communication, and investment.

Leadership

In our experience, one-third to one-half of a leadership team should be deep software experts. This might require radical steps, depending on the makeup of the leadership team currently in place.

More and more traditional companies are realizing that to compete and grow in a digital world, they must look, think, and act like software companies themselves.

The board should have at least two directors with software experience and should also keep the pressure on management by monitoring progress against specific software KPIs. The CEO of one company felt compelled to light a fire under its emerging progress in software when one influential board member added a review of the software business to the top of the agenda at every board meeting.

At many leading software companies, CEOs' direct reports include tech visionaries and AI scientists to stimulate thinking and push the organizations. Marc Andreessen urges companies to be even bolder: "Find the smartest technologist in the company and make them CEO," he told *McKinsey Quarterly* in 2022.

Besides hiring software leaders, most companies must educate their existing senior team. This means getting past basic training sessions and visiting start-ups. Real learning comes from building relationships and interacting closely with software companies. Some CEOs told us that they gain expertise both by inviting software leaders to join their boards and by joining the boards of software companies.

For example, Latin American bank Itaú Unibanco established a space for an informal incubator of 120 start-ups. Chief information officer Ricardo Guerra credits the informal networks that have sprung up between the bank and these start-ups as being instrumental in raising the bank's software IQ. "The best way to understand what's happening is to spend real time with software businesses," says Guerra.

Communication

The strategy, value proposition, and progress of a software business need to be communicated consistently. One challenge is to do so in a way that prioritizes the software business while keeping the core business and its people performing and feeling valued.

Some leaders we spoke with address this issue by reinforcing the idea that all employees,

whether in the software business or not, are part of a single culture. For example, all employees at Keysight Technologies, a leader in electronic testing and measurement, have a certain portion of their pay tied to overall performance of the company. Some CEOs we spoke with also emphasize being intentional about spending time with business leaders in the legacy business and ensuring that those leaders' priorities continue to have a place at the top of the corporate agenda.

External communications about the software effort are equally important, especially given the impact of software initiatives on valuations. The CEO of a large industrial company told us that half of all the questions they had faced on a recent investor call were about the company's new software business.

Investment

Software-centric businesses can be highly valuable franchises, but they require sustained investment. Most of these new businesses need to invest an average 25 to 35 percent of revenues over three to five years before they start to generate profits.

Three 'switch to software' models

There are three archetypes for companies moving toward a software business model:

1 Archetype one: embed software into the core of the business. For companies facing significant external business threats or looking to take a big leap in growth, becoming a software business at the core is a go-big strategy. While the company's business model remains consistent, its operating model shifts to put software at its core. One leading global bank, for example, realized that to respond to fintech companies and changing customer expectations, it needed to become a digital-first bank. It created 25 general-manager roles to operate like CEOs and be fully responsible for leading high-priority software initiatives. It also hired hundreds of engineers, product managers, and other technical team members to help pivot its tech organization and operate with the speed and agility of a start-up.

2 Archetype two: build a new software business. When companies face a fundamental disruption or find highly attractive adjacencies, they often launch new software businesses. The new business typically has

Given the significant operating-expenditure requirement to maintain this level of investment, many companies turn to acquisitions to accelerate the process. The IT company Hexagon, for example, acquired more than 25 software companies over ten years. In many cases, a single major acquisition is the key to accelerating the development of a software-centric business. McKinsey experience suggests that a big software acquisition is often a key indicator of success.

Invest in empowered product managers

You can't build world-class software capabilities without world-class software product managers. They turn the creative force of engineers and designers into winning software products and services. They have end-to-end accountability and, in some cases, even full profit-and-loss responsibility for a specific product. In the tech world, the ascendancy and importance of product managers are well established. But few nontech companies give them commensurate responsibilities or influence. That's a big mistake.

its own profit-and-loss (P&L) account and operates differently from the core business. This archetype can be a good way to learn while starting new revenue streams with the potential to overtake the incumbent business over time. Rockwell Automation, for example, realized that it needed to diversify its revenue streams by building out a richer set of software products to complement its hardware offerings. The company made an explicit pivot to establish a software business unit with experienced software leaders and sufficient autonomy and P&L responsibility.

solving customer pain points within the banking journey, is in the early stages of selling some of its internal solutions (such as financial planning) and platforms to other global banking institutions.



Some companies pursue multiple archetypes if they have the capabilities and sufficient market demand. And companies may transition through different archetypes as their capabilities mature and the market evolves. The six principles of software transformation described in the article apply to all three archetypes.

- 3 Archetype three: bring internal software 'gems' to market.** This archetype is about turning the software developed to manage internal problems into products to sell externally. These software products can coexist with core offerings, but each needs its own product management, engineering, and go-to-market capabilities. In a few cases, companies launch the products as independent companies. DBS Bank, which focuses on

Leaders we spoke with identify two key characteristics of a great product manager. First, such managers obsess over usage data and leverage it to do everything from knowing customers and informing the product road map to making product retirement decisions and helping users capture value more quickly. They embrace active field testing and experimentation to get data so that they can continuously improve the product.

Second, a great product manager has great “product sense” in the same way that a top horse trainer has “horse sense.” Based on years of experience and a mindset unconstrained by norms, successful product managers have an intuitive ability to understand how tech can address an issue in a new way. They involve designers, engineers, and data scientists early in the ideation phase to tap a wide range of unconventional thinking.

When Walgreens wanted to develop its health business, the company gave product managers leadership roles so that they could rethink how customers interact with pharmacies. This shift has expanded the range of interventions (including medical tracking and testing, medication monitoring, and the role of genomics in specialty medication treatments) that the pharmacy considers. “You really start seeing the future on behalf of the consumer, and then you intervene much earlier in that journey,” says Vish Sankaran, former Walgreens chief innovation officer.

Drive engineering excellence through autonomous teams and flexible architecture

Good software development can’t thrive in a hierarchical organization. CEOs we spoke with are clear that providing product teams with the autonomy to experiment, try new tech, and develop their own solutions is critical. As mentioned, this starts with providing product managers with the freedom and accountability to lead their cross-functional teams as they see fit to deliver on a given goal. This autonomy can be supported with key mechanisms (such as objectives and key results) to drive accountability for outcomes and with automated functions (such as testing) that not only speed up development but also put in place guardrails to limit risk.

For software teams to work autonomously, they need a flexible tech architecture. Core components of this architecture include APIs that can access the underlying data, algorithms, and processes in legacy systems; a set of microservices (essentially self-contained units of code that execute a specific function) that are modular and connect into APIs, eliminating the dependencies that plague legacy systems where a change in one part of the code typically requires multiple changes in others; and a common data platform that knits disparate data sources into a single accessible pool that developers can easily access.

BlackRock’s Aladdin is an example of a technology business that brings together all aspects of the investment workflow onto a common system. To support scaled development within BlackRock and at Aladdin’s external clients, Aladdin features an open architecture that helps both internal and external developers create applications easily. “The way people are interacting with software is changing,” says Sudhir Nair, global head of the Aladdin Business at BlackRock. “Today, at BlackRock and at our Aladdin clients, a meaningful

portion of the organization self-identifies as technologists, and a big chunk of those people don't sit within the part of the business formally recognized as the tech org. We enable these 'citizen developers' with access to the building blocks of our underlying tech, in addition to underlying microservices—giving them the ability to innovate without sacrificing scale and controls."

Win at software by playing the ecosystem game

The software ecosystem is a mix of independent tech companies and 30 million to 40 million full-time and independent developers, some of whom are citizen developers (essentially, businesspeople using no- and low-code tools to develop software). Software companies increasingly need to tap into this broad ecosystem to access the developer talent that they need to compete.

Acquiring or accessing software developers, nurturing them, and delivering a great experience for them is critical to winning in software. Leading companies tap into this developer ecosystem through two strategies.

Joining an existing ecosystem

Within the broad software ecosystem are many booming ecosystems operated by the leading cloud providers, which have made enormous investments in building out their platform capabilities and services. Nearly all the leaders we spoke with say joining these existing ecosystems is a great way to access top developers.

Döhler, a global producer, marketer, and provider of tech-based natural ingredients and ingredient systems headquartered in Europe, joined the SAP Business Network for Logistics for access to services and talent (it has more than 22,000 partners in its ecosystem). Building off of this network, Döhler digitized intercompany logistics for delivery planning and fulfillment, which its 50 global locations use to connect with their business partners.

Building an internal ecosystem

Another way that companies can compete is to develop their own software ecosystem either through partnerships with their customers or with cloud providers (or both). SLB, the energy services and technology company formerly known as Schlumberger, built its DELFI platform as a way to attract both developers and customers. DELFI, which makes applications and workflows accessible to upstream oil and gas companies, has a community of more than 1,500 developers from 50 oil companies. These developers, who have created more than 3,000 new exploration and production applications and plug-ins, access DELFI's developer portal, which provides a rich and easy-to-use API library, among other developer-friendly tools.

Build a specific software go-to-market capability

Selling software at scale is very different from selling most other products. To cite just one example, most nonsoftware companies sell on a cost-plus-pricing basis, with a focus

on margins, for example. But since software has low marginal costs (after development), pricing needs to be based on the value that it generates for the customer.

Another difference: selling software requires deeper engagement with the customer. Sellers do everything from communicating upgrades and tracking how customers use the software to providing technical experts who can teach customers how to use the software.

Asking your existing salespeople to drive sales of something so different can be challenging. While upskilling, retraining, and providing incentives can help, selling software is so complex and so focused on different outcomes and impact that several CEOs told us they feel compelled to recruit software veterans from outside the company to bolster their existing capabilities.

Hexagon brought in outside software sales experts to serve as its regional sales leaders. Rockwell Automation made a software veteran its chief revenue officer. Software experts bring a deep understanding of how to use telemetry and data to understand customer behaviors and needs better. For example, they use software as a tool in the sales process to demonstrate capabilities, which leads to much deeper and richer conversations with clients.

In addition to bringing in software talent, top companies typically create a separate software sales force. The most effective companies provide these software teams with the rights to go after new customers among existing clients. While that can sometimes be disconcerting for the established sales force, the reality is that the customers who software sellers seek out tend to be more technically oriented buyers who are higher up in the client's organization.

Keysight Technologies transformed its sales model by hiring more than 1,000 salespeople, many of whom have deep software-selling expertise. Additionally, it redesigned and integrated its entire sales force into a go-to-market approach built around three models: solution value (selling integrated hardware and a software value proposition), continuous value (adoption and retention via subscription and customer success), and transaction value (e-commerce and digital sales). To support this model and encourage the growth of recurring revenues, the company shifted its performance metrics to emphasize annual contract value. More than one-third of its revenue now comes from software and services.

Find and keep talent by focusing on mission and work environment

While the competition for top tech talent is fierce, companies with attractive missions or work that allows developers to build key software skills have an easier time recruiting top talent. Rockwell Automation, for example, has been able to use its focus on industrial automation to become a top destination for many electrical engineers and other tech talent passionate about the Internet of Things and digital twins.

Companies looking to attract software talent will likely need to rethink their recruiting practices. This realization drove Keysight Technologies to open new software development and design centers closer to prospective talent, including on the Georgia Institute of Technology campus. That decision was instrumental in helping Keysight Technologies increase its number of employees by 50 percent in just a few years, driven heavily by growth in software-focused staff.

Companies often undercut their success in wooing top talent by shortchanging the employee experience, resulting in significant retention issues. Top software engineers, for example, want autonomy, opportunities to grow, and the ability to build their skills. One crucial measure to focus on is developer experience. We have found that if the developer experience is good and software engineers are happy, they will stay and do good work. Developer experience is so important to the CEO of one tech company that he uses a dashboard to track developer satisfaction scores. Keysight Technologies addressed developer experience by developing structured trainings and co-innovating cutting-edge solutions with customers to build its developers' skills.

More and more companies looking to stay relevant and compete in the digital age are attempting to become software businesses. It's an extremely challenging shift to tackle. Leaders can engage the effort with a transformation mindset and a commitment to make significant changes across the organization. Business leaders can use the six principles enumerated in this article as the foundation for their own companies' enduring software transformations. Q

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A more efficient food system can build global resilience

by Nicolas Denis

There are six breadbaskets in the world. Combined, Ukraine and Russia are a big one. The region produces 28 percent of the world's exported wheat and 15 percent of its corn.



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A combination of factors is disrupting the global food supply. There have been other food crises in the past, but I

think there are a couple of elements that make this different. We have more people to feed in a system that is global but where there is more geopolitical constraint. And at the same time, emerging trends show a progressive increase of the risk of simultaneous breadbasket failure due to climate change.

There are six breadbaskets in the world. Combined, Ukraine and Russia are a big one. The region produces 28 percent of the world's exported wheat and 15 percent of its corn. The current war in Ukraine has two implications. Besides being a region that produces a lot of commodities, it's also where some of the world's fertilizer is produced. That's contributed to the price of fertilizer going up, which affects farmers' ability to pay for those fertilizers, which can potentially have an impact on yield.

It's happening at a time when grain stocks are relatively low in many countries. That's because since 2020, we have seen a spike in the price of agricultural commodities, and countries tend to deplete their stocks more aggressively when the price of commodities is high. The combination of relatively low stocks with a disruption in one of the breadbaskets has a further impact on price.

The COVID-19 pandemic has caused a disruption to the food system, mostly on a demand level, because people stopped going to restaurants and food service was mostly closed, and those

areas are where a lot of fish and red meat are sold. That, in turn, had an impact on the demand for corn. Many people lost jobs, so they had less income, which also had an impact on demand. So, farmers adjusted to that lower demand. Then suddenly, some sectors reopened, creating a bit of a shock on demand.

Add to this an ongoing drought in India and in most places on the planet, including some of the breadbasket regions, for the past few months. That's led to low production compared with the historical level.

So, there are currently more shocks to the food system than usual.

On July 22, 2022, an agreement was signed between Russia and Ukraine, and the prices of some commodities have come down. But it only partly solves the problem, as there are indicators that planted and likely harvested areas could be 15 to 25 percent lower than historical levels. Current conditions may not produce the same yield as in previous years. In Ukraine, emerging trends show that 30 million to 44 million fewer tons of row crops are likely to be produced in 2023 compared with a typical year. There is less insight into what is happening in Russia, but some of the companies providing seeds and crop nutrition may not be operating under ideal conditions.

What has not been planted has not been planted. No one can change that.

To deal with these problems in the shorter term, we must ask: How do we rebuild strategic stocks for the different commodities? And we have to also reflect on how we could protect populations most vulnerable to food insecurity and make food affordable for them. In the medium to long term, private- and public-sector stakeholders can think about how to build more resilience into the food supply chain. One way may be through diversification of the sources of supply—being less dependent on just a few countries. Another could be by trying to eliminate losses and waste, including by using effective seeds and using irrigation efficiently. Roughly 30 percent of all food globally is wasted across the value chain. And then there's getting both the right level of protein consumption in diets and thinking about the protein mix. There is a factor of ten or more between the least and most efficient ways of producing protein. Focusing on the most efficient proteins can relieve some pressure on the food system.

Use energy as an analogy: the more energy efficiency you create, the more you create resilience in your energy system. The food system is very similar. Q

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In Ukraine,

30 million—44 million

fewer tons of row crops are likely to be produced in 2023 compared with a typical year.

Reducing food loss:

What grocery retailers and manufacturers can do

by Moira Borens,
Sebastian Gatzler,
Clarisse Magnin,
and Björn Timelin





An estimated \$600 billion worth of food is lost during or just after harvest. Can manufacturers and grocers do anything about it? Definitely—and it will be good for business, people, and the planet.

It's a dire statistic: 33 to 40 percent of the world's food is lost or wasted every year. A devastating fact in less desperate times, it takes on even greater urgency today, in light of a looming global food crisis resulting from knock-on effects of the war in Ukraine, the COVID-19 pandemic, and climate change. Already, one in nine people in the world can't get enough to eat—that's more than 800 million suffering from hunger. The consequences of food loss and waste will only get worse. (Food loss happens at harvest or soon after, while food waste happens after the food reaches the retailer or consumer. See sidebar, "Is food loss the same as food waste?")

The loss of the food itself is bad enough, but the secondary effects are alarming as well: the water consumption linked to food loss and waste amounts to approximately one-fourth of the world's freshwater supply. Greenhouse-gas (GHG) emissions from food loss and waste constitute 8 percent of the global total, or at least four times those of the aviation industry.

To date, most large-scale efforts to understand and address the problem have focused on food waste, largely because it's more visible: people see food being wasted in stores, restaurants, and households. But up to half of the food that doesn't get eaten by humans—worth an estimated \$600 billion—is lost at or near the farm during or just after harvest. Reducing food loss should therefore be treated as a societal and environmental priority.

It should become a *business* priority as well. Our in-depth examination of the farm-to-retailer food supply chain reveals that food loss is a result of inefficiencies, and its hidden costs are often equal to or greater than retailers' net profits—even the best-performing ones'.

The good news is that reducing food loss is immensely achievable. Our research shows that food manufacturers and retailers, because they are at the center of the food value chain, are uniquely positioned to lead global efforts to reduce food loss. Working with each other and with all participants in the value chain, we believe they could cut food loss by 50 to 70 percent. Two-thirds of the food that would otherwise be lost could be redirected to human consumption; the remaining one-third would go to alternative uses, such as bio-based materials or animal feed.

And the business rewards would be significant: companies would reap economic and cash flow benefits while simultaneously improving their Scope 3 emission footprint. Our research shows that retailers could reduce their cost of goods sold (COGS) by 3 to 6 percent and manufacturers by 5 to 10 percent. Grocers and manufacturers could capture \$80 billion in new market potential by developing new businesses from food that would otherwise be lost. And they could cut CO₂ emissions and the associated costs by 4 to 9 percent.

Because food loss is a sprawling problem that spans multiple players and processes, siloed approaches will have limited impact. To effect major change, all stakeholders will need to work together. The effort and investment will be well worth it, on many levels.

Where and how does food get lost?

More than two billion tons of food are lost or wasted every year. About half of this happens upstream: during the harvest, postharvest handling and storage, and processing stages (Exhibit 1).

Although meat and dairy have a high environmental impact per unit produced (it takes more than 1,000 gallons of water to produce a pound of beef, for example), meat accounts for only about 3 percent of food loss, with dairy another 5 percent. Three other food categories—fruits and vegetables, cereals, and roots and tubers—account for much of the food loss and the associated CO₂ emissions and water use. Those categories should therefore be the focus of loss reduction efforts.

Exactly where in the supply chain does food get lost, and what factors contribute to this? In collaboration with the Consumer Goods Forum and its members, and working closely with leading European grocers and distributors, we investigated the farm-to-retailer journey, using tomatoes as our test case.

We chose tomatoes because 50 million to 75 million tons of them are lost upstream every year—more than any other fruit or vegetable. In addition, lessons learned from the

tomato's journey can be extrapolated to other fresh-produce categories. Tomatoes are grown and eaten all over the world, are available year-round, can be eaten fresh or go through further processing, must conform to certain cosmetic standards (color, shape, and so forth), and resemble several other produce categories with regard to perishability.

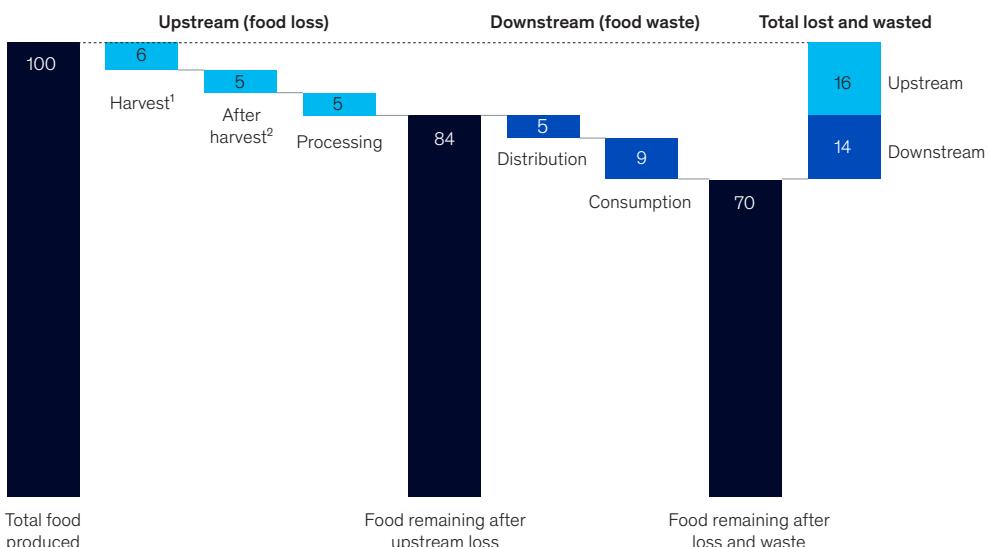
We studied tomato journeys in both developed and developing markets—tomatoes sold fresh, those sent into the processed supply chain, those grown in fields, and those grown in developed-market greenhouses. Exhibit 2 illustrates what happens to tomatoes grown in fields in developed markets and sent to retailers to be sold fresh in their stores. As the exhibit shows, in developed countries, out of every 100 tomatoes, only 59 to 72 make it to a store shelf. In the developing world, the numbers are grimmer: only 35 to 58 make it to the store.

At harvest, we estimate that one-third of the loss is linked to production surplus (the farm produced more food than it could sell), another third consists of food that is edible but doesn't meet customer specifications, and the remaining third is because of damage that renders the food inedible. In short, two-thirds of the loss is edible and could be safely redirected to human consumption.

Exhibit 1

About half of global food loss and waste happens upstream, before products arrive at retailers' stores or warehouses.

Global food loss and waste, by value chain step,¹ % of total production



¹Reported in primary crops for crops, carcass weight for meat, live weight equivalent for fish, and total production leaving manufacturer for processed commodities.

²Postharvest handling and storage.

Source: Food and Agriculture Organization of the United Nations; press search

Our research revealed that some food loss results from exogenous factors, such as weather events, or suboptimal practices within a specific stage of the supply chain, such as poor equipment maintenance—but some loss is linked to the interdependencies and interactions among the players in the value chain. Growers may overproduce because they are uncertain about market demand, while manufacturers and retailers often don't have much transparency into supply. Stringent customer specifications can lead to excessive postharvest outgrading. Most procurement contracts don't create incentives for reducing food loss.

Solving the food loss problem will therefore require fundamental changes in the ways that stakeholders work together. For tomatoes alone, the potential impact is more than 40 million tons saved every year. Globally, CO₂ emissions linked to tomato loss would fall by 60 to 80 percent. And if this can be done with tomatoes, it can be done with other food categories as well.

Since food loss happens primarily at the farm, what can food manufacturers and grocers do about it? Quite a lot.

How companies can turn food loss into big wins

Since food loss happens primarily at the farm, what can food manufacturers and grocers do about it? Quite a lot, it turns out. An effective action plan would entail, first, establishing a baseline and setting targets; then systematically developing and implementing initiatives; and, finally, putting in place the enablers for lasting change.

Ultimately, addressing food loss will require mind-set shifts by all stakeholders. Food manufacturers and retailers will need to see food loss as a result of inefficiencies and missed opportunities across production, procurement, R&D, the supply chain, and sales—not as an inevitable cost of doing business or a niche topic that concerns only the sustainability department.

They should see reducing food loss as a potential value pool: an opportunity to improve both the top and bottom lines.

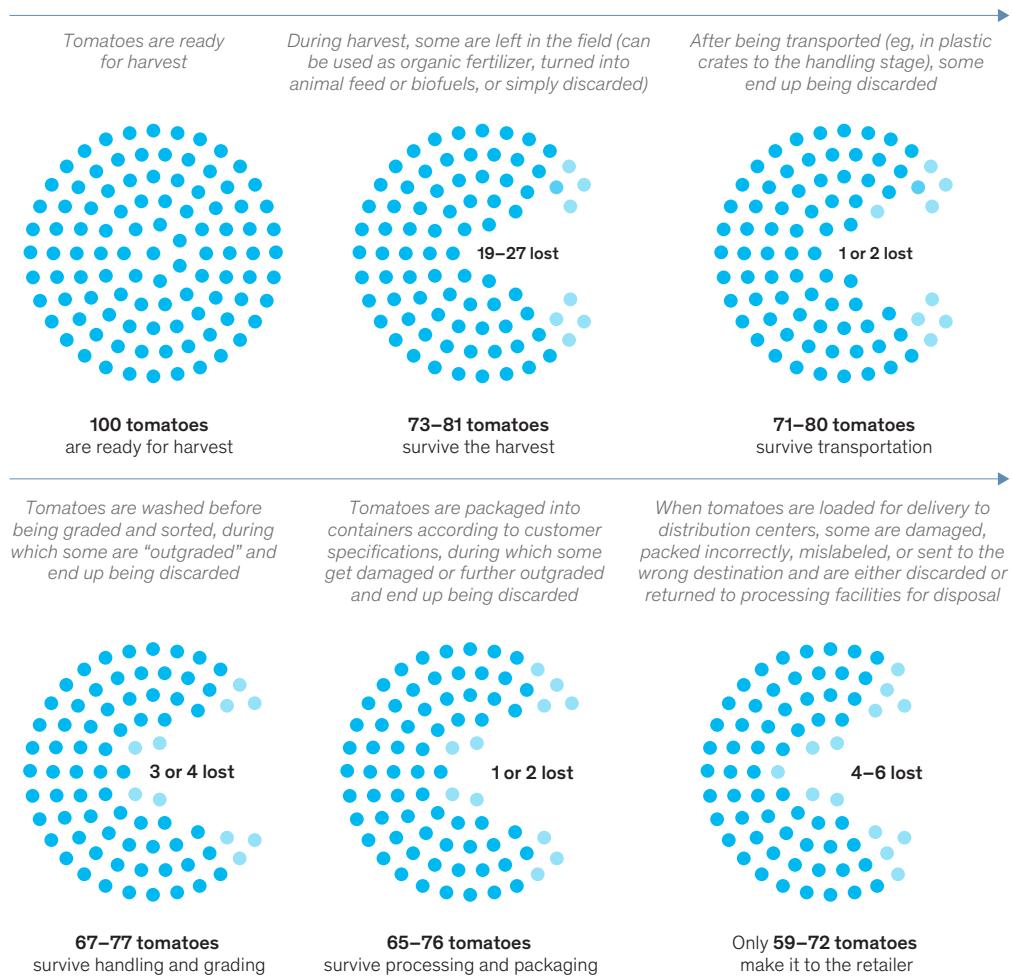
Create transparency and set targets

Quantifying food loss and creating accountability for it aren't (yet) an exact science; the measurement techniques and metrics are still being defined and debated. But that's no excuse for companies to do nothing. If you are a grocer or a food manufacturer, aim to gather directionally accurate information through a range of sources and techniques, such as interviewing internal teams, examining data from suppliers, and reviewing third-party research. Work with your suppliers to understand and monitor food loss, perhaps using

Exhibit 2

What typically happens to field-grown tomatoes meant to be sold fresh in developed countries?

Loss rate for every 100 tomatoes



the on-farm protocols for food loss measurement readily available online. Set targets for both your own company and suppliers, and integrate food loss visibility and reduction into incentive structures. Stay aware of—or, even better, participate in—industry efforts to harmonize reporting and certification standards.

Forward-thinking companies are actively engaging with suppliers to map food loss hot spots in the supply chain and to understand their causes. Some companies are developing (and providing public access to) an integrated database of suppliers' performance across locations. Others are conducting an annual external audit or requiring third-party assessment of suppliers' performance on this issue. A few best-practice companies are using digital technologies, like blockchain, to make products traceable at every stage along the journey from farm to store.

Don't wait for perfect data; just gather enough information to sense the scope of the problem. Generating awareness of how much loss happens—and where—is an important first step in creating urgency for change.

Decide what to do—and do it

Our research revealed four levers that retailers and food manufacturers can pull to make meaningful impact: minimizing loss during production and processing, minimizing loss during transit, selling more of what is produced, and structurally preventing loss. Each lever comprises a set of potential actions. Some will require significant investment and new ways of working. All will pay off, resulting in not just a reduction in food loss but also a more efficient value chain, EBITDA improvements, and lower CO₂ emissions.

No single combination of levers will be right for every company; each stakeholder will need to select the mix that best fits its particular context. Regardless of the chosen course of action, each company must fundamentally change how it interacts with other stakeholders in the food ecosystem. The following are specific ways in which manufacturers and retailers can go against business-as-usual approaches and make big strides toward addressing food loss:

- *Work with suppliers to better match supply and demand.* This will require much more communication and transparency among the players in the value chain. Retailers will need to give farmers more information about expected demand; farmers will need to give

There is enormous potential to sell more of the food that farmers produce. Food that would otherwise be lost can be turned into new products and thriving businesses.

Is food loss the same as food waste?

Food loss and food waste are related but distinct. Food waste, according to the Food and Agriculture Organization (FAO) of the United Nations, is “the discard of edible foods at the retail and consumer levels.” In other words, food waste happens downstream, during either the distribution stage (for example, as food makes its way from a retailer’s warehouse to a store shelf) or the consumption stage (such as people throwing out leftovers). Food loss, on the other hand, happens upstream: the FAO defines it as “the decrease in edible food mass at the production, post-harvest, and processing stages of the food chain.”

Regulatory bodies and industry groups alike have taken steps to address both food waste and food loss. In fact, the United Nations’ Sustainable Development Goal 12.3 is to “halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses” by 2030.

retailers more visibility into their production plans. Some companies are starting to engage in long-term planning with their suppliers, working together to align on the volume and mix of crops—not just for the upcoming planting season but also for the next one and the one after that—thereby reducing uncertainty for the parties involved.

- **Overhaul procurement practices.** How you buy must change dramatically. Shift away from a commoditized view of food and a focus on managing short-term costs; instead, consider launching structured supplier collaboration efforts or entering into innovation-focused partnerships. Don’t choose suppliers based on price alone. Take food-loss-reduction efforts into account when drawing up contracts, creating incentive structures, and establishing performance metrics. In addition, regularly review specifications and look for opportunities to make them less stringent, without compromising food safety or sell-through. (For example, through consumer surveys, grocers might find that consumers have a higher tolerance for color variations than in the past or that shoppers don’t pay much attention to the size of a particular fruit variety.) For manufacturers, reviewing specifications to optimize for loss reduction both at the farm and at the factory could lead to lower volume requirements.

- **Find creative ways to turn food loss into value.** There is enormous potential to sell more of the food that farmers produce. Food that would otherwise be lost can be turned into new products and thriving businesses. Consider dedicating R&D resources to developing new revenue streams from nonmarketable food. AB InBev, for instance, invested \$200 million in processing plants to turn its barley byproducts into a protein and fiber ingredient. It developed two new businesses as a result: a dairy-free protein drink sold under the Canvas brand and a protein ingredient that AB InBev now sells to other food manufacturers.

Enable true and lasting change

At any company, food loss reduction won't be treated as a strategic priority unless it has the sponsorship of the C-suite. Indeed, in an informal poll of a dozen industry leaders, two-thirds pointed to weak governance as the biggest roadblock to the implementation of food loss programs in their companies.

One of the most important enablers for significant and sustained change, therefore, is a strong governance model—with cross-functional accountability encompassing procurement, R&D, the supply chain, manufacturing, marketing, and finance; clear responsibilities and objectives; and KPIs at the individual, functional, and enterprise levels. Designating an owner for each food loss initiative and aligning on measures of success will help ensure progress. New performance metrics might include, for instance, the volume of food lost, the profit from upcycling, or the revenue gained from saving food that would otherwise be lost.

Stakeholder management, too, is a critical enabler. Suppliers, consumers, and other participants in the value chain can be persuaded to become allies and supporters of loss reduction efforts rather than inhibitors. Manufacturers and grocers can create and raise awareness of the problem—and its extent—among farmers and suppliers to help them see food loss as an inefficiency instead of an inevitability. On the consumer side, targeted marketing programs and educational campaigns can help consumers understand how to reduce food loss, which could in turn enable the implementation of upstream measures, such as less-exacting cosmetic specifications for fresh produce.

At most companies today, the unfortunate reality is that food loss is no one's problem.

At most companies today, the unfortunate reality is that food loss is no one's problem. No individual or team owns and champions the issue. In a sense, companies have had the luxury of not having to pay too much attention to food loss.

That could soon change: as the world moves toward a potential food emergency and as public awareness of the issue grows, external stakeholders will become savvier about food loss and, as a result, more demanding. They will compel retailers and manufacturers to act. Simply put, addressing food loss now isn't just a good thing to do; it's also good business—and soon it won't be optional. **Q**

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The authors wish to thank the Consumer Goods Forum, its members, and its network of external experts for their contributions to this research.

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A vintage Stanley Steamer car with two men in period clothing driving it.

by Russell Hensley,
Moritz Rittstieg, and
Shivika Sahdev

The 125th anniversary of the little engine that couldn't

Once upon a time, the Stanley Steamer was the “car of the future” that broke speed records, drove beautifully, and famously climbed Mount Washington. What could go wrong?

What would you imagine as the “car of the future” if you were imagining it 125 years ago? At the end of the 19th century, the Stanley brothers—twins Francis and Freelan—imagined an automobile that would be aesthetically pleasing. They aspired for high but safe speeds. They strove for a vehicle that was intuitive and reliable. And, inculcated by 19th-century industry, they imagined a car that would run on steam. They created their automobile in a rapidly industrializing United States, in 1897, and five years later branded it the Stanley Steamer. For two remarkable years, in the days before the Ford Model T, it was the highest-selling car in the country.

A start-up gets its long head of steam

When the Stanleys put their working model on the road, steam dominated commerce. Steam had been ascendant for a century; it powered the Industrial Revolution. Steam propelled the world’s navies and gave rise to an intricate network of coaling stations, coaling islands, tugboats, cruise ships—not least, nor most fortunate, the RMS *Titanic*—battleships, and dreadnaughts. Most important for overland mobility, steam powered the railroads. Before the steam engine, distance could be destiny. But in the 1800s, the century of the railroads, steam-powered trains gradually and then seemingly inexorably brought together disparate areas across Africa, Asia, and Europe. (Russia, quite purposefully, chose a different track gauge than its neighbors.)

In the United States, railroads made an indelible impression. People and products moved across the United States along great trunk lines and arteries, tied with the Golden Spike at Promontory Summit, Utah, in 1869. The Midwest became a center of commerce. Chicago, first recorded in the late 1670s as a trading post among Native Algonquin peoples and French traders, numbered fewer than 5,000 residents as late as 1840. In 1848, the city opened its first railroad station and then grew exponentially. In 1860, Chicago’s population topped 100,000; by 1890, it exceeded one million.

Henry Ford, from prospering, midwestern Dearborn, Michigan, famously averred that “if I had asked people what they wanted, they would have said faster horses,” and the equine, as measured in “horse power,” remains part of the automobile’s DNA. But only a part. The automobile is no less an outgrowth of imagining and expressing mobility through steam-powered trains: cars, trucks, drivetrains, brakes, signals, tanks. That’s the argot of railroad engineers.

The success of steam-powered railroads did not make steam-powered automobiles a sure thing in 1897. Just like today, multiple powertrains—including internal-combustion engines (ICE) and electric motors—were available. Records show that in 1900, US companies manufactured, in all, about 4,200 automobiles: 40 percent were steam-powered, 38 percent were electric, and 22 percent were ICE. When patrons of that year’s inaugural National Automobile Show were polled about which type of automobile they favored, electric actually edged out steam; ICE cars finished third. Even the Stanleys gave electric vehicles their due, sort of: “It would be ideal,” the company admitted of the electric car, “but for its four principal limiting factors: range, speed, staying power, and hours to charge.”

Taking a product perspective

Francis and Freelan built the Stanley Steamer with product details in mind. They weren't amateurs. The Stanleys had already made a fortune from patenting the airbrush and made even more money from developing dry-plate photographic technology, which they sold to George Eastman, who built the Eastman Kodak Company. The Stanleys designed their 1897 automobile with railroad precision: a minimum of parts, so it wouldn't readily break down; a minimum of noise, so driver and passenger could easily have an intelligible conversation; and a sturdy steam boiler. In 1899, Freelan and his wife, Flora, drove their steam-powered car to the peak of Mount Washington, the highest elevation in the northeastern United States, in one-third of the time it would take a horse and carriage to make the same trip. In 1898 and 1899, the Stanleys' motorcar company outsold every other US automaker. In 1906, a racing version of the Stanley Steamer broke the world record for the fastest recorded speed in an automobile—127.7 miles per hour—a mark that no car would surpass for *more than five years*.

Drivers needed to stop for water tank top offs to keep their car kettles boiling.

From a product standpoint, the Stanley Steamer had other advantages, as well. To start (quite literally), ICE vehicles wouldn't engage unless they were first cranked up with a cumbersome, external turning bar that had to be inserted into the car's front, a process that required not only physical strength but a bit of luck that the crank wouldn't jerk back and break the turner's thumb, hand, or arm. ICE vehicles also required the technical chops to know the vehicle's correct timing at ignition, in degrees from top dead center. Today, only those with expertise in general automotive knowledge would know that. But

at the turn of the century, every ICE driver had to know ignition timing. Not so for the Stanley Steamer: steam vehicles didn't need a crank. They did, though, need to be warmed up first for about 20 minutes, sometimes more, particularly on cold days, to build their head of steam. Electric vehicles also didn't need a crank; they started immediately.

In fact, electric cars enjoyed something of a miniboom at the turn of the 20th century. Electric taxis operated in several cities, including London and New York City. When President William McKinley was fatally shot in 1901, he was rushed to a Buffalo, New York, hospital in an electric-powered ambulance. (It was his second trip in an automobile; his first was in a Stanley Steamer.) Yet while electric cars worked for short jaunts—or tragic rushes—they were critically challenged by their limited range: their batteries needed to be recharged.

Steam cars, which could be powered by a variety of fuels—from coal and charcoal to kerosene and wood—had an uneven range, at least from the driver's perspective. One steam car reached 1,500 miles on a single load of fuel. Practically speaking, however, steam automobile range was restricted by the requirement to keep adding more water. Drivers needed to stop for water tank top offs to keep their car kettles boiling. A car, after all, is constrained by its ecosystem.

Thinking in systems

But the Stanleys missed the system point—or, more correctly, they never really aimed for it. They set out to build a great car, arguably the best car. They fixated on their automobile. By 1917, the Stanley Steamer line would come in several models and feature, among other amenities, a Klaxon push-button horn. Its upholstered seats, while neither rich nor Corinthian, were made from soft, genuine leather. Stanley Steamer produced about 500 cars in 1917; its four-passenger touring car was priced at \$2,550.

Ford produced more than 600,000 Model Ts that same year; its five-passenger touring car was priced at \$360. And Ford's seven largest competitors at the time—ICE manufacturers all—combined to produce an additional 600,000 vehicles. Demand for ICE-powered cars had begun to eclipse both steam- and electric-powered-vehicle market share by about 1903, and then left both electric and steam powertrains far behind as demand surged during the First World War (1914–18). After the war, ICE vehicles dominated the automobile market for the rest of the 20th century.

Unlike the Stanleys, Henry Ford *did* think in systems, relentlessly in systems; he cogitated about “the real foundation for an economic system . . . our whole the system should be one with the car.” Ford thought in systems when developing the assembly line, a systemic change from the piecework method. Ford rapidly bent the cost curve, enabling the company to turn out vastly more vehicles that would meet—and often exceed—consumer expectations on speed, power, range, reliability, and, especially, price. Ford priced his cars so that his workers, in particular, could afford one. Henry Ford built the Model T “for the great multitude.” The multitude kept buying, and Ford and other ICE manufacturers worldwide kept building. By 1924, Ford had produced more than ten million Model Ts. Stanley Steamer shuttered production that same year.

ICE-powered vehicles catalyzed an ICE-vehicle ecosystem. If an ICE-vehicle ecosystem wasn't made precisely by design, it wasn't made by sheer accident, either. The Stanleys derided gasoline as “explosive liquid fuel,” but hardware stores sold it, and farmers kept it around. As Model Ts and other ICE vehicles poured out of factories, a network of service stations sprung up to keep gasoline pumping.

**Electric
cars enjoyed
something of a
miniboom at
the turn of the
20th century.**

The more people could travel, the more people wanted to ride. ICE-powered buses began to roll on city streets and intercity highways, competing with electric trams. More automobiles drove the demand for more paved roads, a network of them, which increased fivefold from 1905 to 1920: roads that had gas stations but not infrastructure for electric or steam vehicles; cities and towns that had parking lots and parking garages—two cars in every garage, rang the slogan—but not garages with water pumps or charging capabilities.

Lessons for cars and the future

Looking back helps sharpen our perspective going forward. Steam travel powered, and was encapsulated by, one age; internal combustion advanced and epitomized another. Yet there are remarkable parallels between the dawn of the 20th century's transition from steam to ICE and the 21st century's challenges of moving from ICE to electric (or, possibly, to—or in tandem with—hydrogen or to other non-carbon-emitting fuels).

First is the challenge of form and function: What exactly does a great car *mean*? It should be a reliable, well-running vehicle to move people and goods, to be sure. But a great car is fundamentally about providing mobility that people will want, enjoy, and can afford—both individually and as a society, particularly as we confront the societal costs of traffic accidents, the repercussions of carbon and other emissions, and the urgency to move to a net-zero world. And increasingly, a great car is a platform, bringing technologies to bear that enhance driving safety and efficiency.

Second is the challenge of resources to make and to run the vehicle. As Henry Ford recognized, but the Stanleys seemingly never fully grasped, making a great car requires not only operating a great factory but also thinking in terms of both physical and human capital. Today, given immense interdependencies across the automotive industry, potential raw-material shortfalls, and supply considerations, taking a holistic approach to production is increasingly becoming a point of competitive advantage—particularly for those who move early.

That challenge ties into another parallel: the need to consider supporting infrastructure. Great vehicles—vehicles that are fun to drive, fun to be in because they can drive themselves, and fundamental to productivity because of the multiplier effect they have in efficiently moving people and goods—are not self-contained. In the early 20th century, steam powertrains failed and ICE succeeded because an entire infrastructure developed for ICE automobiles. Even as market demand for electric vehicles today catches up to forecast expectations, leaders know that they must do everything they can to advance investment in effective supporting infrastructure, which connects cars to the electric power grid for refueling convenience, bolsters the grid's resilience, and provides new electric-power utility via the power plant within each vehicle.

Disruptiveness at the turn of the 20th century used the same recipe that disruptions follow today, including launching a “good enough product” that others are disincentivized to copy (because it disrupts their value pools), and expanding the way that people perceive a product and how it affects their lives. Cars, after all, are not self-contained. Cars have consequences. A great car can create great change, but the future always has the last word. Imagine the ecosystem of the future, and you can imagine the car of the future. In exactly that order. Q

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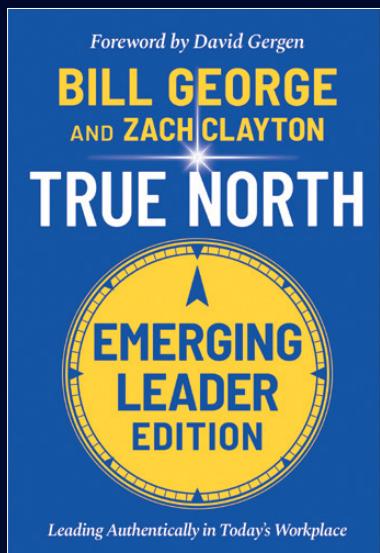
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Bill George on emotionally intelligent leaders

The Harvard professor and former Medtronic CEO explains, in a conversation with McKinsey Global Publishing's Rick Tetzeli, how navigating multiple simultaneous crises with high EQ helps distinguish tomorrow's brightest leaders.



What is the relationship between developing your sense of purpose as a leader and developing your company's purpose?

Before you can become an authentic leader, you have to know who you are. That's your "true north"—your most deeply held beliefs, your values, the principles you lead by, and what inspires you. Until you define your true north, you won't know what your purpose is. Your purpose is your North Star. You carry that purpose throughout your life, and you want to find a company where you can align with that.

How have crises taught emerging leaders lessons on what not to do?

Crises are teaching leaders today that you can't just rely on what you learned in business school, that everything is going to be long-range planning and process controls. Those things are important, but you have to be able to adapt very rapidly to changing conditions.

I tell young leaders, "Go put yourself in a situation where you learn how to lead in a crisis. Don't just lead in stable times, because you'll never know what to do when the big crisis comes along—like the COVID-19 pandemic, where everything shut down, and you had to adapt your entire business model." If you're just waiting for the stable times to return, you're not going to get there.

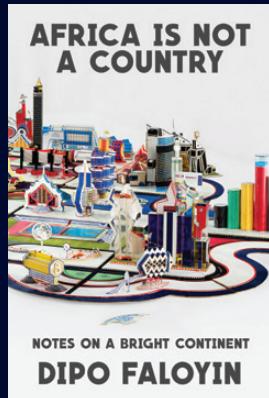
Is it hard to convince leaders to explore their personal journey and sense of self in order to lead effectively?

In working with many leaders, I find many of them want to jump into leadership roles and get power too quickly. Maybe I fell into that trap too. Today, you have to know yourself first before you can be a great leader. Until you do, you're always subject to what I call the "adulation trap," where people on the outside are saying, "You're terrific; you have this great title" or "You have all this power, all this money."

We need to have leaders today who take the time to know themselves, have good mentors, and take honest feedback—those who surround themselves with truth tellers who will tell them what they don't want to hear. The hardest thing you have to do is see yourself as others see you.

Dipo Faloyin on correcting the African narrative

In a conversation with McKinsey Global Publishing's Raju Narisetti, the senior editor at VICE challenges readers to reconsider the enduring, monolithic perception of the African continent as a place of devastation and poverty to one of achievement and possibility.



What do you mean by "engage with the continent as it actually exists . . . not with an idea"?

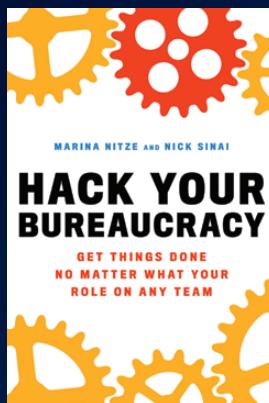
If you ask most people to picture Africa, they'll think only of two ideas: one is poverty, and the second is safari. But this is a region of 1.4 billion people and over 2,000 languages. African countries can represent anything, from stories of great triumph

and success to stories of great pain. When you start to better understand the region, history, and context, you start to build a far more realistic reality of what it means to be Nigerian or Rwandan, or to be from Zimbabwe, South Africa, or Algeria.

From around the 1890s [when Africa started being referred to as the "dark continent"] to now, there has been a singular vision of Africa as a place where people don't hold their destinies in their own hands. That isn't the case.

Marina Nitze on navigating red tape with ease

The former chief technology officer of the US Department of Veterans Affairs talks with McKinsey Global Publishing's Raju Narisetti about strategies for breaking down bureaucratic silos and spotting inefficiencies.



Can you explain your tips for hacking bureaucracy, starting with, "Be the queen on the chessboard"?

In chess, the queen can go forward, backward, and diagonal, unlike other pieces. When you're trying to fix a process, I encourage you to be like the queen and go everywhere that you need to go to fix it.

I watched a state welfare officer process foster-parent applications.

The woman was filling out a carbon copy form to request an applicant's driving record. I asked, "Why are you filling out this old form?" She said, "It's because the people at the DMV [Department of Motor Vehicles] live in the 19th century. They're still using this old paper process."

Because I'm the queen on the chessboard, I went to the DMV and asked how they process those forms. To my surprise, the woman at the DMV pulled up an electronic request system. I asked, "Where does the carbon copy paper fit in?" She said, "You must have been at child welfare. They live in the 19th century." By figuring this out, we were able to remove a cumbersome part of the process.

Relevant reading



 McK.co/businessbuilding

If you liked “Starting strong: Making your CEO transition a catalyst for renewal,” on page 38, check out “Where delegation fails: Five things only the enterprise CEO can do to build new businesses.” Occupying the top spot at any organization is more difficult today than it has been in at least a decade, thanks in part to complex global dynamics and digital transformation. This article explores how to effectively pull off one of the most important initiatives for any CEO, particularly those making a first impression as a leader: building a new business without being distracted by existing operations or shiny but short-lived trends.



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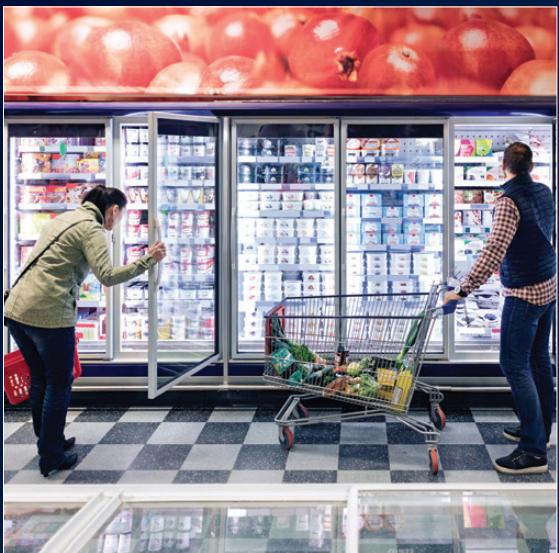
If you liked “How will the space economy change the world?,” on page 74, read “Strengthening collaboration in the European space ecosystem.” The race to gain first-mover advantage in space is heating up as more businesses—including makers of everything from pharmaceuticals to semiconductors—realize the potential of partnering with aerospace companies. But getting ahead, particularly for European stakeholders, will require a thoughtful approach to collaboration and to the sharing of expertise among public agencies, private companies, entrepreneurs, and investors, as this article explores.



If you liked “A defining moment: How Europe’s CEOs can build resilience to grow in today’s economic maelstrom,” on page 82, also read “Raising the resilience of your organization.” European business leaders face their own challenges in the current macroenvironment, but they are hardly alone. For global executives to outperform their competitors, they must not only weather economic headwinds but also bounce back from them stronger. This article outlines a four-pronged approach to resilience, which includes creating an agile organization and promoting adaptable leaders.



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If you liked “Reducing food loss: What grocery retailers and manufacturers can do,” on page 104, consider “The state of grocery retail around the world.” Grocery retail executives are navigating evolving consumer preferences, inflation, and a dynamic labor market, each of which fundamentally changes the rules for what works in the industry and what doesn’t. While shopping behaviors vary among consumers across the world, the growth in grocery e-commerce—still a nascent space in many geographies—is nearly universal.



McK.co/groceryretail

They said it

“Many new CEOs enter the role thinking that they will go hard for the first 90 days and then back off a bit. That’s easier said than done.”

Starting strong: Making your CEO transition a catalyst for renewal, p. 38

“Today’s events might even feel like a cluster of earthquakes that are reshaping our world.”

On the cusp of a new era?, p. 16

“The only thing I like about emergencies . . . is they force us to solve short-term problems of food and water with so much energy and efficiency.”

‘It’s important to bring the spirit of emergencies to the long term,’ p. 50

“At most companies today, the unfortunate reality is that food loss is no one’s problem.”

Reducing food loss: What grocery retailers and manufacturers can do, p. 104

“In 2021, private-sector funding in space-related companies topped \$10 billion—an all-time high and about a tenfold increase over the past decade.”

How will the space economy change the world?, p. 74

“More and more traditional companies are realizing that to compete and grow in a digital world, they must look, think, and act like software companies themselves.”

Every company is a software company: Six ‘must dos’ to succeed, p. 92

“Drivers needed to stop for water tank top offs to keep their car kettles boiling.”

The 125th anniversary of the little engine that couldn’t, p. 114

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