



# AlixPartners Disruption Index

Taking control in  
a disrupted world

# Contents

- 03 Letter From Our CEO
- 04 Our Findings in Brief
- 06 Survey Methodology
- 08 Disruption Is the New Economic Driver

## Deepening Disruptions

- 14 Demographic Decline
- 19 Technological Acceleration
- 25 Deglobalization
- 32 Climate Transition

## Take Control

- 41 Disrupt Yourself, Before Anyone Else Can
- 42 Accelerate Your Digital Metabolism
- 43 Create the Workforce of Tomorrow, Today
- 44 Prioritize Pace Over Perfection
  
- 46 Industry briefs
- 67 References



Simon Freakley  
Chief Executive Officer

## Letter From Our CEO

The past 24 months have presented the most significant challenges to business since World War II.

For the nearly 80 years since that conflict ended, most of the world has enjoyed relatively steady economic and social gains with increasing standards of living, dramatically improved modes of transportation and communication, growing free trade and global collaboration, improving civil liberties for an ever-greater portion of the global population, and improved life expectancies and public health.

Over the past 20 years, we have seen the pace of gains only accelerate as the IT revolution and free-trade movements have brought a record number of people into the global economy, creating new and robust economic flows.

But as we fully enter the 2020s, much of the economic logic of the Post-World War II era is being upended. As if signaling the sea change awaiting us, the advent of a global pandemic heralded our arrival into the new decade. The last two years of lockdowns have not only exacted a heartbreaking human toll, but also demanded bold new approaches to productivity, supply, consumption, and leisure. At the same time, the tensions caused by the pandemic have revealed a conglomeration of other disruptive forces, that had been rising for years —both step-change advances in technology and innovation, as well as deep challenges to our economy, political stability, and climate.

For decades, firms like AlixPartners have been analyzing the shifting technological, political, and societal sands that have influenced a gradually changing society. That analysis has been helpful in attacking specific problems or dislocations as they occurred in industries, geographies, and populations.

But what happens when the entire planet is disrupted overnight?

In this, our third annual study of disruption, we surveyed 3,000 business executives around the globe to get their perspectives. Perhaps surprisingly, despite its universal effects and immense toll in human life and suffering, COVID-19 is not, in fact, the biggest challenge for CEOs going into 2022. What concerns them most is the array of other disruptive forces they are struggling to address.

With the AlixPartners Disruption Index 2022, we hope to shed more light on these challenges and, most importantly, what leaders are doing to meet them.

For over 40 years, AlixPartners has been helping our clients manage disruption. In an environment of volatility and uncertainty, clarity, control, and speed are essential.

Our experience in turnaround and restructuring speaks to the necessity of leaning into the forces of change, especially taking required and swift action before you lose the ability to set your own destiny. The macro environment may not be in anyone's control, but how you respond and the rate at which you do so are.

I hope this report provides helpful insight into how to boldly seize opportunities, tackle challenges and build a sustainable future for your business.

All best,

  
Simon Freakley

# OUR FINDINGS IN BRIEF

Four major forces will transform the world economy.

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## DEMOGRAPHIC DECLINE

For the first time in modern history, much of the world is seeing a decline in the proportion of the population that is productive. This has profound implications for economic growth, monetary policy, migration, and the future of work.



## TECHNOLOGICAL ACCELERATION

The rate of technological innovation and adoption is increasing exponentially and changing every aspect of our lives. At the same time, we also have to balance the ethical implications of these new technologies.



## DEGLOBALIZATION

The economic and geopolitical world order is shifting. The forces of globalization, which have helped fuel economic growth through greater trade and openness, are on the retreat.



## CLIMATE TRANSITION

The effects and urgency of climate change are becoming increasingly apparent and accepted, but the transition to greener energy will take longer to slow the rate of predicted global warming than many hope or predict.

## Take control and thrive in a disrupted world

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### CREATE THE WORKFORCE OF TOMORROW, TODAY

- Don't let inertia drive your talent strategy. Build the workforce you need versus the one you have.
- Leverage technology as a collaborator with talent, not a replacement.
- Create the talent if you can't find it. Source diverse capabilities from atypical places and train for the skills you need.

### PRIORITIZE PACE OVER PERFECTION

- Take an action mindset. Plan less, do more.
- Lean into the change. Start small, scale fast.
- Don't underestimate the importance of a clearly communicated vision. Repeat it often.

### DISRUPT YOURSELF, BEFORE ANYONE ELSE CAN

- Have the courage to break away from tried-and-true, but rapidly fraying, business models.
- Embrace a future-first mindset. Envision the possible and then lean into the change.
- Know that taking a wait-and-see attitude is too often the beginning of the end. Invest in the next, not the now.

### ACCELERATE YOUR DIGITAL METABOLISM

- Digital is not something you do. It must be who you are.
- Focus on the business problem, not the technology.
- Don't let the sins of the past define the future. Today's digital is not yesterday's IT.
- Build greater digital IQ everywhere—in the boardroom and on the shop floor.

# 72%

of CEOs are worried about losing their jobs due to disruption

up from 52% in 2021 ↗

# 94%

of executives say their business models must change within the next three years

# 57%

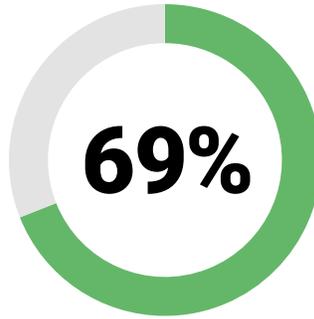
of executives worry their company is not adapting fast enough to the pace of change

# ONLY 3%

of executives say COVID-19 is their number one priority for 2022

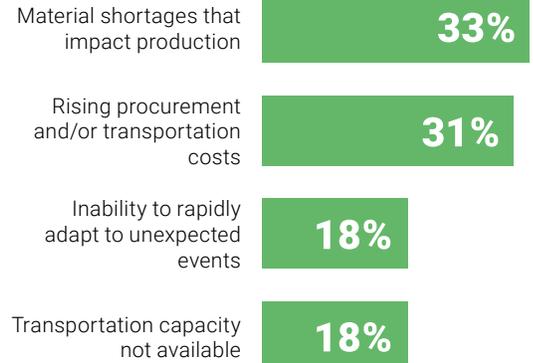
## Areas of greatest concern

### SUPPLY CHAIN

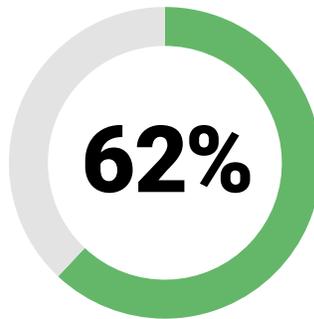


of CEOs are concerned by the impact of supply chain disruption

### MAIN CHALLENGES

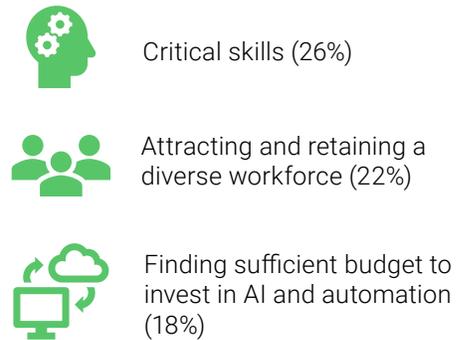


### WORKFORCE

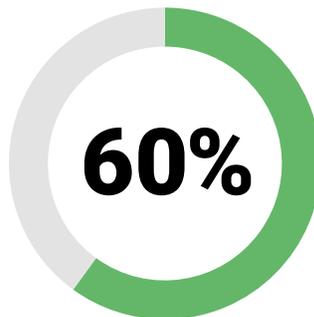


of CEOs are concerned by the shortage of qualified workers

### MAIN CHALLENGES



### DIGITAL



of CEOs are concerned by digital tools and technology

### MAIN CHALLENGES



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# Survey Methodology

The AlixPartners Disruption Index (ADI) measures the state of disruption across major industries and regions.

From September to November 2021, we surveyed 3,000 senior executives across 10 industries and 9 countries. We asked them questions on the degree to which their business is being disrupted, the various disruptive forces impacting them, the pace at which these disruptive forces are accelerating, and the strategies they are employing to confront them. Using these responses, the ADI provides a measure of the magnitude and complexity of disruption that organizations are facing, accounting for overall disruption levels as well as the number of disruptive forces confronting an organization.

## Business executives defined as...

- Ages 25-65
- Employed in one of the nine countries listed below
- Director level or above
- Company revenue of \$100 million+
- Having insight into disruption trends facing their industry

## 9 countries:

U.S., Canada, U.K., France, Germany, Italy, Switzerland, China, Japan

## 10 industries:

Aerospace & Defense, Automotive, Consumer Products, Energy & Power Generation, Financial Services, Healthcare & Life Sciences, Media & Entertainment, Retail, Technology, Telecom & Cable

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For the purposes of this report, all fieldwork was conducted using multimodal online and telephone interviews between September 28, 2021 – November 29, 2021.

Disruption is defined as significant change driven by forces that displace business, markets, and operating models.

In 2022, 50% of executives surveyed are C-level and 50% of executives are working for \$1B+ companies.

**3,000**  
executives  
surveyed

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**300**  
per industry

**1,000**  
EMEA

**1,000**  
North America

**1,000**  
APAC

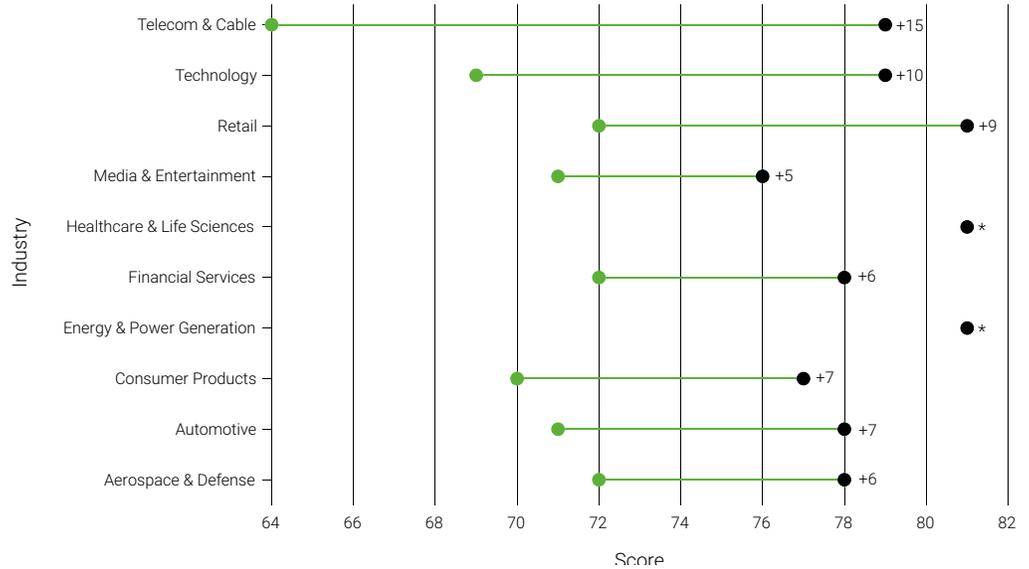
All results show combined, global data unless otherwise noted. U.S. n=667, Canada n=333, U.K. n=211, Germany n=194, Italy n=193, France n=209, Switzerland n=193, China n=667, Japan n=333

# The AlixPartners Disruption Index: A measure of the magnitude and complexity of disruption experienced in the past year.

## Industry breakdown 2021 v. 2022

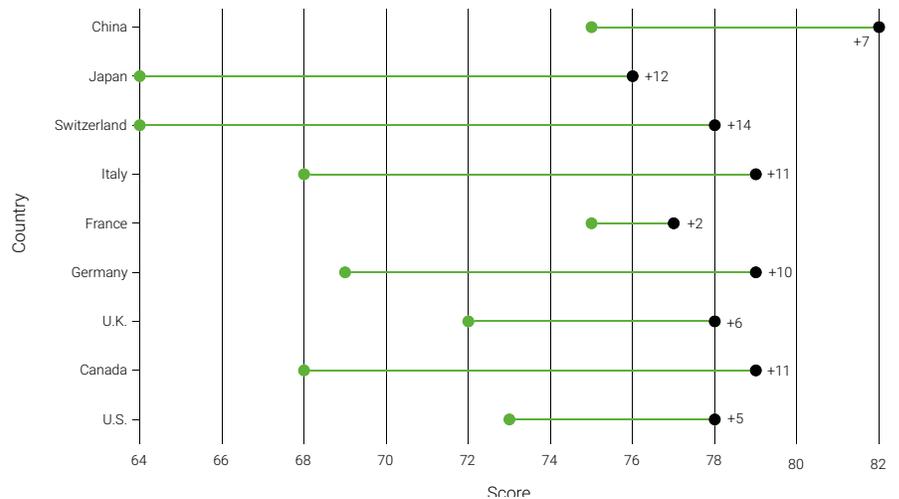
● 2021 ● 2022

\*Note: Healthcare & Life Sciences and Energy & Power Generation were not surveyed for the 2021 index.



## Country breakdown 2021 v. 2022

● 2021 ● 2022



$$\text{AlixPartners Disruption Index} = \sqrt{(10 * \sqrt{\text{Complexity}}) * \text{Magnitude}}$$

The Complexity of Disruption

Number of simultaneous forces impacting companies over the last year



The Magnitude of Disruption

Assessment of how disrupted companies have been over the past year

"How strongly has your company been impacted by each of the following disruptive forces?"  
(% at least somewhat impactful, global)

"How disrupted would you say your company has been over the past year?"  
(% selected response, global)

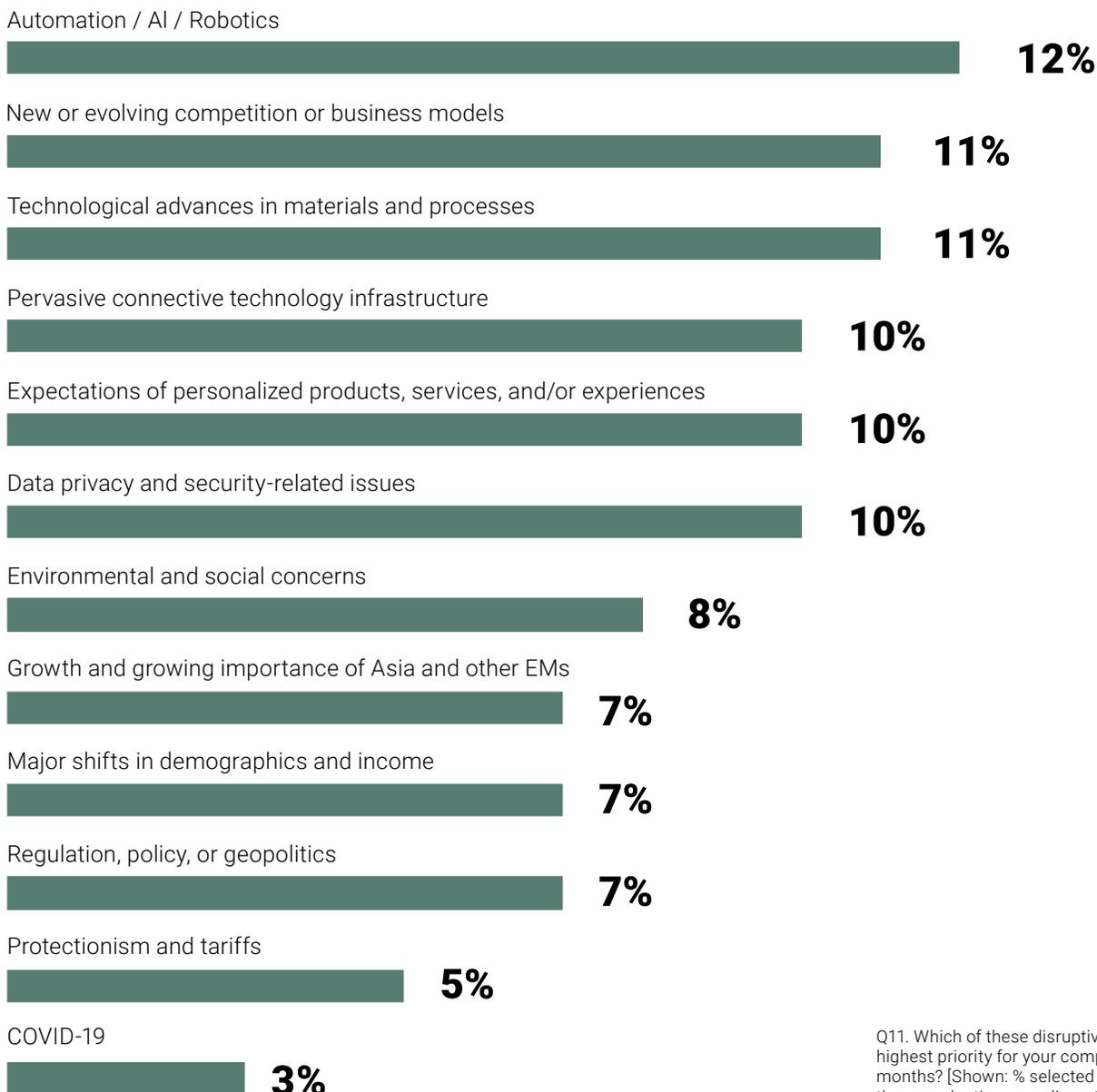
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# **DISRUPTION IS THE NEW ECONOMIC DRIVER**

# Disruption is The New Economic Driver

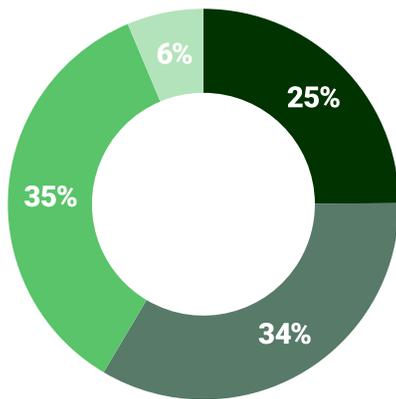
Despite COVID-19 being arguably the biggest disruption to the global economy in the past 80 years, just 3% of executives list the pandemic as their top worry in the coming year. This is despite a count of 5.5 million deaths and rising by official measures (up to two to three times that when unaccounted-for deaths are included)<sup>1</sup>, mandated shutdowns of industries, disrupted supply chains, massive outlays of public spending, and ongoing uncertainty of what will be next.

## Highest-priority disruptive forces in the next 12 months, per executives



Q11. Which of these disruptive forces is the highest priority for your company in the next 12 months? [Shown: % selected response among those evaluating core disruptive forces + COVID-19] [Sample size: n=2,164]

## Expect changing business models



- Changing now
- Within the next year
- Within 1 to 3 years
- More than 3 years

In our annual Disruption Index, a survey of more than 3,000 executives globally, it is not the wave of COVID-driven disruptions, which are acute but (hopefully) short-term that are worrying business leaders most. Instead, they are watching the massive tidal wave of change coming at them from other forces: a combination of technological innovation, demographic change, climate-driven disruptions, and growing trade barriers, a retrenchment after nearly 30 years of rapid globalization.

Fully 64% of executive concern is around disruptions stemming from new technologies and the emerging business models and implications that come from them. They see the huge opportunity technology presents—as the recent frothy capital markets over the past year will attest—but also worry that if they don't pick up pace, their companies will be left behind.

In the face of these pressures, executives know that they cannot change fast enough. Fifty-nine percent of executives are either in the midst of transforming their business model or planning to do so in the coming year. Nearly all—a staggering 94% of executives—believe that their business models will need to change in the next three. As we come to the end of a year that has seen the announced breakup of such icons as General Electric and Johnson & Johnson, it is clear that even much-revered stalwarts are not immune.

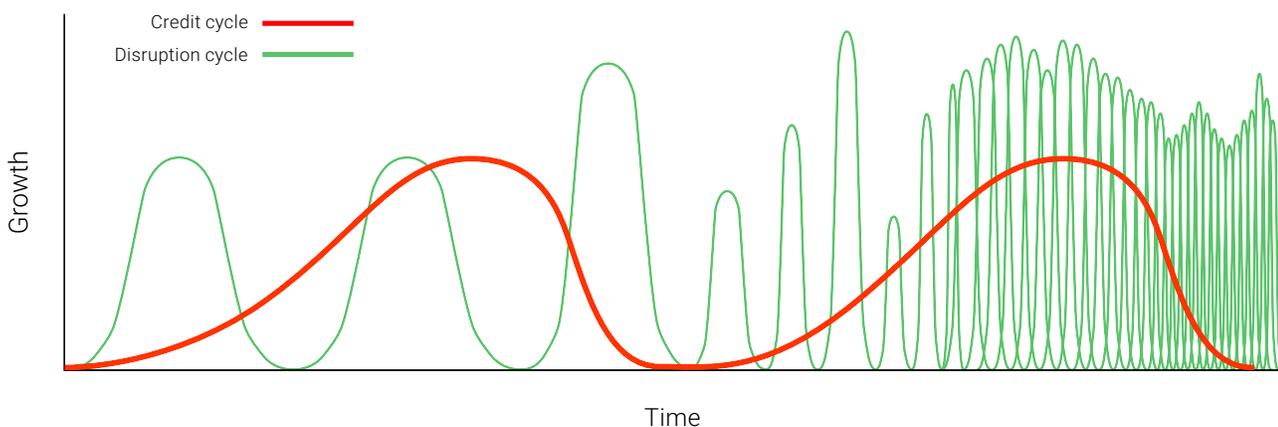
In this topsy-turvy environment, no one feels safe. Fully 72% of CEOs believe these disruptions are so great that their personal jobs are at risk, up from 52% just a year ago. (To put further emphasis on that number, that earlier statistic was taken during the 2020 lockdowns, making the rapid jump in this year's statistic more startling yet.)

It is no longer traditional economic forces at work that are reshaping the economy, but rather the ever-accelerating pace of change. Like molecules in a chemical reaction when exposed to heat, moving faster and colliding with more energy, economic forces are interacting at an ever-increasing pace—and in doing so, upending existing business models, markets, and value networks at a historically unprecedented rate.

The very idea of "business as usual" is obsolete—there is no usual. Rather, executives will increasingly need to lean into an economy of constant change. And the key skills required to do so successfully will be agility, responsiveness, and adaptability.

Disruption is the displacement of businesses, markets, and value networks as the result of economic, societal, environmental, political, regulatory, or technological changes. Technological innovation and adoption, in particular, act as catalysts to accelerate other disruptive forces.

## DISRUPTION CYCLE OVER TIME



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# The Business Challenge

For business leaders, responding to the forces of disruption is their greatest challenge. They must confront an environment that is shaped not just by the magnitude and sheer number of disruptive forces, but also by the complexity of their interconnected impact.

Consider COVID-19. It has not just been the disease itself that has been devastating, but also the myriad second- and third-order effects. Maintaining the physical and emotional health of employees, customers, and suppliers quickly emerged as a paramount concern. Consumer demand became unpredictable—and was rapidly directed through new and emergent channels.

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## 7 IN 10

executives report high disruption to their company over the past year (70%), up from 59% in the prior year.

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## 6 IN 10

executives worry their company is not adapting fast enough to stay ahead of disruption (57%).

Establishing capabilities to remain productive in the face of stay-at-home orders, factory closures, and supply chain dislocations proved an ongoing challenge. Coordinating vaccinations and bringing people back to work presented another set of dilemmas, which have had to be reworked with the advent of each new variant.

In a matter of weeks, executives had to completely retool ways of working, how they produced and distributed goods and services, and how they ensured the continuity of their businesses. Fields like telemedicine that had struggled to gain traction for years became the norm overnight as traditional healthcare was turned on its head. COVID brought not only a public health challenge, but also a plethora of business, operational, and societal challenges. And COVID is just one example.

An increasing number of technological innovations are driving truly disruptive change across society and around the globe.

Many of these are step-change advances. Ubiquitous connectivity is empowering consumers to demand what they want, when and how they want it, constructing and inhabiting self-curated digital ecosystems (creating what we call “me-centric consumers”)<sup>2</sup>. And the resulting explosion of data enables ever more sophisticated and real-time AI-driven tools. The rapid success of mRNA vaccines has opened the way for a new generation of potential drugs to treat intractable diseases such as cancer, heart disease, and HIV.

Falling costs for renewable energy and more effective energy storage technologies are reducing the world’s reliance on fossil fuels. The expansion of electric vehicles is rapidly changing not just the automotive market, but all of the supporting infrastructure for combustion engine car culture. Additive manufacturing (or 3D printing) is enabling companies to produce goods in a more distributed fashion with fewer raw materials and increasingly lower costs, bypassing supply chain bottlenecks.

Of course, not all of the effects of disruption are positive. Globalization and technological change have contributed to the widening gulf between the wealthiest and poorest members of society. Social media has deepened polarization—connected individuals are overwhelmed with information and conflicting views, making it difficult to know who to trust. Cybercrime is on the rise. An increasingly digitized world is putting pressure on already strained electric grids, with the share of global energy consumed by data centers, consumer devices, and networks expected to almost double to 21% of all energy consumption by 2030—even before factoring in the impact of electric vehicles<sup>3</sup>.

The irony is that the institutions and individuals with the most power to help society respond—including business leaders and policymakers—are not moving fast enough. To meet the challenges presented by disruption and build a sustainable future for ourselves and generations to come, we must accelerate the pace of change.

# The Consumer Economy's Great Power Inversion

The tables have turned. Empowered by technology and each other, today's consumers have declared, "It's not you, it's me."

It's becoming clearer than ever that power has permanently transferred from brands to consumers—but equally clear that many companies have not fully realized the extent of this shift. Consumers now have almost unlimited access to information and products, which makes loyalty hard to earn and easy to lose. They can easily find a different product they prefer or a similar product at a price they prefer at a different brand or retailer—or even from the manufacturer directly.

More importantly, social platforms have given consumers megaphones, enabling them to discover new products, read and write peer reviews, identify with communities of shared interests, and buy only what aligns with their personal brand. They

make choices about what they want to buy based on information from sources that transcend—and upend—traditional company marketing efforts. The simplest way to think about this is the absolute democratization of consumerism. Consumers always had agency, but never power. Now they have both.

We see this shift in our [annual holiday survey](#) where consumers say they are ever less forgiving of missteps. [Three in four consumers](#) would be less loyal or less likely to buy again from a retailer if they experienced product unavailability. They also value convenience. Accelerated by the pandemic, 40% of U.S. consumers have tried a new shopping method—such as curbside pickup, buy-online-pickup-in-store, or delivery—over the past year, and nearly [three-quarters](#) of them want to keep using these services.

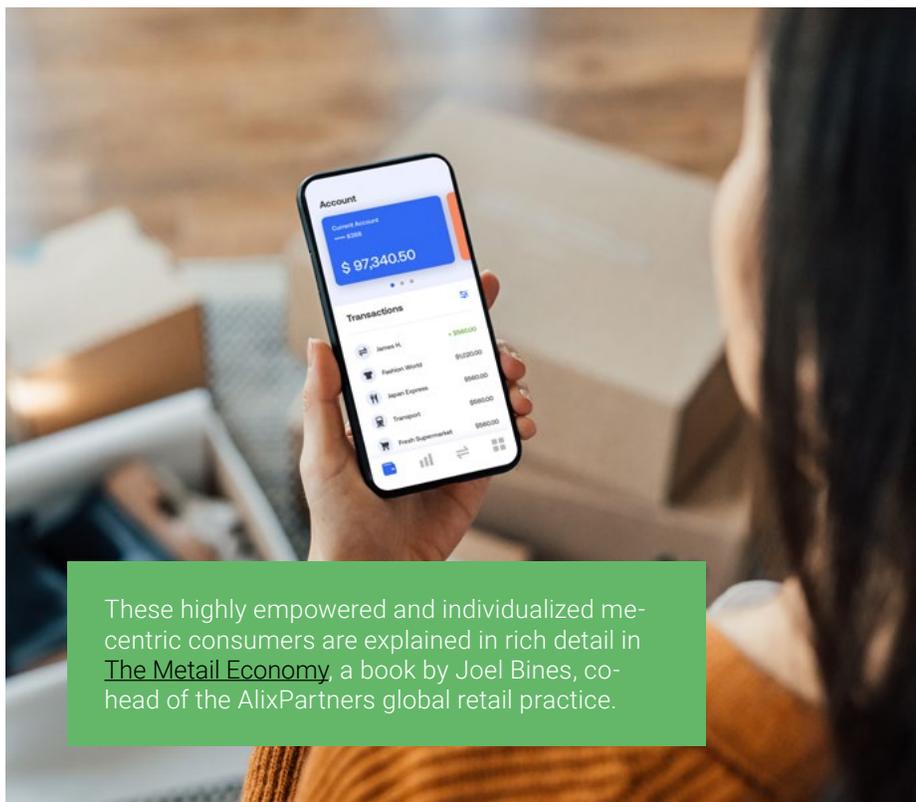
The point is this: Consumers now operate outside of the carefully controlled customer experience zones where companies have felt most comfortable for essentially all of time.

At the same time, consumers are also spending more, which means that for any retailer missing this power shift and not determining how to alter strategy accordingly, these dollars are theirs to lose.

It's up to the companies to meet the me-centric consumers where they are, not the other way around. Otherwise, consumers will take their dollars elsewhere. To be successful, companies must restructure their entire business model around serving their particular me-centric consumer.

But this also offers up an opportunity to build a lasting relationship with your consumers. Businesses must never again think of consumers or their tastes and needs in terms of static demographic groups. Instead, they should focus their resources on establishing an intimate and personal understanding of their brand's unique assortment of consumers and building new relationships with them. You need to ask not only, "Would a customer like this?" but "Would *our* customer like this?"

This power inversion is perhaps the greatest change to our consumer economy in centuries. Companies that do not understand this shift and refocus their investment, resources, and energies to maximize their customer relationships will struggle in the new world. There is no safe haven from the powerful new consumer no matter what business you operate in.



These highly empowered and individualized me-centric consumers are explained in rich detail in [The Metail Economy](#), a book by Joel Bines, co-head of the AlixPartners global retail practice.

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# Deepening Disruptions

In this year's report, we identify four major forces that we believe will transform the world economy in the years ahead. These represent challenges—but also huge opportunities.



## Demographic Decline

For large parts of the world, the decade of the 2020s marks a stark transition: It is the first decade in which all of the leading economies across the globe—Europe, the U.S., Japan, and China—will see labor force growth markedly slow and, in many cases, shrink. Retirements will outpace new workforce entrants in almost every major economy. (Indeed, only India, Africa and parts of the Middle East will see meaningful labor force growth in this decade.) This will present a major economic headwind: Fully a third of GDP gains over the last six decades have come directly from labor force growth. To sustain economic growth levels in line with those we have been accustomed to, technological innovation will have to accelerate even faster.



## Technological Acceleration

The explosion in new technologies is both a boon and a bane—technological innovation will become the principal driver of economic growth and promises to improve our lives and our world, but it is also the primary source of disruption and dislocation. This is the tsunami wave that has executives most worried. The 2020s are seeing the emergence of the so-called bionic enterprise: the merging of human capital with artificial intelligence (AI), big data, robotics, and an array of digital technologies to drive next-order business outcomes. The mission for companies is clear: Be digital or die.



## Deglobalization

After nearly three decades of expansion, the forces of globalization—which have helped fuel economic growth through greater trade, exchange, and openness—are in retreat. Barriers are going up, and global trade declining. Protectionism is on the rise. The world's two largest economies, the U.S. and China, appear to be on a path of continued confrontation. Actions like Brexit and punitive trade wars are making economies more isolated than not. A long-term realignment of supply chains is underway. The biggest near-term implication will be increased economic friction, reversing more than two decades of falling prices and access to cheap goods. We should expect continued rising prices and inflation, as well as the distinct possibility of increased global conflict.



## Climate Transition

The effects and urgency of climate change have become increasingly apparent and accepted. And it is not just the long-term effects, but also the growing climate volatility as we see a marked increase in extreme weather events, both devastating and costly. As important as climate change itself is our response to it. Roughly \$2 trillion annually is now being invested in new renewable energy technologies, and fully 50% of investment dollars are now tied to Net Zero emissions requirements<sup>4</sup>. Moreover, ESG demands from a broad range of stakeholders—including customers, employees, investors, and regulators—are driving companies to set more ambitious goals. We should expect to see a plethora of new technologies and operating models aimed to drive a more sustainable set of environmental outcomes.

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# DEMOGRAPHIC DECLINE

# Demographic Decline

Economic output depends on three factors: capital, technology, and people. Or even more simply:

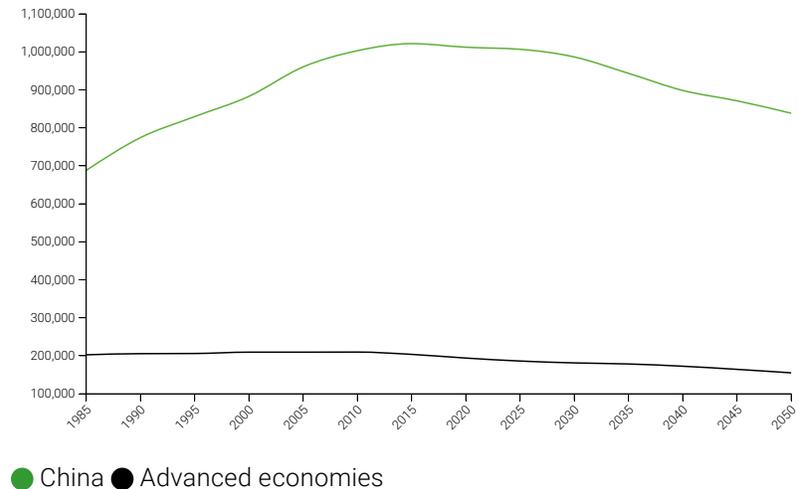
$$\text{Economic output} = \text{Number of workers} \times \text{Average output per worker}$$

Therefore, economic growth is dependent on only one of two things: a growing work force or improving productivity (technology deployment  $\times$  capital investment).

While, for decades, predictable labor-force growth has been a steady tailwind driving economic growth, we are entering our first full decade in the modern era where that is no longer true.

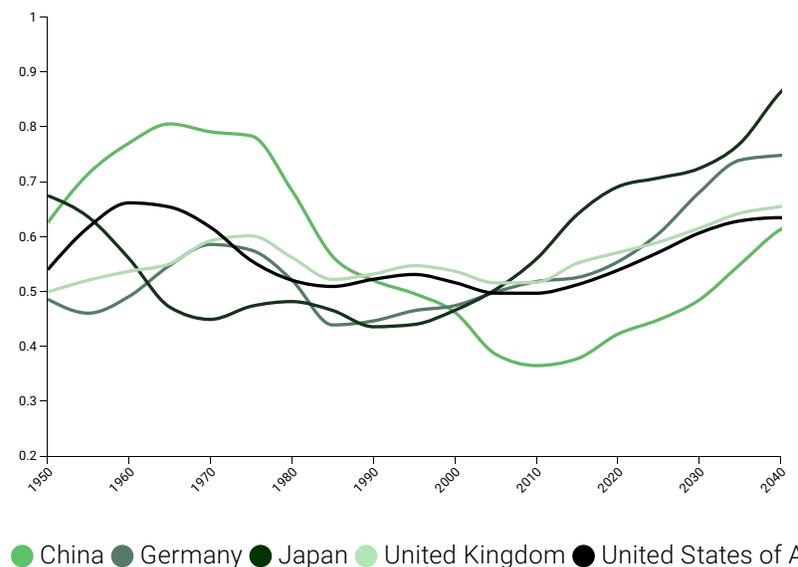
This sea change stands in marked contrast to any time since the end of World War II. The post-war baby boom in Western Europe and the U.S. led to decades of steady growth in output and consumption. Increased levels of labor participation by women and ongoing immigration waves into Europe and the U.S. only added further fuel. The subsequent integration of China, India, and the former Soviet Bloc countries into the global economy in the 1990s kept that growth growing, almost doubling the number of workers participating in the global economy.

### Working age population (in thousands)



Source: UN World Population Database

### The positive labor supply shock from China (Working age population in thousands)



Source: UN World Population Database

But the party is coming to an end, with a dependable economic tailwind turning into an economic drag. Not only is the global labor force not growing, but the costs of an aging population will be significant as we see pension and healthcare costs explode. By 2050, one in six people in the world will be over 65 years old, almost twice today's levels<sup>5</sup>.

To mitigate the impact, some governments may delay retirement ages, but there is a practical limit to how far that can be pushed. In addition, there is likely to be little public support.

While increased immigration can help soften the blow, barriers towards immigration are going up, not coming down, in almost every country in the world.

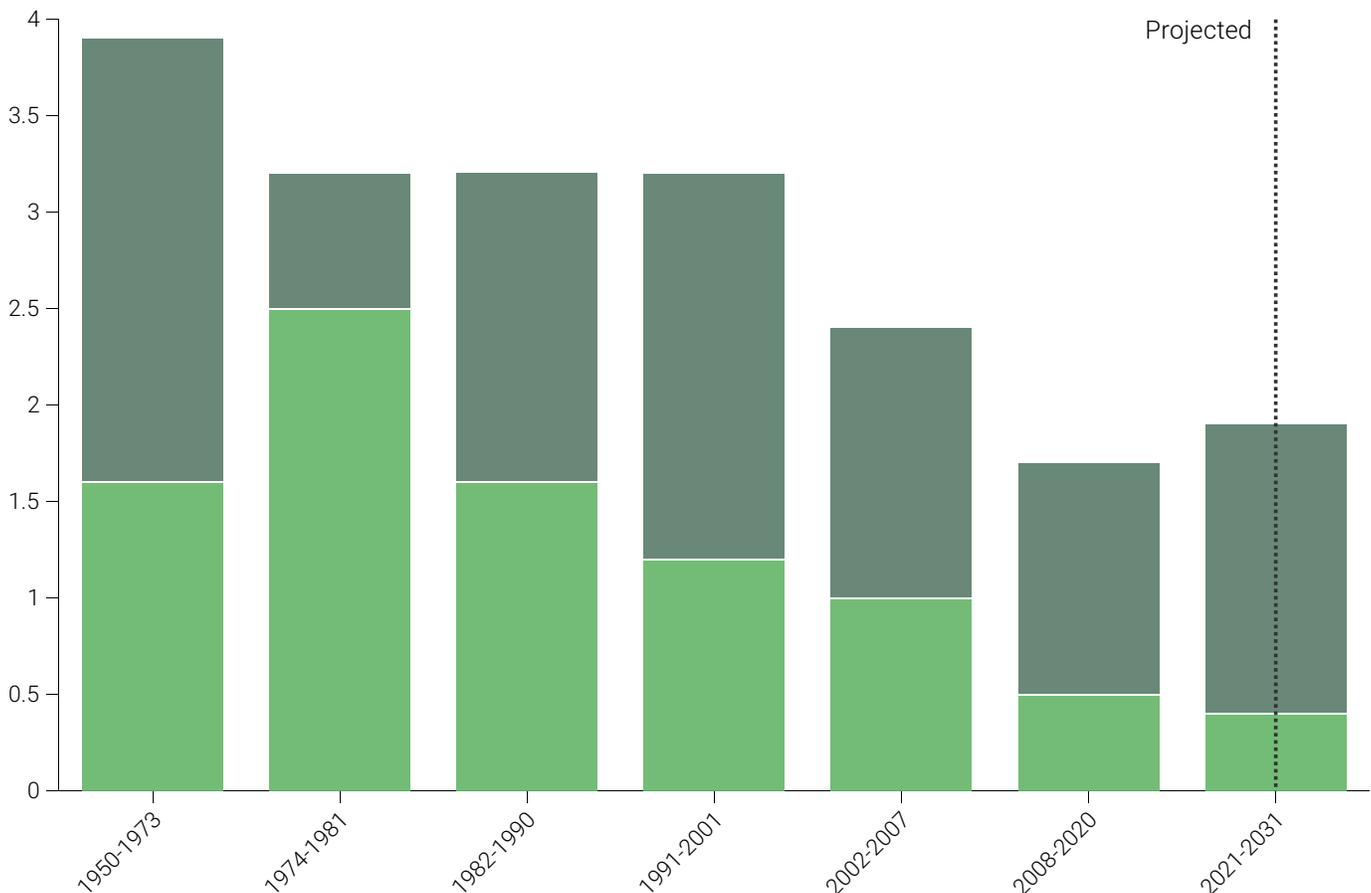
This means that nearly all growth in the major economies will now need to come from productivity gains. Take the U.S., for example. Upward of 80% of economic growth (if not more) will need to come from increased productivity to maintain historic growth rates. In many European countries and Japan, that number is above 100%. China also will turn the corner this decade.

While there are some parts of the globe still seeing population growth—India's population will continue to grow for at least the next 30 years, and the population of sub-Saharan Africa is expected to double over that same period—there are myriad challenges for these countries to fully capture the benefits of globalization. The Chinese miracle is unlikely to be repeated.

We are moving from an era of labor abundance to one of labor scarcity<sup>6</sup>.

## U.S. average annual growth of real GDP

- Potential Labor Force
- Potential Labor Force Productivity



Source: U.S. Congressional Budget Office

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## Demographic Decline

# What does this mean?

Practically, this means that the vast majority of economic growth will come from increased deployment of productivity-enhancing technology. We will continue to see technology companies—and companies that deeply embrace digital business models—gain disproportionate rewards v. their less digitally savvy peers. That is because these are the actors that will be driving the productivity gains and growth. We can expect major dislocations as traditional companies that do not reinvent fast enough get sidelined and squeezed.

Much has been made of the transitory nature of wage pressures coming out of the pandemic. And while many of the forces pushing wages higher in the

past year are temporary, the long-term effect of a shrinking workforce will, entail higher wages. The bargaining power of labor will increase as companies compete to fill increasing numbers of vacant positions.

In our AlixPartners Disruption Index survey this year, 80% of CEOs believe the current labor shortages may be permanent. When looking at their workforce, finding enough workers with critical skills needed was executives No. 1 concern. The biggest pressure point will be on our technical workforce as we see demand for technology workers significantly outstrip supply.

Given the demographic headwinds facing all major economies, these challenges are not going away.

Companies will have to radically change how they recruit, train, and retain their workforce. New technologies and ways of working will require higher investments in training and education; with these investments, the need to incentivize and retain these workers also increases. And all companies will need to make diversity front and center, figuring out new ways of attracting more workers from more places than ever before.

# 2 IN 3

executives agree: “I am concerned that my company’s employees will not have the necessary skills required to operate the business in the future” (65%)

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# AND

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# 8 IN 10

executives agree: “My company needs to take on more responsibility educating and training our current and future workforce” (80%)

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# 4 OUT OF 5

CEOs fear the current labor shortages we are experiencing may be permanent (80%).



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# TECHNOLOGICAL ACCELERATION

# Technological Acceleration

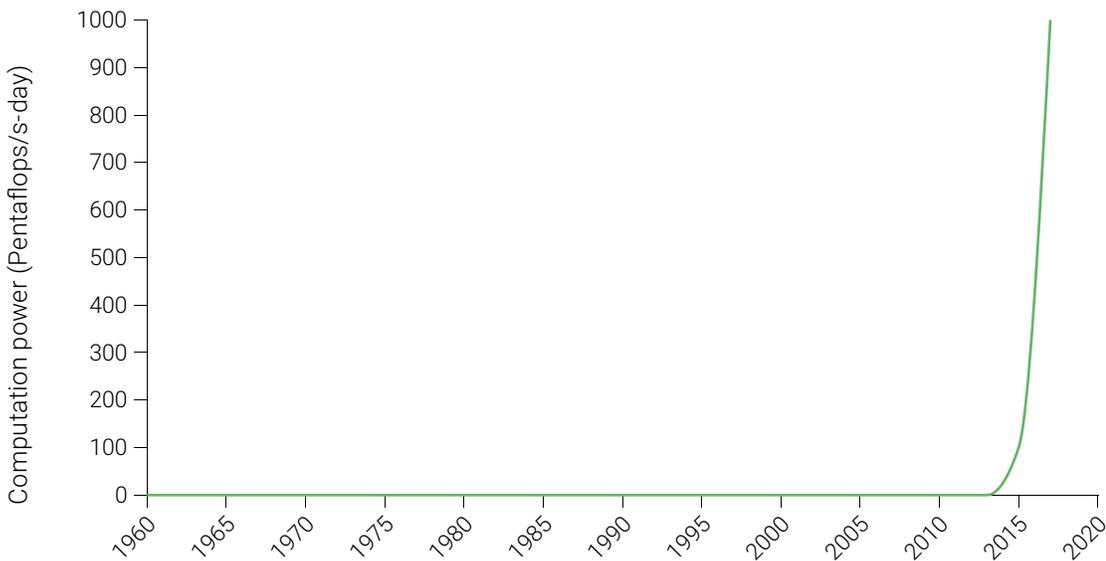
The computational power of artificial intelligence once doubled every two years, according to AI research laboratory OpenAI. It's now every 3.4 months<sup>7</sup>. The pace of gains in technology is exponential, and it is hard for any enterprise to keep pace.

As the cost of labor increases, capital investments in automation and other technologies will become both necessary and more attractive. The pandemic has shifted thinking in many quarters, spurring longer-term investments into deeper tech like computer vision and machine learning. Companies that figure out

how to create the best collaborative interaction between their technologies, their employees, and their customers, putting digital at their core and maximizing the creative output of the combination of technology and talent—literally becoming the bionic enterprise—will thrive.

We are in the midst of what industry watchers refer to as the Fourth Industrial Revolution: the convergence of digital, physical, and biological worlds as we see the IT Revolution of the 1990s and the first two decades of the 21st century move into high gear.

## AI computational power over time



Source: OpenAI

Distributive ledger technologies—of which blockchain is the best known—are rapidly rewiring entire industries. Despite the frothy market speculation over fashionably named cryptocurrencies, much more significant is what's happening behind the scenes: the entire back-end infrastructure of our payments ecosystem is being rewritten. Blockchain and crypto technologies promise a more decentralized, efficient, and secure payment infrastructure.

NFTs, another distributive ledger application, are making major inroads in the art, music, media, and gaming industries as a way to own—and trade—digital assets. Supply chain is one more example: Home Depot employs distributive ledgers for vendors and receiving teams across

its supply chain, providing simultaneous, real-time notification of deliveries and allowing the company to more quickly and effectively move stock from point-of-origin to its customers.

Additive Manufacturing (3D printing) has moved from prototyping to being used for mass production, such as seen across the automotive supply chain. The aerospace industry is also using it to produce higher-quality, lighter-weight parts for aircraft, helping to reduce their global carbon footprint. And it is not just how goods are being produced, but where: Additive tech is becoming distributive.

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For example, manufacturers are able to send the data instructions for a new part and have it printed locally, saving both transit costs and time. This offers a way to further vertically integrate and speed up the supply chains of the future.

The metaverse is the next evolution. Its dynamic 3D virtual worlds promise the next generation remote work, media, gaming, and of retail and brand experiences. Apple, for example, is reportedly working on a version of its AirPods with a camera to facilitate interactivity between the metaverse and the real world.

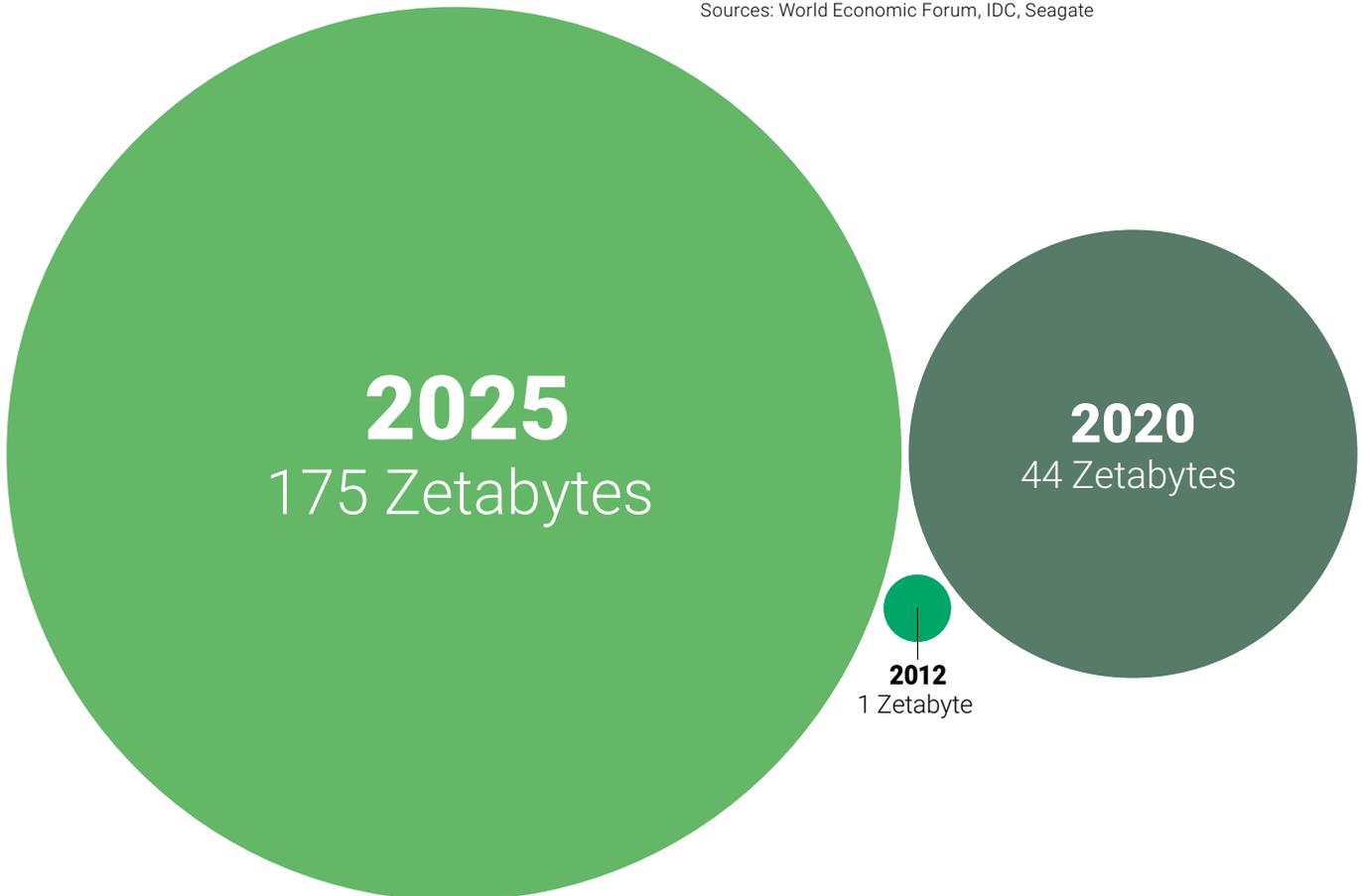
It's all moving so fast—  
no wonder executives  
are struggling.

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## Our data universe is rapidly expanding

From modern history to now, we have created a data universe of 44 ZB which is expected to quadruple over the next five years.

Sources: World Economic Forum, IDC, Seagate



# What does this mean?

# 46%

of executives cite poor execution of technology and tools as a challenge

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Executives know they have to conquer a brave new digital world, but quite frankly they don't know how. Seventy-eight percent of CEOs in the AlixPartners Disruption Index survey believe that the adoption of digital tools is critical to the survival of their company, yet roughly half of all respondents say that their top challenge is poor execution of technology implementation. They are in a quandary: They know they need to move faster than ever, but it is all so new and moving so fast, they worry whether they can be successful. Most companies have a long history of IT investments gone wrong— projects that cost too much, took too long, and didn't deliver promised outcomes. Most companies are struggling with a mixture of aging IT systems that need to change, more data than they know what to do with, and a lack of digital know-how.

Similarly, advanced data companies like Palantir are helping companies make sense of the patchwork of IT systems. They pull insights from multiple and diverse datasets and drive actionable and intelligent decision making, despite aging IT infrastructure.

Important to note: With the increase in data also comes the risk of inappropriate or even illegal exploitation of data. We should expect continued risks to data privacy and also a growing threat of cybercrime. As governments try to catch up with this quickly evolving landscape, companies should likewise prepare to respond to an ever-increasingly regulated—and highly disjointed, as national and local governments both move to respond—landscape. For every digital strategy, executives will need to devise a complementary digital risk and compliance approach.

By the end of the decade, we can fully expect that all companies of any stature will be digital companies. All executives must run the gauntlet, digital to the core.

# 12%

of executives cite available budget as a challenge

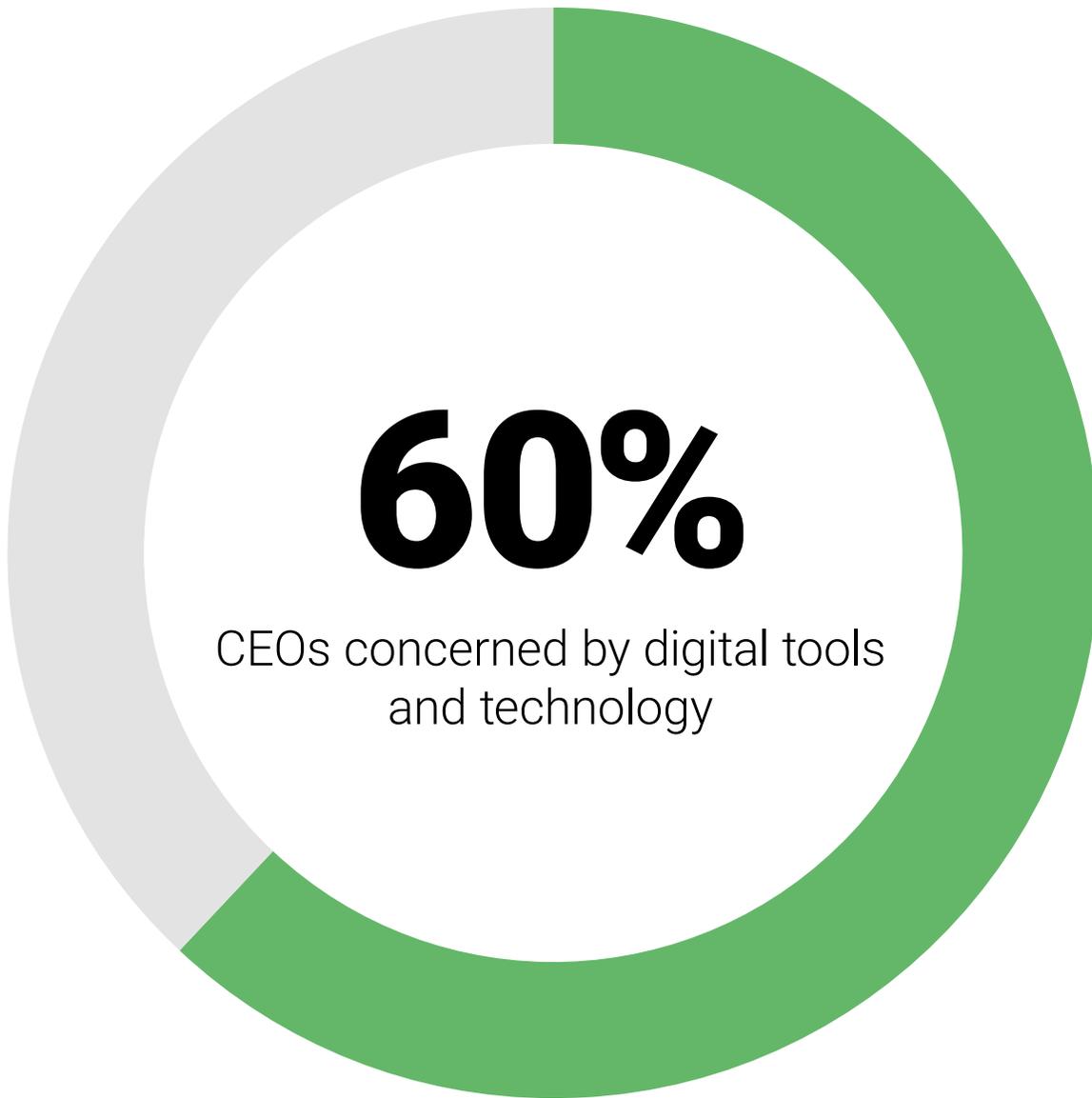
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For companies to survive and thrive, they will need to develop their digital metabolism, making digital the core of their business systems.

# 79%

of CEOs feel employees at their company tend to be set in their ways and not open to change

Fortunately, the new digital infrastructure is much more user friendly than old-school corporate IT. Cloud and SaaS technologies, which allow customers to get out of the software implementation business and focus on running their businesses, help companies make these systems a utility—much more plug-and-play versus the often, painful, long-term IT implementation projects of the past.



## 3 OUT OF 4

CEOs say digital tools are critical or important to the survival of their company (78%)

# Cyber Risk Requires Security at Businesses' Core

Technology has given us much to be thankful for in the past 24 months. Ten years ago, the prospect of pivoting global workforces to remote working overnight would have been unthinkable. Productivity levels during a 2010 pandemic would have looked very different.



However, as with all macroeconomic disruptive forces, threats will emerge in addition to opportunities for organizations, sharply illustrated through the accelerated advances in tech.

The pandemic has, perhaps unsurprisingly, resulted in a surge in cybercrime. The FBI's Internet Crime Complaint Center registered 791,790 complaints in 2020—up 69.4% from 2019—accounting for \$4.2 billion in losses reported by individuals.

The levels of complexity and sophistication in cyberattacks run at a pace proportionate to, if not faster than, the advances in preventative measures available to counter the threats. The supply chain attack on SolarWinds' Orion network monitoring platform, which could have potentially impacted more than 18,000 customers including government agencies and Fortune 500 companies, only serves to cement cybersecurity as a crucial boardroom agenda item for 2022 and beyond.

Technological advances bring new security concerns. Hardware,

firmware, and software compromise is becoming more sophisticated and thus harder to detect and mitigate. Companies will need to increase their monitoring of vendors through their provision of ongoing evidence of secure creation and maintenance, with all aspects of the supply chain needing to be scrutinized from vendor and consumer perspectives.

The Internet of Things, Industrial Internet of Things, 5G/6G, and WiFi 6 are all capable of being highly disruptive to markets, and the security of these solutions is not always a given. The business world today is also increasingly enabled through Software as a Service (SaaS), which can bring many new attack surfaces into focus.

As new solutions are created and connected, more opportunity for digital complexity means a greater likelihood of breach or data manipulation for malicious purposes. Autonomous and semi-autonomous solutions have the potential to create physical and digital hazards, and the complex programming solutions being developed are even more dangerous due to the many application

permutations that require significant observation, feedback, and controls needed to ensure safe usage.

While policy and politics are generally the creator of regulatory compliance metrics, put in place to protect the public, regulatory compliance almost always comes after the fact. Security technologies exist to meet compliance objectives if properly adopted and implemented, and as they mature their ability to solve problems must be tested and confirmed as effective before any upgrades or displacement of existing solutions.

From this perspective, security must be viewed as a journey, not a destination, and establishing "Security Maturity" will be critical in increasing the effectiveness and outcomes of corporate security infrastructure. While the costs to do so often prove to be the nemesis of meeting these standards from the outset, the unmistakable connection between a growing number of disruptive forces and increases in cyber risks suggest that the true cost of inactivity or sub-standard implementation could be much, much higher.

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# DEGLOBALIZATION

# Deglobalization

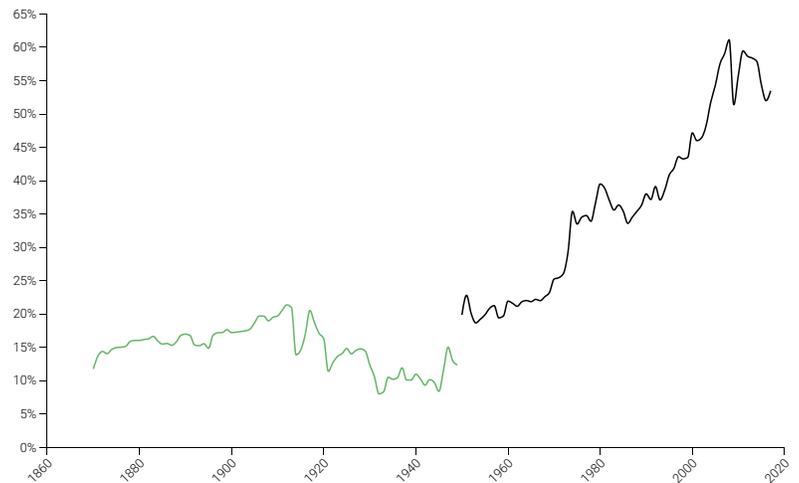
The economic arguments in favor of free trade are straightforward. Through comparative advantage, economies benefit from productivity gains from the international division of labor, and consumers benefit from lower prices. Indeed, the International Monetary Fund estimates that a one-point increase in measures of globalization is associated with an increase in global economic growth of 0.3%<sup>8</sup>.

Trade helps smooth out volatility of business cycles. For example, exports as a share of Eurozone GDP more than doubled in the period from 2010 to 2014, when Europe was still contending with the lingering effects of the financial crisis. This increase helped prevent Europe from sinking deeper by accessing demand in parts of the world less impacted by the crisis like Asia<sup>9</sup>.

Following the second world war, there was an explosion in global trade, fuelled by falling communication and transportation costs.

## Global trade openness (Value of imports and exports as % of GDP)

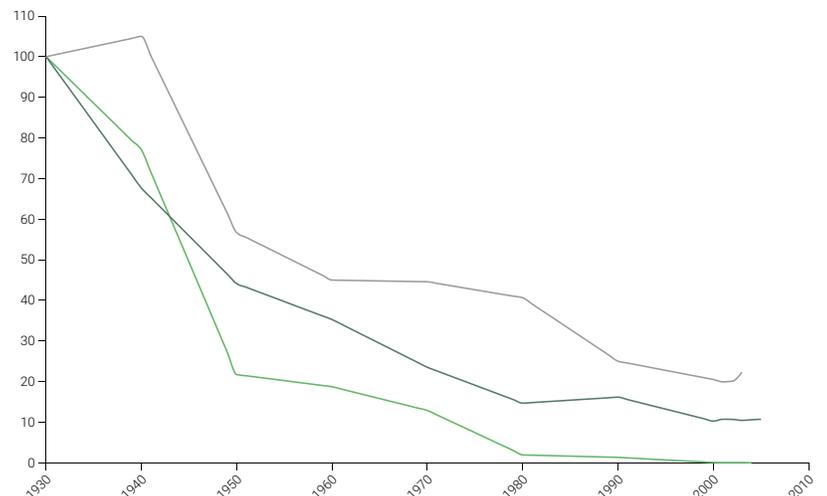
- Klasing and Milionis 2014
- Penn World Table



Sources: Our World in Data, Penn World Tables, Klasing and Milionis 2014

## Cost of communication and transportation over time (Indexed 100 @ 1930)

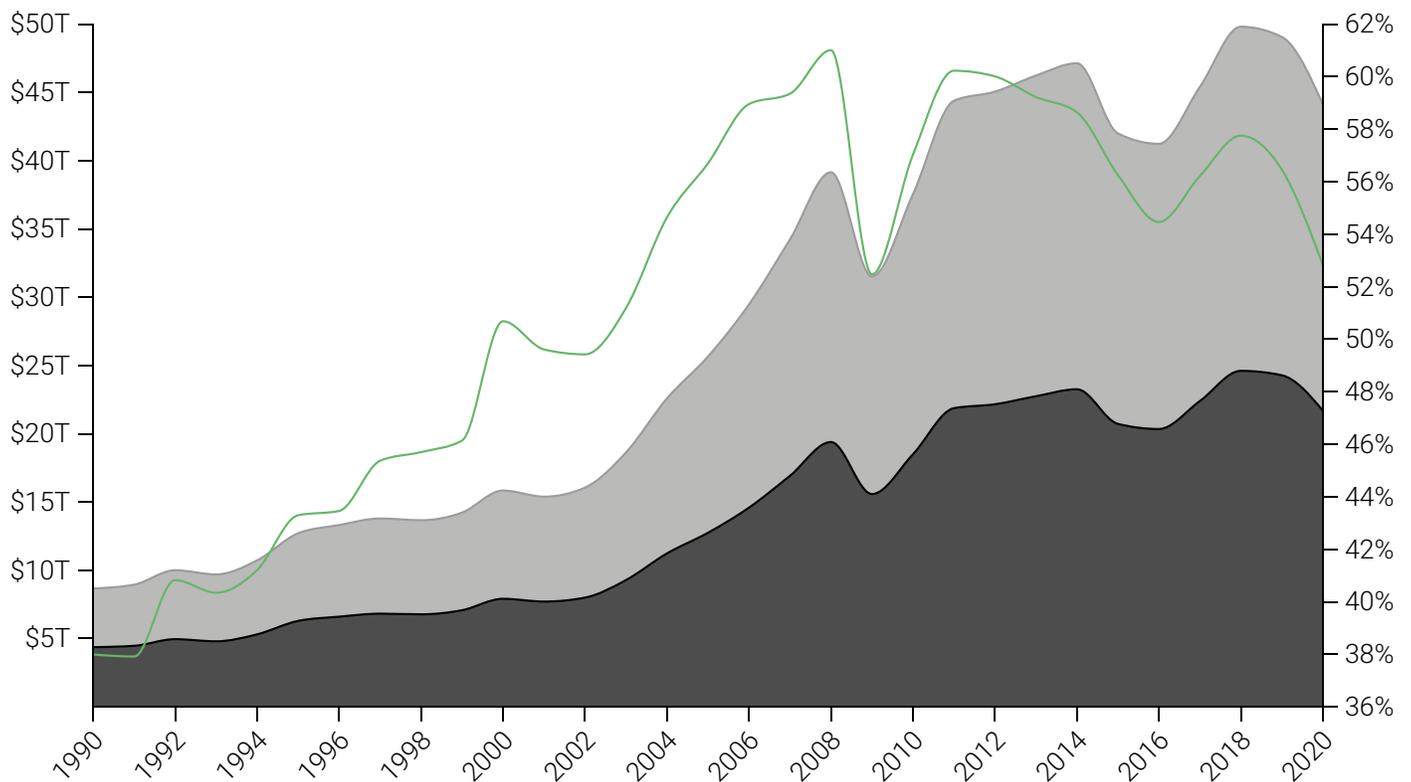
- Communication costs
- Air transport costs
- Sea freight costs



Trade as a percentage of global economic output, however, peaked in 2008 at 61% and has been in retreat ever since. While the absolute dollar value of trade has risen, it hasn't kept pace with the growth in economic output. In 2020, trade as a percentage of world economic output stood at just 53%.

## Global GDP and value of imports and exports (Current USD)

- % of Global trade
- Value of exports
- Value of imports



Source: World Integrated Trade Solution

The reasons for the pullback are clear. While the benefits of globalization are widely distributed, the costs are often quite concentrated.

# Deglobalization

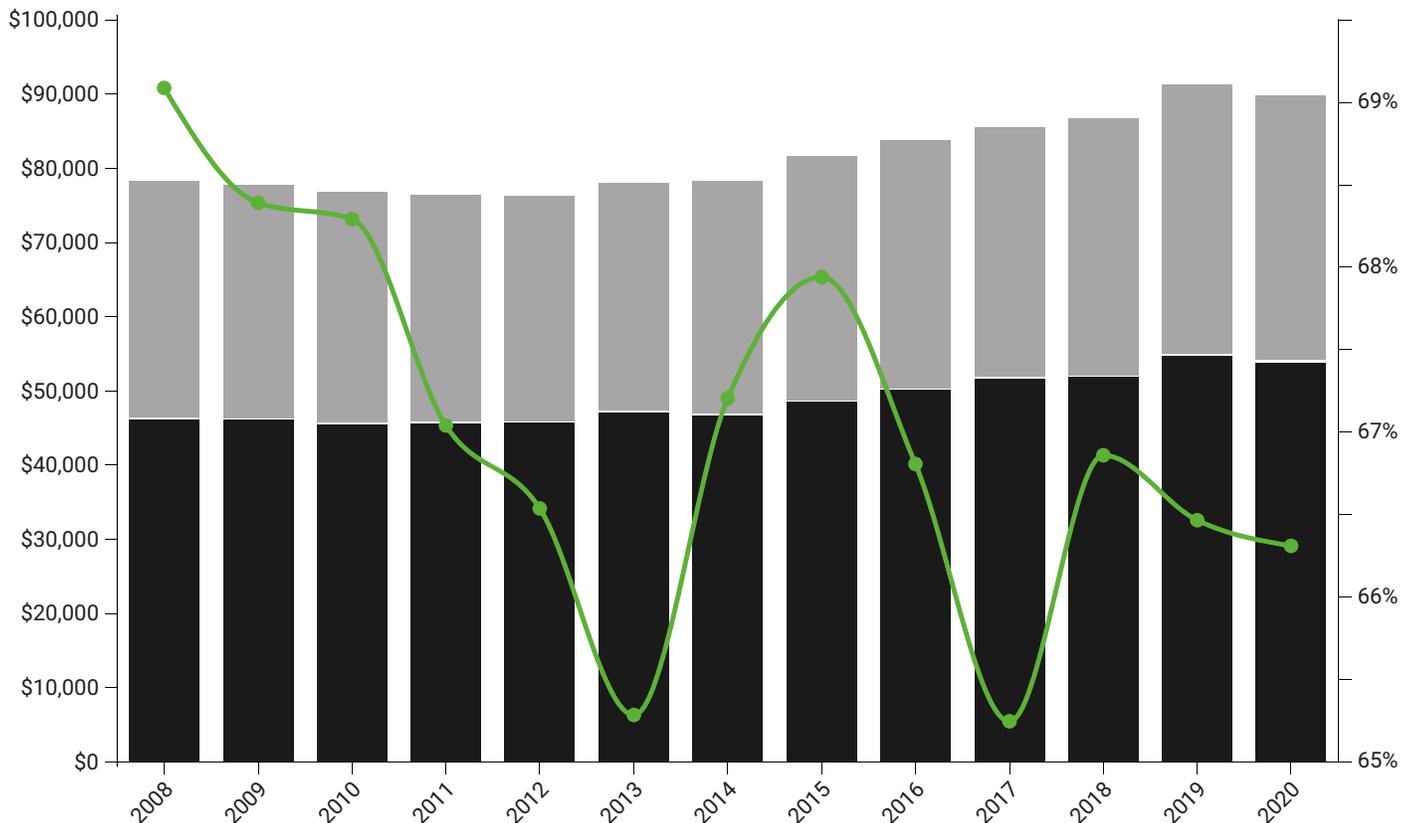
Sectors of the U.S. and European economies, particularly middle- and working-class jobs, were hit hard by the movement of jobs to lower-cost centers of production in the first two decades of the century. As a result, median incomes in the advanced economies largely stagnated—leading to high levels of discontent. This was in spite of the long and sustained deflationary impact on consumer prices that accompanied the trade gains in the 1990s and early 2000s, driving effective increases in standards of living for most consumers.

Since 2017 in particular, increased trade barriers and a generally less-hospitable environment for the free movement of goods, people, and ideas have prevailed—with few signs of subsiding. According to the Global Trade Alert, the number of protectionist undertakings has increased by 220% globally over the past four years<sup>10</sup>. And while the Trump administration famously took an anti-trade stance, the Biden administration has kept most of the policies intact. Similar protectionist policies have also been pursued by China, the European Union, the U.K., Brazil, and India.

Despite stagnant wage growth for most Americans, globalization has contributed to falling costs and increased purchasing power.

## U.S. average and median incomes since 2008

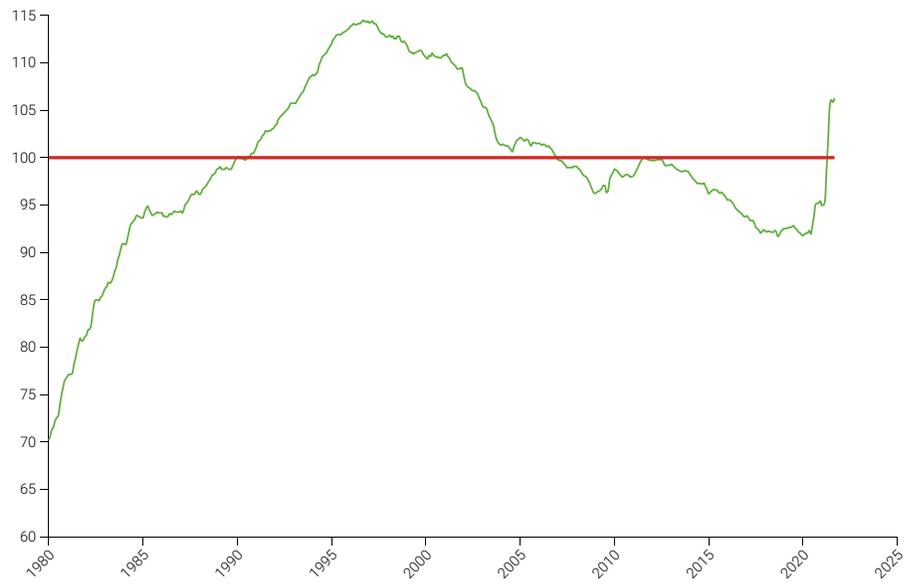
● Median to mean ratio ● Median personal income ● Mean personal income



Sources: Social Security Administration

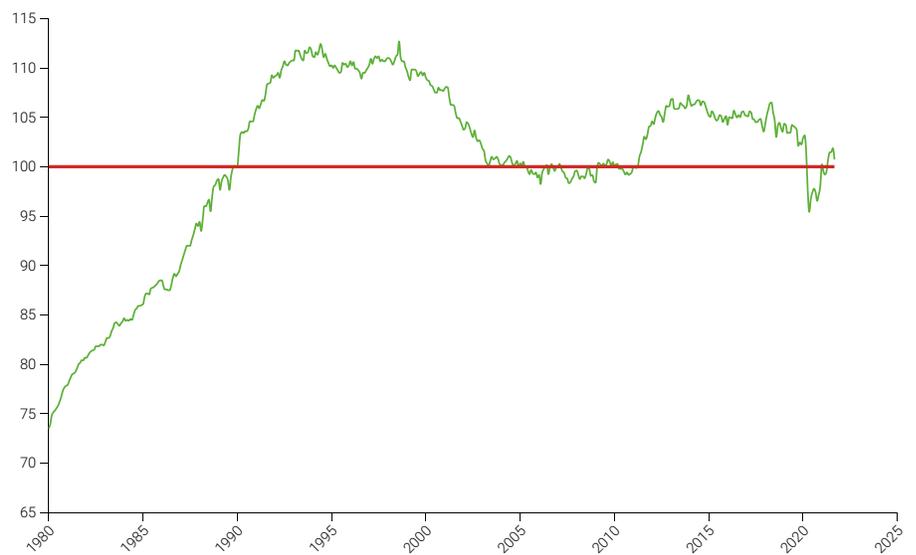
## U.S. Consumer Price Index: Consumer Durables

- Price index
- Index 100



## U.S. Consumer Price Index: Clothing and Apparel

- Price index
- Index 100



It's estimated that median-income U.S. households gain 29% of their purchasing power through trade.

Sources: Federal Reserve Economic Data, Bureau of Labor Statistics Council of Economic Advisors

# What does this mean?

While a full-scale retreat from globalization is both unworkable and improbable, continued trade confrontation and secular shifts in the economy mean ongoing supply chain tangles and transitions.

The AlixPartners Disruption Index shows that 69% of CEOs are concerned with the impact of supply chain disruptions, but less than half of executives are taking long-term action in response. Seventy-seven percent say that the actions they are taking are not enough.

Much of the current discussion on supply chain bottlenecks and transportation and raw material price increases has emphasized the transitory nature of these dislocations. However, the longer-term rebalancing of supply chains—especially when combined with wage pressures from shrinking labor forces—will rework the dynamic flows of the economy.

Likewise, these movements will mark the end of a long deflationary cycle. It is hard under any scenario to see how price pressure will not increase. The period of consistently low inflation

and low interest rates that the global economy has enjoyed since 1990 is largely coming to an end.

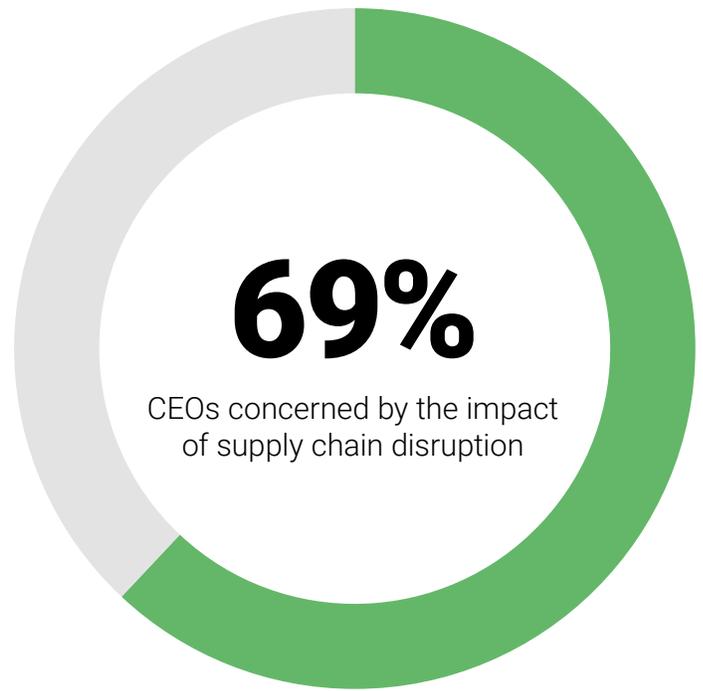
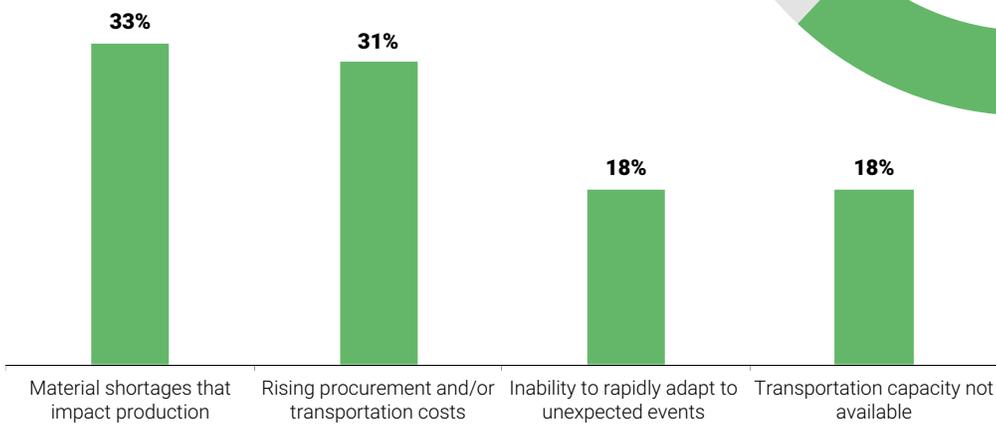
Companies will need to rethink their supply chains in new ways. They will have to focus on more local and regional supply options, increase flexibility and resiliency with more suppliers, and likely retract from the furthest extremes of just-in-time supply that have been the mantra over the past two decades.

But this shift also marks a huge opportunity for innovation. We should expect to see new technologies and new approaches to supply chain coming into play, especially as companies also try to rework those supply chains to lessen their environmental footprint. If the 1990s to 2010s led to the creation of the just-in-time global supply chain, then the 2020s will mark the entrance to the next era.

## 8 IN 10

executives say the actions they're taking are not making enough of an impact (77%).

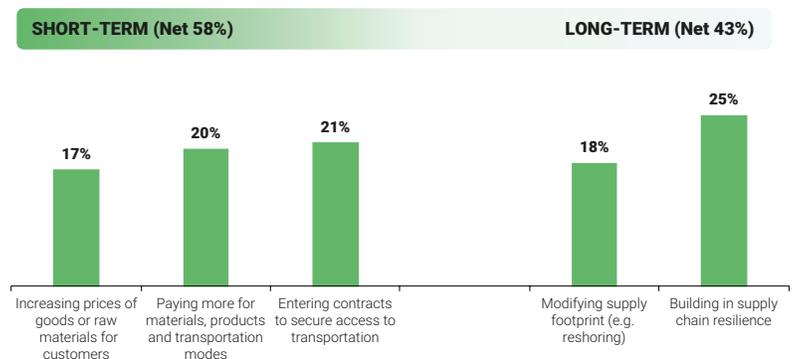
## CEOs on supply chain challenges



# LESS THAN HALF

of executives are taking long-term action in response to supply chain disruption.

## Top actions taken to address supply chain challenges



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# CLIMATE TRANSITION

# Climate Transition

The consensus on climate has shifted markedly in the last few years. At COP 26, the latest UN Climate Conference, nearly 200 countries representing over 90% of global GDP signed the global climate pledge—a historic level of consensus<sup>11</sup>. Perhaps even more impactful, according to the Net Zero Asset Managers initiative, the investing world reached a tipping point in 2021 with over half of global assets under management (some \$57 trillion) committed to supporting a goal of Net Zero by 2050<sup>12</sup>.

The pressure to change is not just coming from the top down, but also grassroots. Workers, particularly younger ones, are demanding their employers align with their values on ESG concerns, and consumers are increasingly voting with their pocketbooks for more environmental choices.

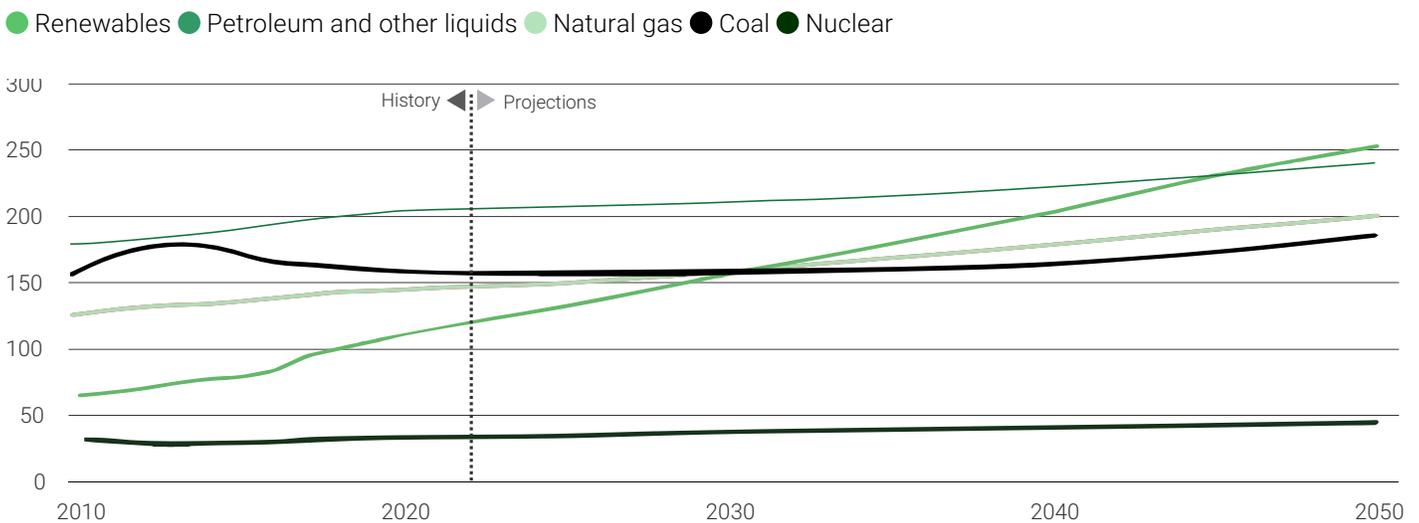
The convergence of regulation, dollar flows, and employee and consumer sentiment—not to mention the rapidly falling costs of green technologies—will accelerate the move away from fossil fuels.

Yet, the transition to a green economy will not be simple, cheap, nor quick. According to Goldman Sachs, \$56 trillion in global infrastructure investment is needed to achieve net-zero carbon emissions by 2050<sup>13</sup>.

While there will be much debate over whether the investments will be enough to change the climate tide fast enough, there is no question that the level of investment will still radically change how we live. Renewable sources of energy such as wind and solar now account for over 70% of new energy installations and represent the cheapest source of new electricity generation<sup>14</sup>.

The transition away from internal combustion engines (ICE) vehicles to electric vehicles (EVs), which are gaining market share particularly in China and Europe, is well underway. EV accounted for more than 7% of global auto sales in 2021, up from less than 3% in 2019, according to research firm BNEF. This figure likely would have been higher without the supply constraints hobbling the auto sector in 2021<sup>15</sup>.

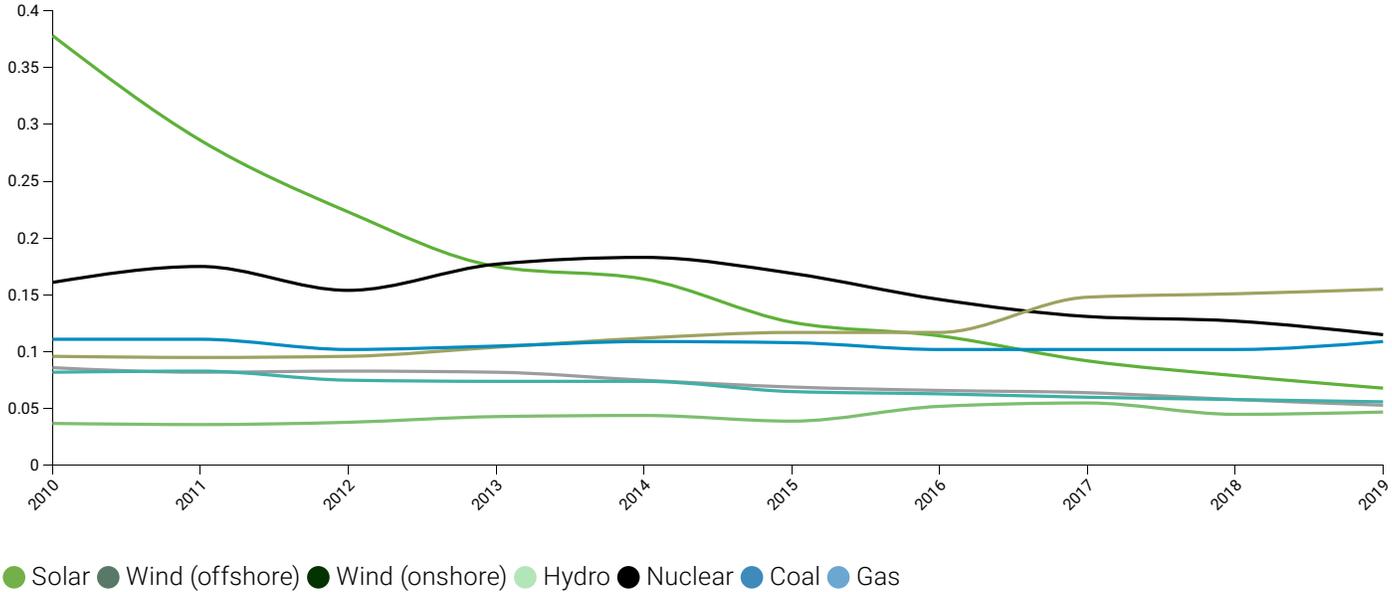
## Global energy consumption by source (quadrillion BTUs)



Source: EIA International Energy Outlook

Actual Levelized Cost of Electricity (LCOE-A) for greener technologies has dropped, a key factor in generation mix changes.

### Levelized Cost of Electricity (\$/kWh)



Sources: IRENA Power Generation Cost 2019, AlixPartners Analysis



The global energy landscape will evolve in the coming years, impacting all direct producers and primary consumers.

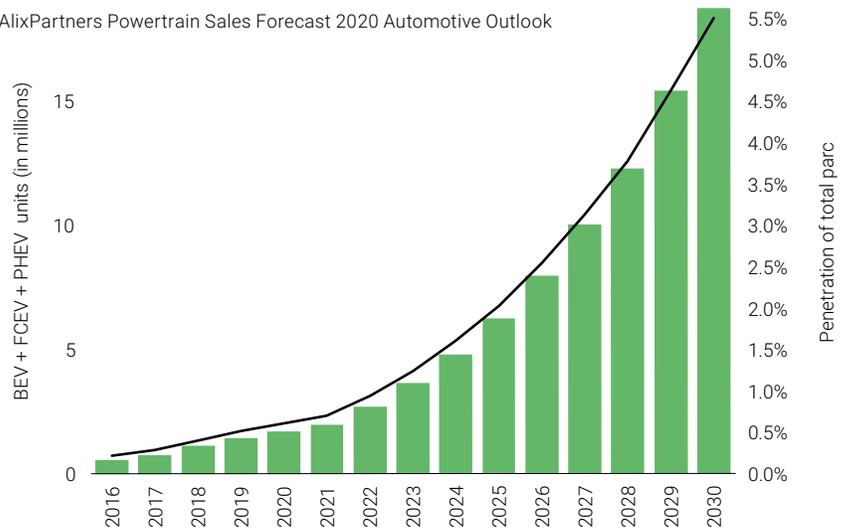
# Climate Transition

Yet, while the tide is turning, the transition will take years. There is still an enormous, installed base of both energy generation infrastructure and traditional gas-powered vehicles to roll over before we are primarily running on renewables.

For example, AlixPartners' projections show that ICE-only vehicles will still be the majority of new cars manufactured in the U.S. through at least 2033, and non-ICE vehicles won't account for a majority of new cars until after 2040.

## Electric Vehicles in the U.S. (% total and units)

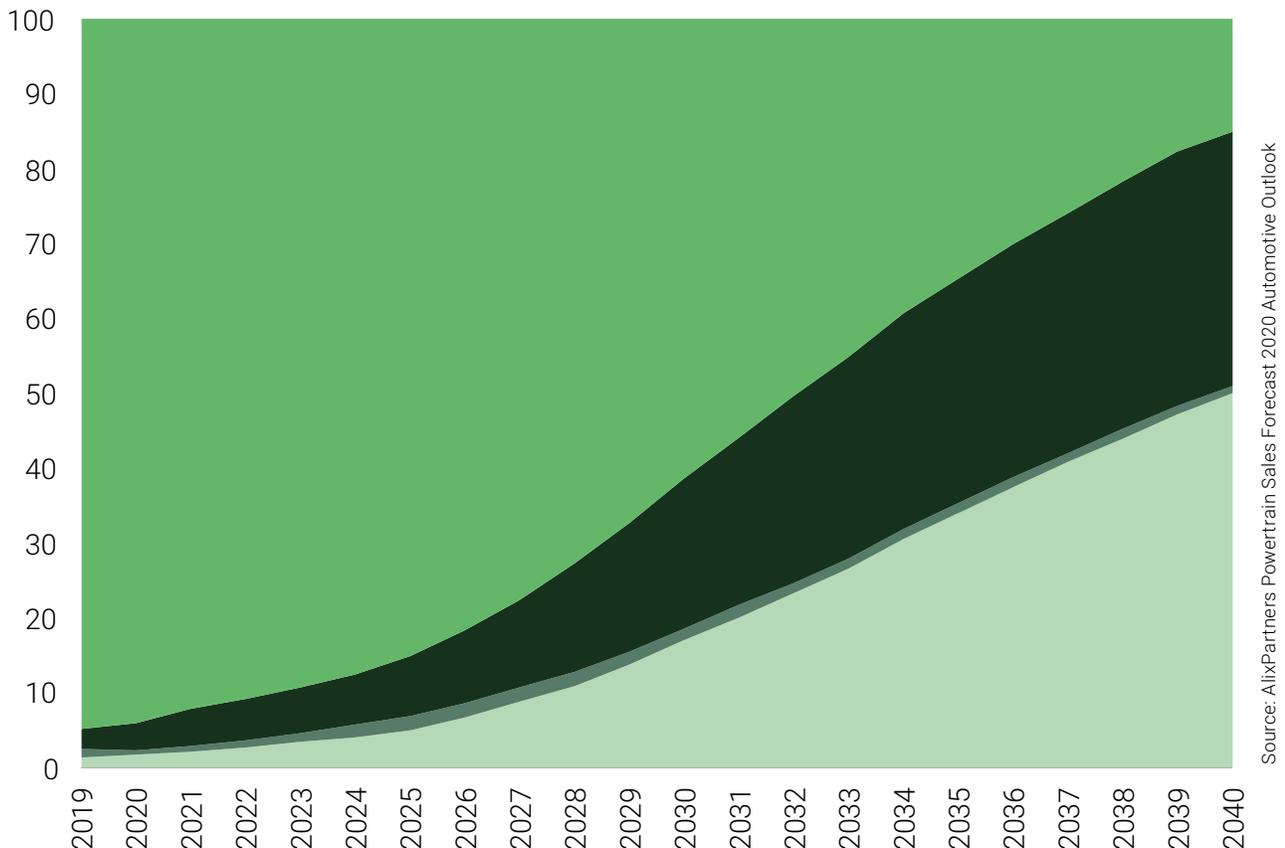
Source: AlixPartners Powertrain Sales Forecast 2020 Automotive Outlook



While still in the “early adopter” phase, EVs are set to become meaningful by 2025 with the the number of vehicles in operation following sales.

## New powertrain sales forecast—U.S. sales (market share %)

- Internal Combustion Engine (ICE)
- Petrol Hybrid and Mild Hybrid (HEV+MHEV)
- Plug-in Hybrid (PHEV)
- Battery Electric (BEV) + Fast Charging Electric (FCEV)



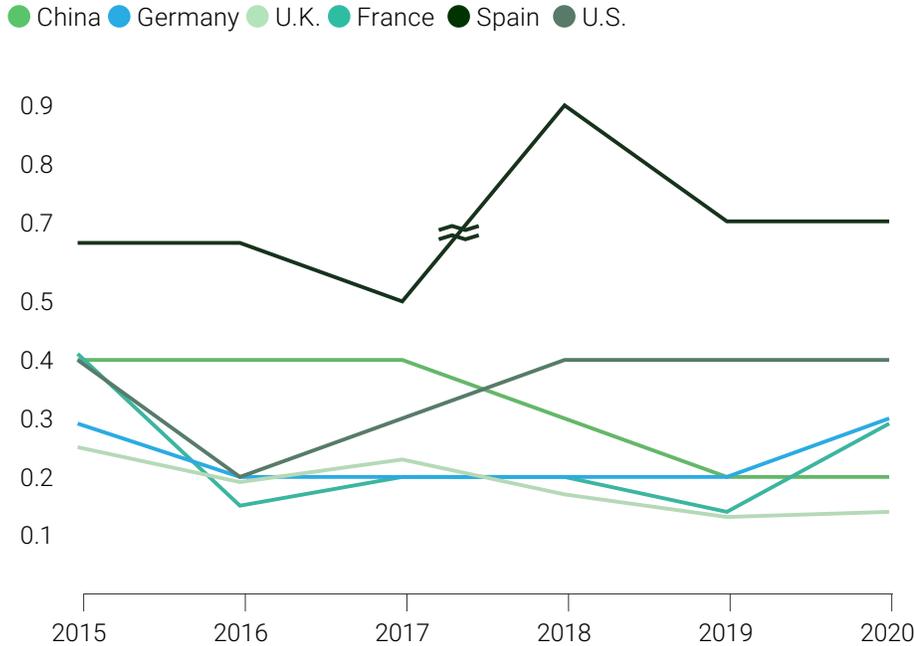
Source: AlixPartners Powertrain Sales Forecast 2020 Automotive Outlook

Grid challenges exist in transmission (intermittent renewables) and distribution (EV & Data) infrastructure—with the U.S. trailing.

Moreover, the transition will require transformations in lots of areas especially as economies address second-and third-order effects.

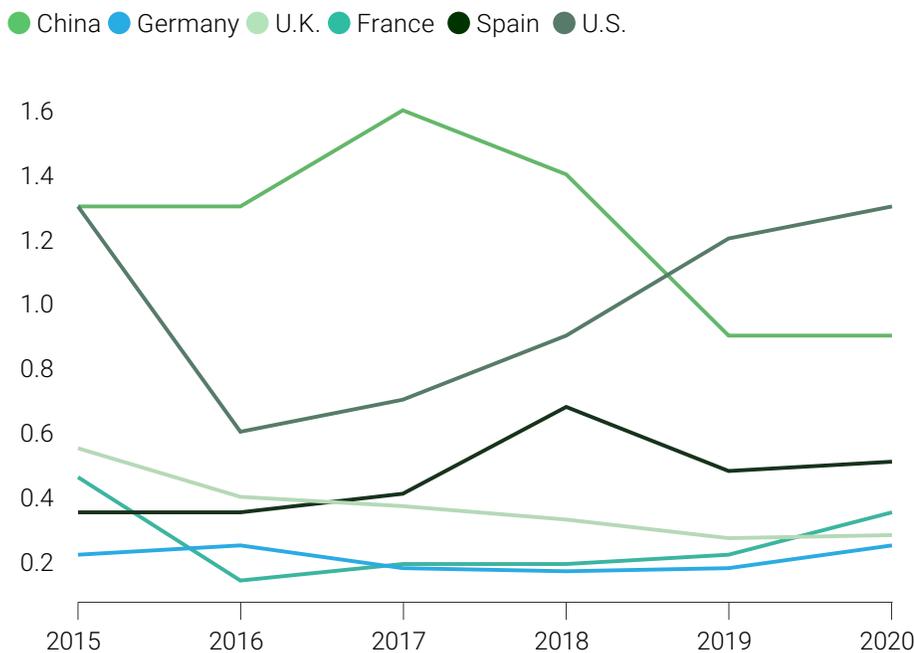
For instance, grid operators claim to be able to handle increased BEV charging loads. However they have not fully modeled the impact of multivehicle charging occurring simultaneously. New York City, for example, is expected to have 2 million EVs by 2040. At peak charging times, this implies the same load on the electric grid as 40,000 new high-rise buildings.

### System Average Interruption Frequency Index (SAIFI)



Sources: World Bank, EU Joint Research Center, AlixPartners Analysis

### System Average Interruption Duration Index (SAIDI)



Sources: World Bank, EU Joint Research Center, AlixPartners Analysis

# Climate Transition

We have also not yet fully appreciated the energy infrastructure required to support our increasingly digital world. Today, large data centers utilize between 3%-10% of global energy production; this could increase to as much as 20% by the end of the decade. A single large data center can require as much energy output as produced by an average natural gas-fired combined-cycle unit.

Advanced economies are planning hundreds of these data centers, putting enormous strain on the same underlying power grids that are being stretched to support new sources of distributed renewables generation and the emergent EV charging demand.

The disruption will go well beyond energy consumption. For example, most countries have an entire infrastructure built out around gas stations, including a huge amount of convenience store retail. As EVs take an ever-larger share of cars on the road, expect widespread disruptions in the support infrastructure of the gas-car economy.

At the same time, climate change is not just a long game.

Despite our moves toward new technologies to address long-term climate impacts, there are multiple near-term impacts attributed to a changing climate—most notably, the increased incidence of extreme

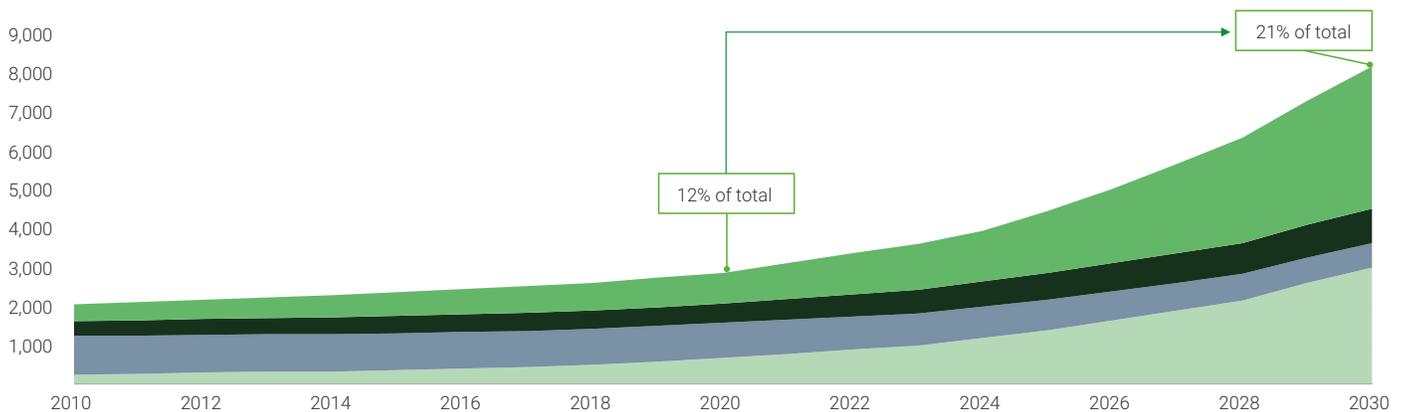
weather events, like hurricanes and wildfires, causing massive economic destruction and displacement in their wake.

In the U.S., four of the six most destructive years for weather events since 1980 have occurred in the last five, with a combined cost of nearly \$650 billion, or an average annual cost to our economy of roughly 1% of U.S. GDP each year<sup>16</sup>. These are driving a meaningful set of unpredictable yet very real kinds of business disruptions.

## Grid resiliency projections regarding EV penetration often overlook looming impacts from data storage centers, cloud, and AI.

Projected global Information and Communication Technology (ICT) energy consumption (TWh)

- Networks (wireless and wired)
- Production of ICT
- Consumer devices (TV, computers, mobile phones)
- Data centers



Sources: Andrae and Edler, AlixPartners Analysis

# What does this mean?

There is no silver bullet for addressing the climate change challenges. While we can envision a world powered with renewables, the supply shocks and price spikes that the world witnessed in 2021 show that we need a practical path to making that transition, particularly as we dramatically increase our demands on energy generation and the grid.

Migration from fossil fuels will require patience, discernment, and willingness to effectively navigate the economic consequences, geopolitical threats, energy availability, and tradeoffs for driving decarbonization responsibly and comprehensively.

By focusing on capital-intensive, lower-labor effected, and high carbon-generating sectors, companies and governments can deploy solutions in a disproportionately meaningful way. Specific areas where these impacts will have the most impact include power generation, refining, petrochemicals, fertilizers, mining, and steel—and we should expect profound changes.

For example, Occidental Petroleum Corporation, one of the largest oil producers in the U.S., is making ambitious moves to launch carbon capture technologies as a way to offset the carbon resulting from its core business.

Similarly, existing emissions can be offset by replacing older direct combustion with more efficient combined-cycle plants, producing more power with less carbon.

Individuals also play a role, making personal choices to lower their own footprint. Most common options include installing home solar and smart meters, buying EVs, moving closer to work to lower commutes, and using mass transit.

Nearly \$90 billion was invested directly into green technology in 2021—the rate at which investments are increasing is only accelerating. While not all of this will bear fruit, some of it we should fully expect to see decreases in pricing and increases in the adoption of existing technologies—like renewables, batteries, and EVs—as they evolve and gain scale, as well as the emergence of a raft of new technologies. Every large beverage manufacturer, for example, has made a pledge to move into recyclable bottles by mid-decade. We should expect lots of innovation around packaging, recycling, and waste management.

Importantly, many of these innovations will likely represent a convergence with other multiple forces—for example, supply chains are increasingly green, digitally enabled, less labor-intensive, and more productive.

We also should see meaningful investments in adaptation, as builders invest in storm-resistant materials and governments make investments to harden infrastructure. For example, Maersk, the global shipping giant, is now making investments to solidify its port infrastructure against rising sea levels. Similarly, insurers are scrambling to reinvent products and offerings in the face of growing risk from extreme weather disasters.

For the last three decades, pundits have predicted the rise of the green economy. Yet, most technologies were still emergent and not cost-effective, and there was lacking regulatory or customer will to drive the change. That has markedly changed. Executives should fully expect the 2020s to be the beginning of the crossover to the green economy.

For more of our insights on this topic, read [“A realistic roadmap to decarbonization.”](#)

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# TAKE CONTROL

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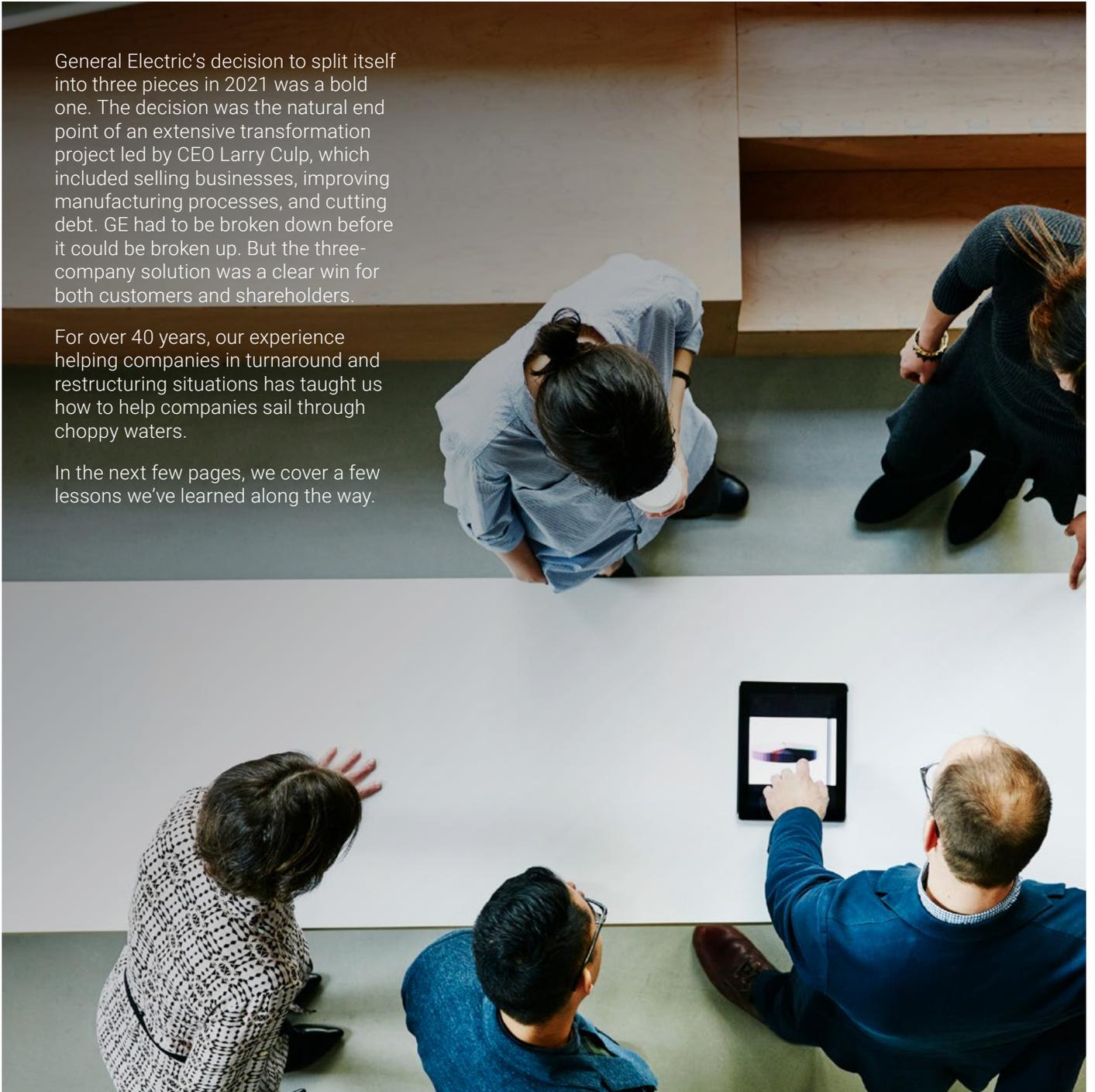
## Take Control

The pace at which disruptive forces impact businesses today means leaders can no longer “wait and see.” The best-performing companies disrupt and reinvent themselves on a continual and ongoing basis.

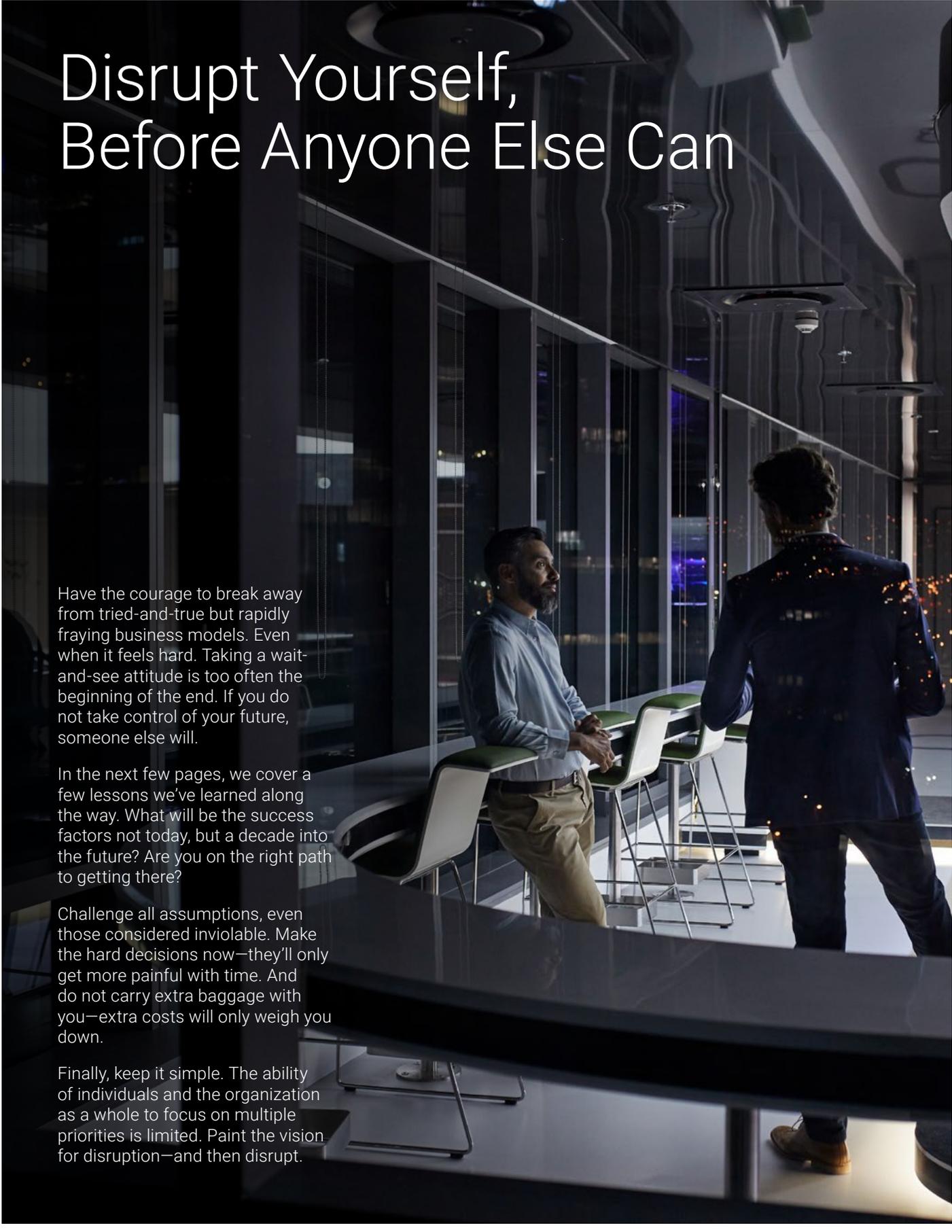
General Electric’s decision to split itself into three pieces in 2021 was a bold one. The decision was the natural end point of an extensive transformation project led by CEO Larry Culp, which included selling businesses, improving manufacturing processes, and cutting debt. GE had to be broken down before it could be broken up. But the three-company solution was a clear win for both customers and shareholders.

For over 40 years, our experience helping companies in turnaround and restructuring situations has taught us how to help companies sail through choppy waters.

In the next few pages, we cover a few lessons we’ve learned along the way.



# Disrupt Yourself, Before Anyone Else Can



Have the courage to break away from tried-and-true but rapidly fraying business models. Even when it feels hard. Taking a wait-and-see attitude is too often the beginning of the end. If you do not take control of your future, someone else will.

In the next few pages, we cover a few lessons we've learned along the way. What will be the success factors not today, but a decade into the future? Are you on the right path to getting there?

Challenge all assumptions, even those considered inviolable. Make the hard decisions now—they'll only get more painful with time. And do not carry extra baggage with you—extra costs will only weigh you down.

Finally, keep it simple. The ability of individuals and the organization as a whole to focus on multiple priorities is limited. Paint the vision for disruption—and then disrupt.

# Accelerate Your Digital Metabolism

Digital is not something you do. It must be who you are.

Digital capability will soon underpin every successful company everywhere. Like cell respiration for biological organisms, digital must become part of a company's metabolism. It needs to be not something that exists in a single department or outside of the core organization, but rather the lifeblood of the organization—and everyone's responsibility.

Importantly, yesterday's IT is not today's digital. Cloud technologies and SaaS subscription platforms make digital easier than it's ever been before.

Focus on the business problem, not the technology. What is it you're trying to solve? Is it lack of visibility on demand? Is it disruptions to the supply chain? By focusing on the business problem, you can then determine the exact technological support you need and build a program that is

manageable and scalable with measurable ROI.

Use your data well. All too many companies are rich in data but poor in insights. The focus must be on zeroing in on usable insights that prioritize the customer and anticipate future needs. This means investing in predictive modeling, AI, and customer insights.

Finally, most senior executives must increase their digital IQ and ensure that they have leaders who can supplement digital skills and understanding. Bridging the digital divide is a gaping challenge for many leaders, yet critical to address head on.

# Create the Workforce of Tomorrow, Today

Don't let inertia drive your talent strategy. The organization you have today will not likely carry you where you need to go perpetually—and you can't ask it to.

Begin to build the workforce you need versus the one you have. And think broadly across all areas of your workforce—not just senior executives or elite talent, but all talent. Source diverse capabilities from atypical places and train for the skills you need. Many jobs that need to be done aren't jobs that have ever been done before, so you can't always expect to find experienced workers to fill the roles.

Be creative. OneTen, for example, is a coalition of 50 of the largest U.S. employers working to substantially increase hiring of Black workers. It identifies likely areas of significant labor market demand such as in advanced manufacturing—to map gaps in the U.S. labor supply. By investing in skill development with a historically neglected talent pool,

OneTen solves two problems at once, providing well-paid job opportunities to an underserved population and helping solve major supply constraints in the overall labor market.

Leverage technology as a collaborator with talent, not a replacement for it. Future employees will need to be increasingly digital. Give them the tools and training to make it so.

Your workforce is your biggest asset. Investing in making it thrive will help create the energy you need to press through the disruption.

# Prioritize Pace Over Perfection



It's impossible to overestimate the importance of execution. Take an action mindset. Plan less and do more. Finally, maintain pace over perfection.

A decent plan to respond to disruption that is implemented with speed and rigor will always outperform a perfect plan executed poorly. Iterate and evolve your plans as you gain experience and knowledge. If something's not working, ask why. Then address the issues and reorient.

Keep focused. Tackle the tasks that will get you to the end goal and minimize distractions. Do not wait to make decisions. Low-hanging fruit can provide momentum—and dollar resources—for longer-term transformation.

Start small. Experiment. But be prepared to scale fast.

Don't underestimate the importance of a clearly communicated vision. Repeat it often. Using communication effectively is a crucial skill needed for leadership, cultural change, and confronting disruption. Compelling communication that really connects with employees can be an effective antidote to the confusing forces of disruption and change.

The entire organization needs to believe in the change you're undertaking and where you're taking them to. Your team needs to understand that benefits will accrue, collectively and for individuals, over time.

Be compassionate but candid. Communicate the truth, even if doing so results in difficult discussions. Delaying those hard conversations is human nature, but rest assured they can create significant obstacles to implementing needed reform.

Leadership, by definition, requires followers. If you're not bringing others along on your journey—inspiring and guiding them—then any transformation is doomed to fail.

The 2020s are a decade filled with promise—but that promise is the disruption. The winners of disruptions will be the disruptors.

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# Become the Transformative Leader Your Organization Needs

## Effectively responding to the challenges from disruption requires two things:

superb leadership and a nourishing culture. The latter, of course, derives from the former. But what are the leadership capabilities that are required to transform an organization to successfully confront disruption?

Three skills are essential: resilience, adaptability, and emotional intelligence (EQ). And this must begin with CEOs—how they lead, the types of leaders that they hire and promote, and the processes and results that they reward. It must then cascade to the executive team and throughout the rest of the organization. Transformative leaders know how to catalyze profound and enduring change in those around them to confront the challenges of disruption.

Mental resilience is essential as is the ability of a person to handle adversity. Leaders must be able to deal constructively and decisively with ambiguity, uncertainty, and failure. They must have the fortitude to focus on a few key priorities, stick to them despite the many distractions that come with running a complex organization, and have the confidence and know-how to pivot when facts or circumstances change. They must bounce back and change course with optimism, knowing that others are watching closely. This requires

a mindset of clarity, equanimity, and immovable resolve in a business environment that is constantly in flux.

Two years of the global pandemic have tested our collective resilience. Lockdowns, new ways of working, health and safety concerns, shifting consumer demand and channels, and dislocated supply chains have become the daily reality for business leaders around the world. Our survey this year shows that those companies that tackled these problems head on and embraced the challenges as an opportunity performed better than those that saw disruption only as a threat.

Adaptability in thinking must be demonstrated, promoted, and rewarded from the top of the organization and in its organization's culture. Changed or changing situations require changes in behavior. An adaptable leader has a clear understanding of and alignment with organizational goals and possesses the flexibility to adjust the strategy to achieve those goals. A learning mindset and a long-term perspective are essential.

Linear solutions cannot solve complex problems. Businesses need leaders who promote collaboration in fluid and nonhierarchical environments and who demonstrate a growth mindset. Adaptable leaders, who are intent on learning quickly, change to meet the needs of a rapidly evolving and disruptive environment. Linear thinking on the other hand, which does not take into account changing dynamics and whole system solutions, can create new problems with unintended consequences.

EQ is a skill increasingly demanded of leaders but still in short supply. We have long known the skills that get leaders to the top jobs are not necessarily the ones that make them good leaders. The emotionally intelligent leader is self-aware and has a clear understanding of their own strengths and, more importantly, their weaknesses.

The ability to comprehend and control personal emotions while understanding and managing others is perhaps the most important skill in managing an organization. As the variety of stakeholders expands, along with their expectations from leaders, EQ has become an even more essential leadership skill.

Truly transformative leaders are at the center of the Venn diagram of resilience, adaptability, and EQ. Transformative leaders are authentic, meaning they live in alignment with their values, mission, and purpose, and inspire others to do the same. Transformative leaders are best suited to deal with disruption because they simultaneously serve as strong role models and culture carriers while also creating the inclusive environments employees demand. The best leaders communicate clearly, consistently, and frequently. They are role models and cultural change agents who create organizations that are able to attract and retain the very best talent.

Disruption demands leaders who can display all these skills, lead their organizations in meeting the challenges of disruption, and create the vision for a brighter and more sustainable future.

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# INDUSTRY BRIEFS

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# Aerospace & Defense (A&D)

The fortunes of the civilian and national-security sides of the A&D industry seldom move in tandem, but the divide between the two has grown especially stark since the onset of the pandemic in the first quarter of 2020. Commercial air travel, which slowed nearly to a halt in 2020, recovered only fitfully in 2021, in large part because the rapid spread of the Delta variant spiked reopening plans and discouraged discretionary travel. The highly transmissible Omicron variant of the virus, first observed in late November 2021, could further depress passenger loads in 2022.

Although commercial air travel increased by more than 50% in 2021 and demand for midsize and small aircraft has strengthened, passenger traffic is still down about 40% from pre pandemic levels and is likely to remain comparatively depressed as business travel remains subdued. The commercial segment of the industry is also wrestling with recurring labor shortages as both in-flight and ground-based workers seek alternative employment, to find relief from low pay, tough working conditions and “air rage” incidents; the U.S. Department of Justice recently announced it would aggressively prosecute flyers accused of in-flight violence.

In contrast to the upheaval on the civil aviation side of the industry, the defense sector has proceeded on a steady upward course. National governments have maintained or even increased their national security budgets in response to terrorist threats and increasing international tensions. France, Germany, and the U.K. have boosted their defense budgets amid continuing friction with Russia. Meanwhile Asian countries,

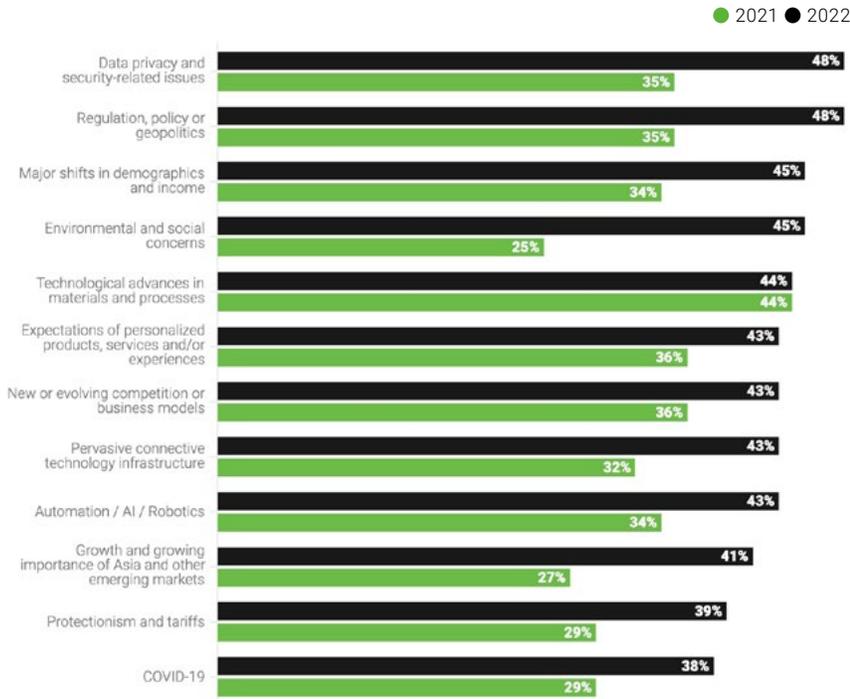
led by Japan, have increased spending and their focus on improving their intelligence and cyber capabilities to counter China’s increasingly assertive foreign policy. The U.S., eyeing potential threats from both China and Russia, has increased its spending as well. Meanwhile, the growing militarization of space, the ongoing pivot toward more digitalized operations, the evolution of advanced air mobility technology, and the trend toward decarbonization of propulsion systems offer ample opportunity for the innovations that will power the industry’s long-term growth.

Long-lasting disruptions of the supply chains for both civilian and military aircraft and services, however, could put a damper on both growth and profitability. The U.S., for one, has dedicated government resources to adding resilience to the supply chain, as well as deploying analytics to anticipate shortages and disruptions and to develop timely alternative supply sources. Many industry players are exploring investments in near-shoring or onshoring crucial links in the supply chain, while the industry’s

push for greater interoperability of components and systems reflects in part strategic decisions to rationalize supply networks.

Even as A&D companies adjust to new economic fundamentals, they are stepping up deal activity. The \$61 billion in deals completed during the first three quarters of 2021 dwarf 2020’s total deal volume of \$22 billion, and M&A activity appears poised to remain strong in 2022. While large, financially robust A&D players will likely pursue deals to drive growth, other companies will seek tie-ups to fill technological or capability gaps, rationalize supply chains, and respond to changes in the geopolitical and regulatory environment. Private-equity investors and special-purpose acquisition companies, in particular, appear strongly drawn to targets with proprietary technology, expertise in advanced air mobility such as hypersonic flight and unmanned aircraft, or capabilities needed for commercial space flight, including space tourism.

**IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: AEROSPACE & DEFENSE**  
 (Showing percentage selected Very/Extremely Impacted)



Q4. (Tracking) How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=297 / 2021 n=394]

Q2. (Tracking) Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=297 / 2021 n=394]

Aerospace industry subsectors report high disruption, but fewer anticipate increased frequency.



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# Automotive

Any hopes that the automotive industry would return to normal—whatever “normal” means these days—in 2021 were dashed almost as soon as the new year arrived. The microchip shortages that stalled manufacturers’ restarts after the COVID-19 pandemic’s first, chaotic wave in 2020 continued to plague the industry in 2021, costing OEMs an estimated \$200 million in lost revenue. Shipping bottlenecks, container chaos, and shortages of key inputs such as magnesium and butadiene contributed to a production shortfall of some 7.7 million units.

Manufacturers of electric vehicles (EVs) struggled with supply problems of their own, namely tight stocks of the lithium and cobalt needed for automotive batteries. And labor shortages across the industry—from warehouses to assembly lines to, crucially, supply-chain departments—crimped production, extended delivery times, and increased costs. The burden landed especially hard on automotive suppliers, many of whose contracts with OEMs contained no provisions for sharing or passing along higher costs.

Yet despite the seemingly endless obstacles to full recovery, the automotive industry staged an impressive bounce-back in 2021, with margins expanding sharply from 2020’s depressed levels. China and the U.S., the world’s largest auto markets, led the industry’s recovery, as sales in both countries returned to pre

pandemic levels. The rest of the world is recovering at a somewhat slower pace, with the Middle East and Eastern Europe on course to fully emerge from their troughs in 2022. Western Europe and Latin America may not match 2019’s sales numbers until 2023, and the comeback could be further delayed by efforts to contain the Omicron variant that emerged late in 2021.

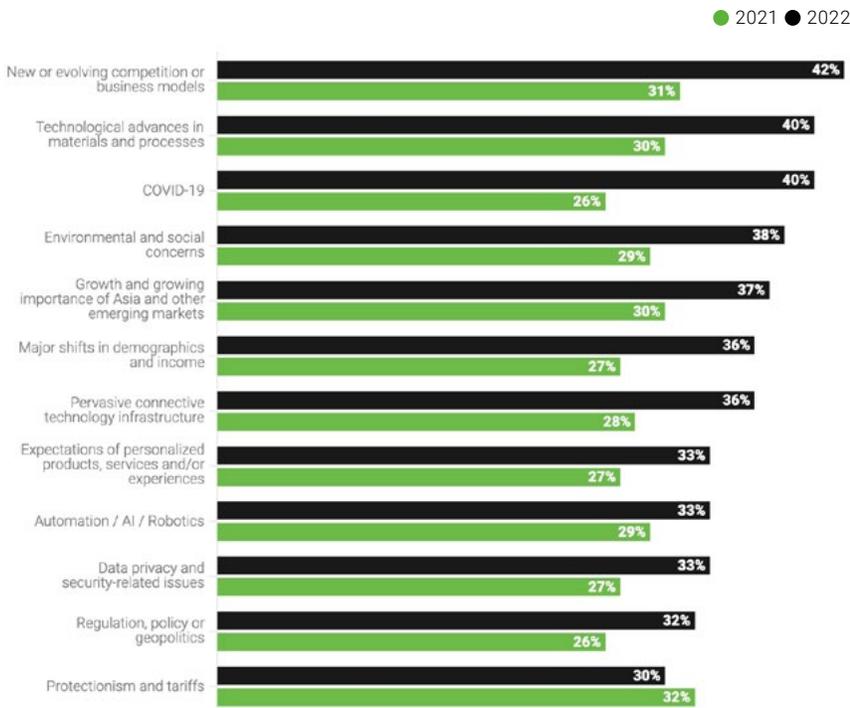
If current trends hold, EVs will remain the industry’s star performer. The category was the clear sales-growth winner in China and Europe, where adoption rates are highest, while U.S. EV sales made strong gains that seem likely to persist, albeit at a slowing rate, in 2022.

Active government intervention will continue to be a key driver of EV sales, as more stringent emissions standards and government-led investment programs nudge both

drivers and manufacturers toward adoption. Higher sticker prices for both conventional and electric vehicles, however, may restrain sales growth, in addition to concerns in many territories regarding the robustness of charging infrastructures. OEMs and suppliers will face crucial decisions about whether to go all-in on EV production or shift a significant share of their conventional-vehicle manufacturing to developing markets, where emissions standards are not as restrictive as in the developed world.

## IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: AUTOMOTIVE

(Showing percentage selected Very/Extremely Impacted)



Q4. (Tracking) How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=294 / 2021 n=394]

Q2. (Tracking) Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=294 / 2021 n=394]

Subsectors within the automotive industry are less disrupted with some expecting increased frequency and others expecting decreased frequency.



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# Consumer Products (CP)

CP companies enjoyed a resurgence of revenues and margins in 2021, driven by two seemingly contradictory currents. On the one hand, some of the most in-demand CPs items—such as hair extensions, shapewear, and false eyelashes—reflected consumers’ urge to get out of the house after long months of isolation, dress up, and socialize. On the other, the popularity of products such as athleisure wear, hand-held vacuum cleaners, and air fryers spoke to consumers’ desire to make the best of staying safe at home. Whatever their motivation, both groups welcomed the arrival of 2021 with relief and a lengthy shopping list.

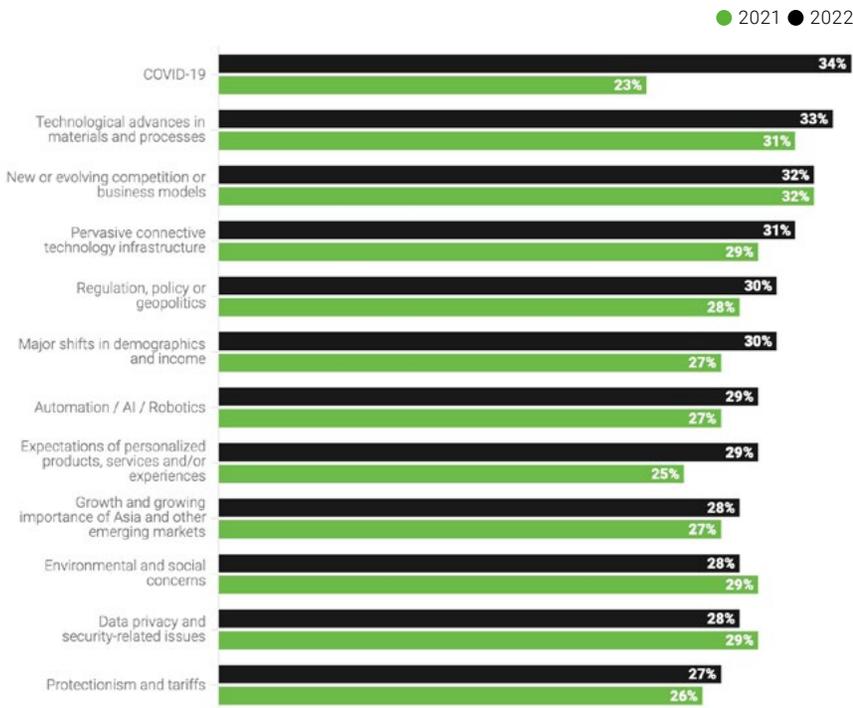
But the industry’s comeback from COVID-19 has been anything but smooth, as lagging vaccination rates, rising prices, and above all, supply-chain disruptions tested CP companies’ resilience and ingenuity. Apparel makers, for example, struggled to keep supply chains running in the face of repeated plant closings in Vietnam, a major apparel exporter whose population remains largely unvaccinated. Leisurewear powerhouses Nike and Lululemon, among others, warned investors that Vietnam’s struggles to contain the virus could crimp sales and inventories through the 2021 holiday season. In a further sign the impact the supply chain crisis’ is having on consumer-facing businesses, the U.S. Commerce Department reported that the inventory-to-sales ratios (which measure the ability of stores to keep their shelves stocked) of apparel retailers and wholesalers stood at 1.9% and 1.8% in July 2021, respectively, down sharply from the 2.4% and 2.1% figures that prevailed in the three years preceding the outbreak of the pandemic.

The crisis made itself felt in other ways as well, as supply chain disruptions and higher-trending energy prices pushed up the cost of packaging materials commonly used in the food industry. Beverage makers had to contend with surging aluminum prices driven by partial closures of smelters in China’s Xinjiang region, the source of nearly 20% of the world’s supply. By no coincidence, the number of times packaging was mentioned during U.S. earnings calls jumped from 48 in the second quarter of 2021 to 73 in the third. Food and beverage producers must also contend with limited cold-storage warehouse capacity, which they rely on to meet consumer demand for fresh products. Even as consumer goods companies work to diversify their suppliers and shorten supply chains, such constraints may continue to challenge them for months or years to come.

As ever, fickle consumers continue to confound the best-laid plans of consumer goods companies. Consider sweatpants, which media outlets such as The New York

Times Magazine and GQ confidently proclaimed would remain fashion mainstays long after the pandemic had passed. As evidence, they presented Entireworld, a maker of color-drenched sweatpants whose sales jumped an astonishing 662% in March 2020. Instead of building on that success, however, Entireworld closed its doors in October 2021, citing drastically curtailed demand. The apparel maker’s story can serve as a timely reminder that whatever else is going on in the consumer goods business, the consumer remains in charge<sup>17</sup>.

**IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: CONSUMER PRODUCTS**  
 (Showing percentage selected Very/Extremely Impacted)



Q4. (Tracking) How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=298 / 2021 n=394]

Q2. (Tracking) Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=298 / 2021 n=394]

Consumer products subsectors report less disruption and overall anticipate rates of disruption will decrease.



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# Energy & Power

The energy and power economic sector endured a tumultuous year in 2021, buffeted by shortages of engineering talent, sporadic shortages of materials and components, and production constraints brought on by years of underinvestment in extraction infrastructure. But for all of the year's upheaval, energy executives may one day look back on 2021 as the calm before the storm. The new year will likely usher in an era of profound disruption for the sector as governments and investors press ever harder for a turn away from fossil fuels and as the transition to more sustainable forms of energy begins in earnest. Talent shortages will help drive the transition as the cohort of oil and gas engineers ages out and younger engineers shun fossil fuels in favor of work in the renewables subsector.

The fundamentals of the energy and power industry improved markedly in 2021, with every source of energy, from hydrocarbons to nuclear, experiencing increases in consumption as economies around the globe reversed the declines of 2020. Prices strengthened throughout the year as demand ramped up, and Europe, in particular, focused on rebuilding natural gas supplies. The power-generation sector was the source of much of the demand as governments and industries embarked on projects to electrify more of the world's economy. Supply bottlenecks also added upward pressure on prices.

Supply constraints were especially apparent in the solar sector, with progress on build-outs of solar capacity slowed by shortages of polysilicon, the main input for

solar cell production, and sharply higher shipping costs from China, where most solar-energy panels are manufactured. As a result, more than half of all utility-scale solar projects for 2022, by one estimate, have been delayed or canceled. The slowdown in solar, in combination with the ongoing wave of divestment from coal mining and oil and gas exploration, will keep energy supplies tight and prices high for at least the next year.

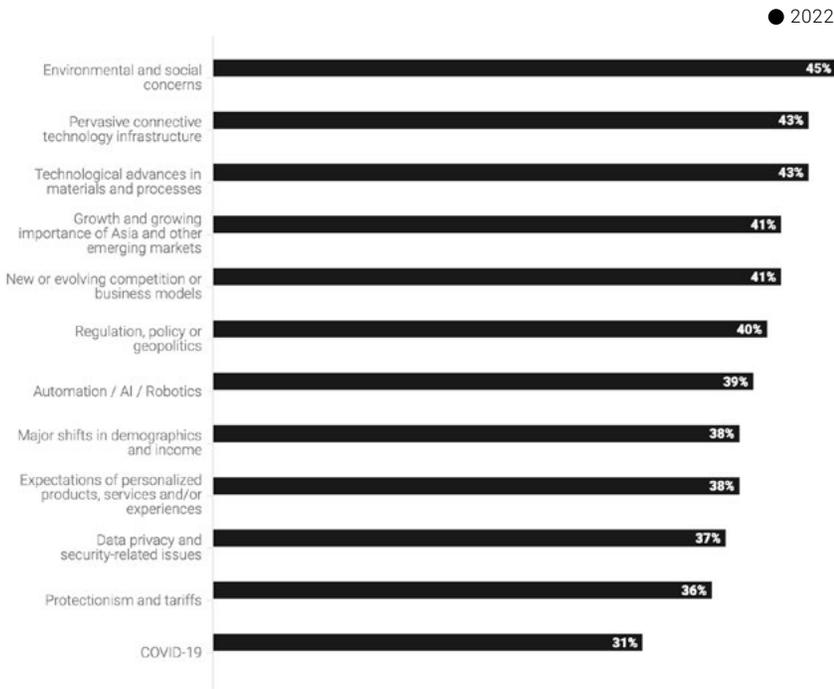
Financing for fossil-fuel projects may grow even harder to come by as green investors focus their investments on renewables and energy-saving technology. The COP26 agreement to reduce emissions, although voluntary and without enforcement mechanisms, will further discourage oil exploration and production, as will a non binding agreement among 20

nations, including Canada and the U.S., to cut off investment in foreign oil and gas projects by the end of 2022.

Oil and gas producers are now confronted with a strategic choice that is existential in its dimensions. They can pull out of ongoing oil and gas projects around the world to pursue investments in the energy transition, at the risk of stranding trillions of dollars in assets. Or they can redouble their fossil-fuel extraction efforts while prices remain firm and use the proceeds to finance investments in green (or at least greener) fuels. Though far from a clear-cut choice, energy majors in particular can expect continued pressure to divest from their investors.

**IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: ENERGY & POWER GENERATION\***

(Showing percentage selected Very/Extremely Impacted)

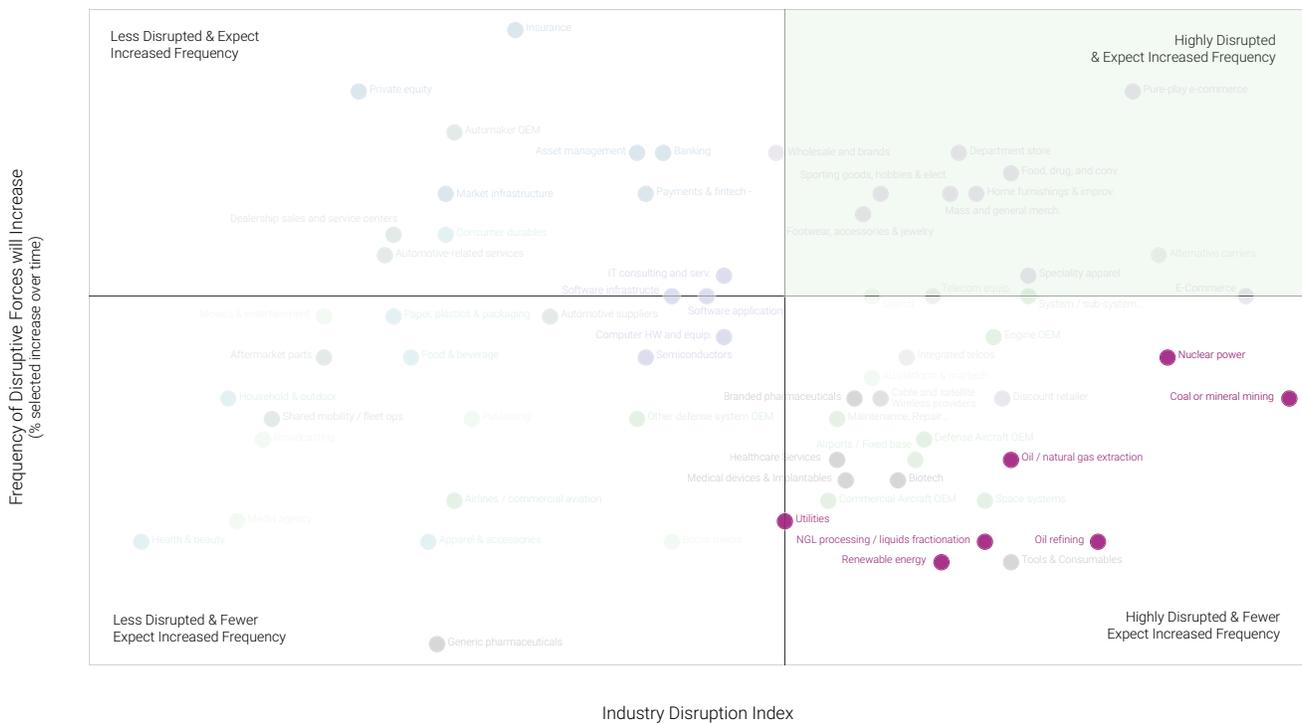


\* NOTE: Energy & Power Generation was not included in previous ADI 2021 research.

Q4. How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=295]

Q2. Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=295]

Though energy & power generation subsectors are experiencing high disruption, few expect increased frequency.



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# Financial Services

A robust economic rebound, strong consumer spending, and buoyant equity markets helped financial services firms report strong corporate earnings through the second year of the global pandemic. Banks and consumer finance firms were able to reverse some of the reserves that were taken in 2020 in expectation of loan losses from an extended global recession. And an aging global population continues to save for retirement, supporting growth in deposits and assets under management.

But a backdrop of higher inflation and rising interest rates are just two concerns keeping finance executives up at night. In our survey this year, 81% of finance executives are concerned about the impact labor shortages are having on their business (compared to an industry average of 53%).

In response, many firms are increasing compensation to retain their most in-demand employees. JPMorgan, the largest U.S. bank by market cap, reported record profits in 2021, but also an 11% increase in operating expenses, which it attributed to the need to pay workers more. Across much of Wall Street, junior staff received record pay increases last year, while Goldman Sachs announced a special \$1 million payment to its partners.

And while rising interest rates may impact some companies' earnings in the short-term, higher interest rates and a more sloping yield curve

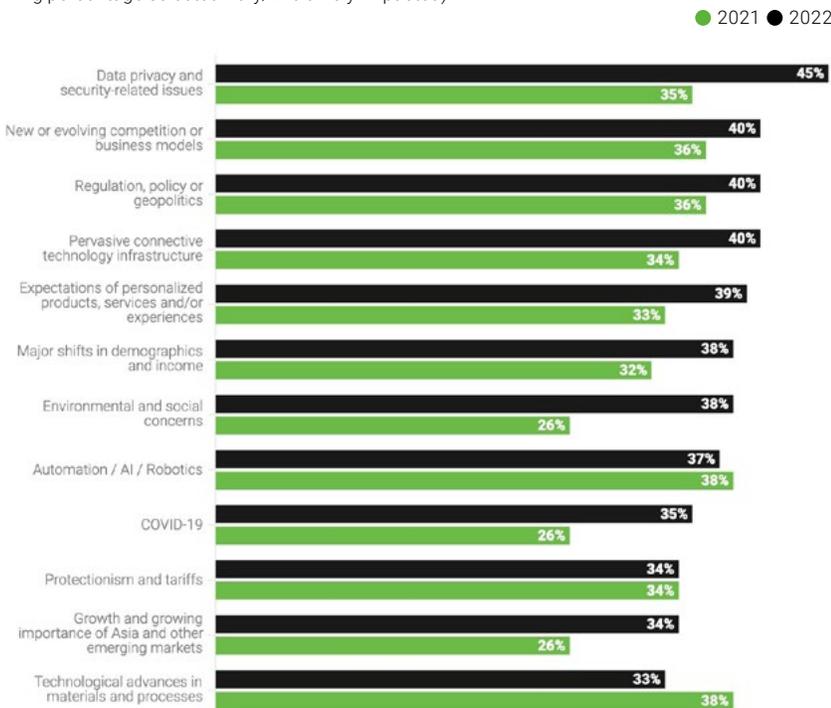
will help profitability in the longer term. Perpetually low interest rates have compressed margins for many firms with large consumer banking footprints. As a result, the prospect of monetary tightening over the course of 2022 will likely prove a net positive for many institutions.

ESG priorities are increasingly taking center stage, and the business case supporting these priorities is being articulated more forcefully. As Larry Fink, CEO of Blackrock, stated in his annual letter to CEOs, "We focus on sustainability not because we're environmentalists, but because we are capitalists and fiduciaries to our clients." At COP26, investors managing \$130 trillion promised not to invest in companies that undermine emissions goals. In 2022, the European Union will begin requiring fund managers to increase disclosures about their own and their portfolio companies' practices.

Finally, perhaps no new disruptive technology has gotten more attention over the past year than digital currencies. Those of the crypto variety continued to capture the imagination of retail investors, while the People's Bank of China plans to be the first major central bank to introduce its own digital currency in 2022. While it may take longer than some may expect, the future of money, like so much else in our lives, is digital, and financial institutions are preparing for that reality.

## IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: FINANCIAL SERVICES

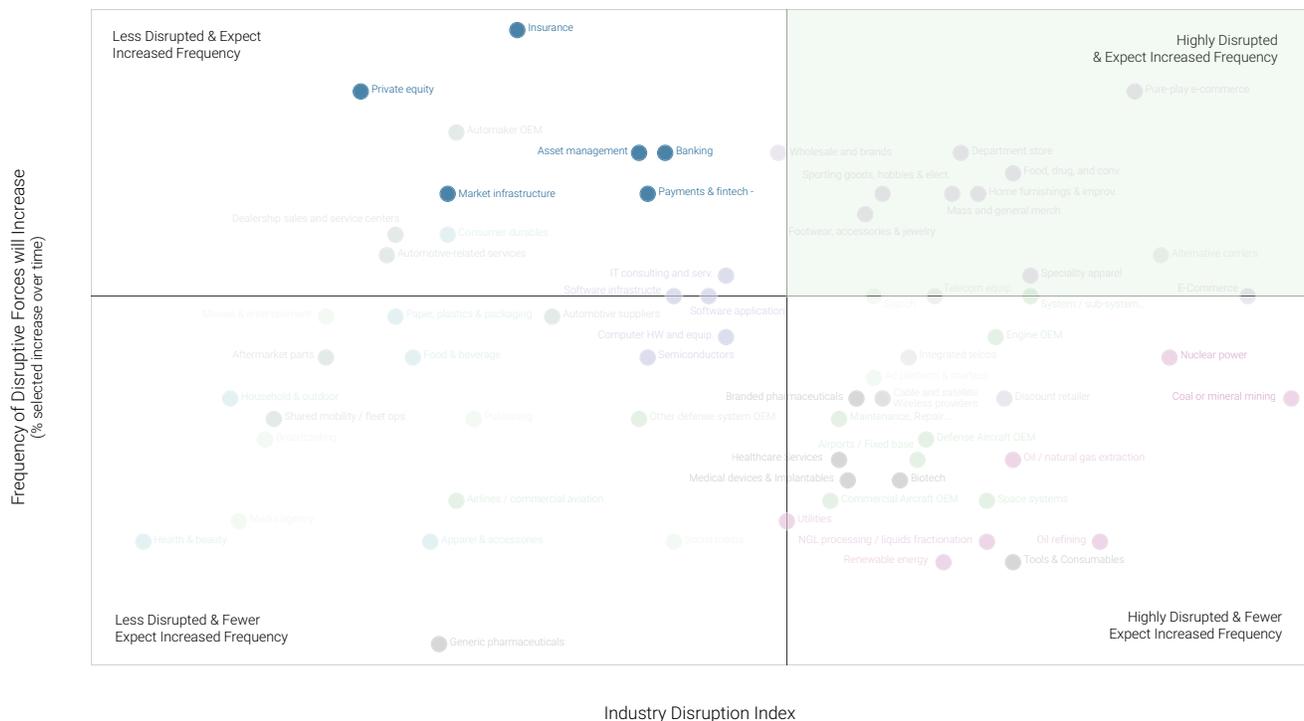
(Showing percentage selected Very/Extremely Impacted)



Q4. (Tracking) How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=312 / 2021 n=394]

Q2. (Tracking) Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=312 / 2021 n=394]

Financial services subsectors are less disrupted but anticipate increased frequency of disruptive forces.



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# Healthcare & Life Sciences

Although it sometimes seems that the healthcare and life sciences sector of the economy is solely focused on COVID-19, the industry in fact has a broader agenda that will likely claim increasing amounts of its energy and attention in 2022. Although much of the industry will pursue vaccination efforts, especially in Africa where vaccination rates are low and vaccine production facilities scarce, the sector will also tackle the backlog of non-COVID-related medical care, such as the millions of joint and spinal surgeries that were deferred during much of 2020 and 2021.

The backlog will strain healthcare resources and budgets, which are already coming under pressure from governments beginning to reckon the costs of the pandemic. Funding could in some cases fall victim to austerity policies. The financial burdens will likely exacerbate the difficulty many healthcare systems face to attract sufficient hospital and pharmacy staff. Many countries, including the U.S. and U.K., are already struggling with shortages of primary care doctors numbering in the tens of thousands.

The supply chain crisis has not spared the healthcare sector. Energy shortages in China have crimped production of ingredients essential to many pharmaceuticals, foil packaging has been subject to temporary scarcities, and container shortages

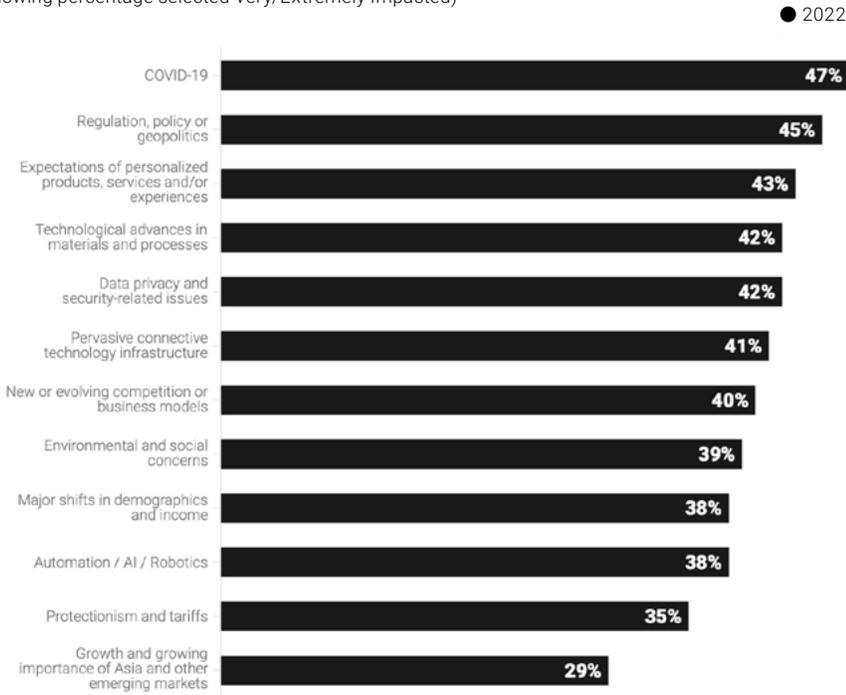
and shipping bottlenecks have led to shortfalls of supplies ranging from hypodermics and surgical masks to advanced medical devices. Efforts are under way in the U.S. and Western Europe to shorten supply chains and repatriate the production of essential inputs, but the process will take years to play out.

Meanwhile, the science of medicine continues to advance. The healthcare sector has stepped up investment and developed expertise in AI and machine learning to process the masses of medical data generated every day. The resulting intelligence is employed to develop personalized therapies for diseases such as cancer as well as precisely targeted pharmaceuticals. But progress could be slowed as governments develop new rules

governing the use of AI. Elsewhere, the successful development of COVID vaccines employing mRNA technology has spurred researchers to train the technology on other virulent diseases such as rabies and Zika, as well as certain cancers and AIDS. The technology also offers the promise of preventive treatments for neurological conditions and strokes.

**IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: HEALTHCARE & LIFE SCIENCES\*<sup>S</sup>**

(Showing percentage selected Very/Extremely Impacted)



\* NOTE: Healthcare & Life Sciences was not included in previous ADI 2021 research.

Q4. How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=294]

Q2. Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=294]

Healthcare subsectors are highly disrupted and expect an even greater frequency of disruption.



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# Media & Entertainment

Media and entertainment companies emerged in 2021 as one of the pandemic's big winners as consumers enthusiastically signed on to various streaming services to keep themselves entertained during lockdown. The industry's next challenge is to retain all those new customers, many of whom are totting up the cost of their various media and streaming subscriptions and canceling those that fall short of their expectations. That trend places on media and entertainment providers the dual burdens of developing both marquee content that wins new subscribers and more modest offerings that persuade new customers to renew.

In addition to offering new content, media and entertainment companies are also experimenting with tiered pricing (including free or low-cost ad-supported streaming), bundled content, and expanded service offerings, such as gaming, music, and podcast subscriptions. As the lines dividing content distribution from content production continue to blur, prospects grow for increased merger activity and cooperative arrangements among players on both sides of the content-delivery divide.

These companies are stepping up their emphasis on gathering subscriber data to help them decide what content to invest in, how to price it, and how and when to recommend it to potential viewers. The data also serves as raw material for platforms

and advertisers to devise compelling and relevant messages that have a chance to cut through the clutter and persuade viewers to continue watching an ad rather than click past. But even without the support of such advertising, U.S. broadcasters, at least, can expect a reasonably prosperous 2022, thanks to an upsurge in political advertising keyed to the 2022 congressional elections and a spate of advertising from sports gambling companies looking to make a name for themselves among the betting public.

Content producers were challenged coming into 2022 as Omicron forced cancellations or postponements of planned shoots. The possibility of new variants could spur more development of documentary content that repurposes or reedits preexisting

film and video recordings. Always attuned to creating content that is more of a "sure thing," producers may be encouraged on this course by the success of director Peter Jackson's eight-hour documentary chronicling the Beatles' sessions for the "Get Back" album. Rather than requiring new shoots, the production sent Jackson and his team back into the edit suite to recut hundreds of hours of contemporaneous footage. The result is a reminder that everything old, in the right hands, can be new again.



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# Retail

New coronavirus variants. Labor shortages. Inflation. Stock-outs and delayed deliveries. Slipping consumer confidence. None of those factors, singly or in combination, deterred U.S. consumers from their appointed rounds of malls, stores, and online shopping platforms in 2021. Despite the tests and obstacles that the year threw before U.S. shoppers, retail sales (excluding gas stations, auto dealerships, and restaurants) appear headed for a banner 2021, with total sales clocking in at an estimated \$4.4 trillion, up more than 10% over 2020's less-than-typical results<sup>18</sup>. Global retail is poised to reverse 2020's 6% plunge and grow an estimated 7%, to \$31 trillion, powered by brisk trade in Asia, especially India, Japan, and China. Asia is also emerging as a hub of innovation in store concepts and experience design<sup>19</sup>.

As in 2020, e-commerce continued to claim a growing share of all sales in 2021, although its growth rate moderated from the prior year's torrid pace as shoppers returned to physical stores. Meanwhile, those unable or unwilling to visit physical stores found many of their favorite retailers leveraging technology to deliver experiences designed to replicate in-store shopping as closely as possible. Livestreaming emerged as one popular alternative—cosmetics power Estée Lauder, for example, hosted more than a million virtual try-on sessions, while other retailers livestreamed fashion shows, cooking demonstrations, and other events<sup>20</sup>.

Social commerce—shoppable posts on platforms such as Instagram and TikTok that enable in-app purchases without the need to click over to a website—came into its own in 2021, especially among younger consumers. The trend appears likely to outlast the

pandemic, with one estimate calling for the worldwide market to grow at a 31% CAGR to \$2 trillion through 2024<sup>21</sup>.

Whatever their chosen channel, however, shoppers will likely encounter occasional frustration and delays as the supply chain crisis leads to stock-outs or extended delivery times for popular items. Retailers may have unwittingly aggravated the crisis in the third quarter of 2021 by over-ordering or prematurely ordering goods they expect to sell well during the holiday season. The actions of individual retailers summed up to a sudden, massive surge in demand—the “bullwhip effect”—that traveled back upstream and stressed already overburdened supply lines.

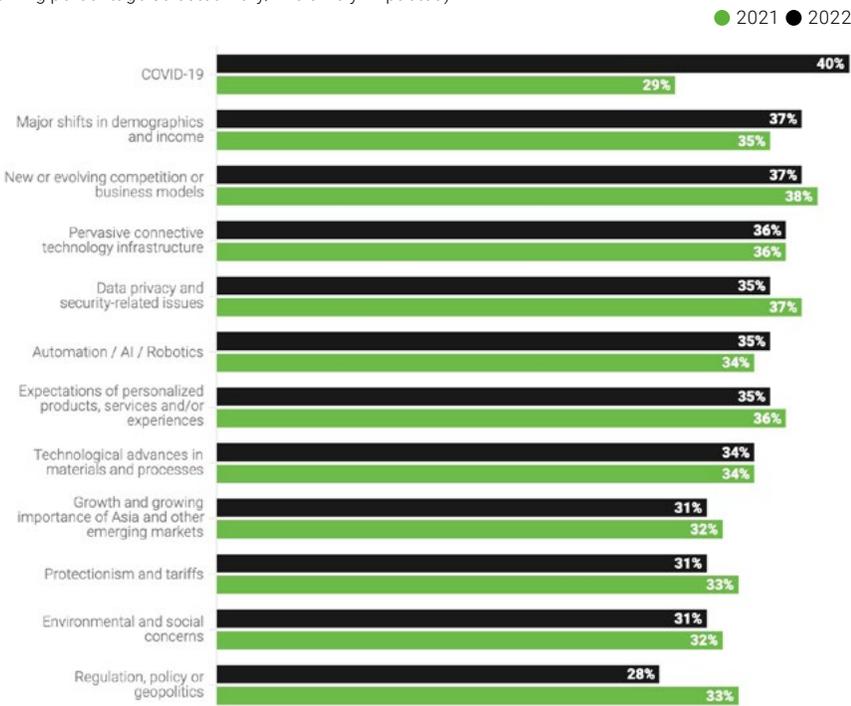
Shoppers' patience may also be tried by an acute shortage of retail workers. The shortage has multiple drivers: fear of contracting COVID-19, a dearth of childcare options, dissatisfaction

with low pay and poor working conditions, expanded unemployment and underemployment benefits, and more. Responses by retailers have varied widely. Some have opted to raise wages and benefits or offer hiring or tenure-based bonuses, while others have pressed management into shift work. Still others are simply opting to ride out the storm and wait for the labor market to stabilize. They may be in for a long wait, as the labor market seems poised for a long-term reset to a higher base level, especially at the lower end of the pay scale.

While some retailers will likely absorb the higher costs in the short term, often by cutting back on holiday promotions, most will pass on a share of their higher wage bill to consumers, if they haven't already.

## IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: RETAIL

(Showing percentage selected Very/Extremely Impacted)



Q4. (Tracking) How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=302 / 2021 n=394]

Q2. (Tracking) Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=302 / 2021 n=394]

Retail subsectors are the most highly disrupted and anticipate the frequency of disruptive forces to continue climbing.



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# Technology

For an industry notable for the optimism of its senior leaders, the technology sector sure has a long list of worries. In this year's survey, 98% of tech executives say their business models must change in the next three years, and 60% are worried their company is not adapting fast enough to stay ahead of disruption. Sizable majorities cited the prospect of talent scarcities and increased regulatory scrutiny as potential trouble spots. And like nearly every industry operating today, tech companies are wrestling with higher input costs and uncertain supplies.

Nonetheless, the COVID-19 pandemic has proved a boon to much of the sector, as business customers have continued to invest in digitalizing their operations and building up the technological infrastructure needed to support remote and hybrid forms of work, while remote workers have shelled out on laptops and video equipment. Digital transformation remains a strong driver of new business, with companies of every size and in nearly all industries continuing to invest in everything from cloud storage to ERP upgrades, UI modernization, SaaS workflow tools, and big-ticket switching systems.

But filling all those orders grew tougher for tech companies in 2021 as shortages of a wide range of components and materials complicated production plans. In

addition to well-publicized shortages of microchips, tech companies struggled to source adequate supplies of passive components such as resistors and capacitors following COVID-related factory closures and fires in China. That country's policy of limiting energy consumption and intensity in parts of the country where energy use by the industrial sector is deemed too high compounded the problems. And now a looming shortage of rare earth metals, with attendant price rises, threatens production in 2022.

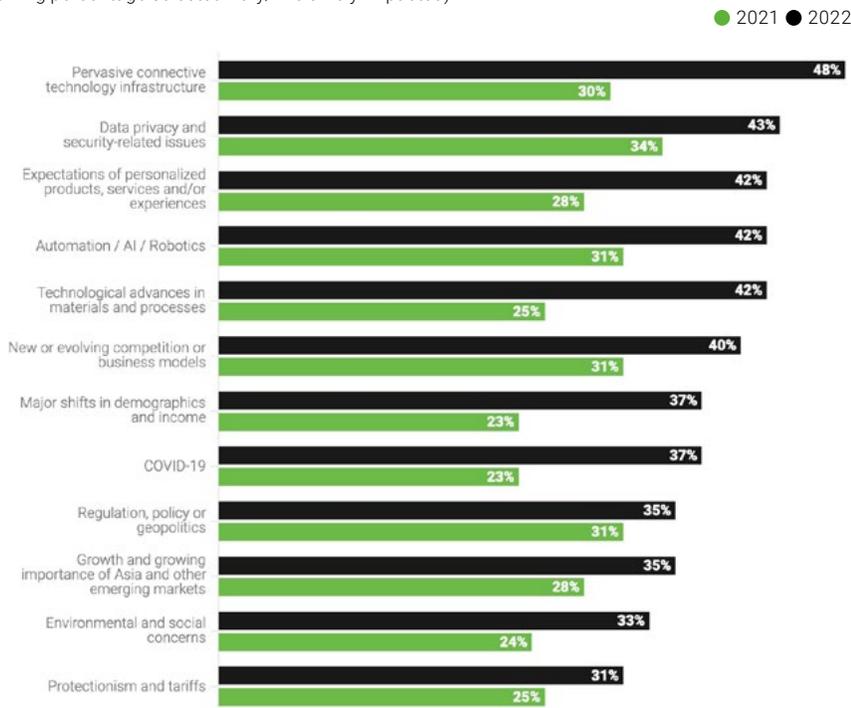
Perhaps a greater long-term concern for suppliers is the dearth of skilled electronics workers. Two-thirds of U.S.-based suppliers and a similar percentage in Europe say they're struggling to source skilled labor, and fresh travel restrictions to stem the spread of the Omicron variant of

the COVID virus add an extra layer of difficulty. Companies are addressing the problem by retraining current employees and offering higher pay, but neither is sufficient in itself to address the scarcity issue<sup>22</sup>.

Nonetheless, recognizing the long-term potential of the drive to digital, investors have poured money into the sector via venture capital and private-equity investment, as well as the proceeds from special-purpose acquisition companies (SPACs) and IPOs. M&A activity remains strong as companies seek scale, niche expertise, and proprietary technology.

## IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: TECHNOLOGY

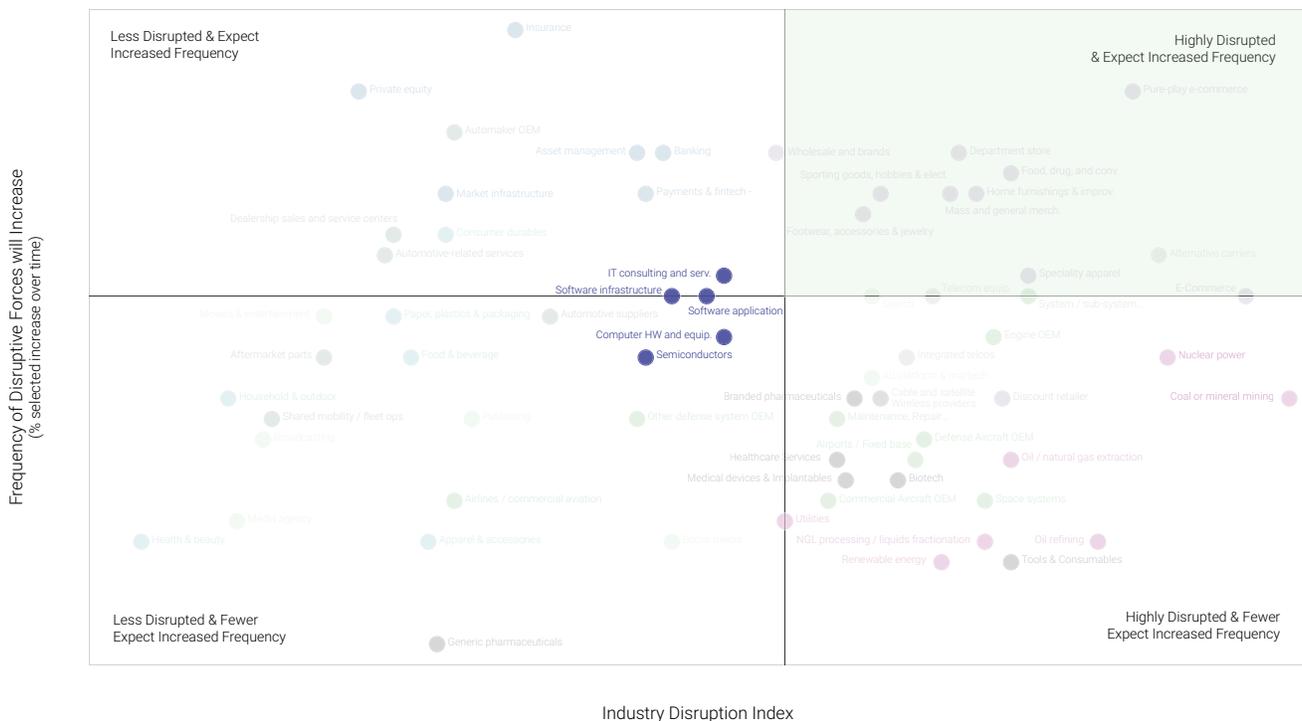
(Showing percentage selected Very/Extremely Impacted)



Q4. (Tracking) How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=309 / 2021 n=394]

Q2. (Tracking) Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=309 / 2021 n=394]

Technology subsectors are slightly less disrupted and report lower expectations of increased frequency.



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# Telecom & Cable

The telecom sector in 2021 solidified its place as the foundation of growth and resilience for industries across the economic spectrum, providing the infrastructure that enabled businesses to transition rapidly to remote work and deliver an ever-widening range of information and entertainment options to consumers stuck at home during long months of lockdown. In an unusual juxtaposition, subscriber growth stalled in 2021, reflecting the industry's high level of market penetration, while revenues from many subsectors boomed as consumers leaned ever harder on their telecom networks, especially broadband capacity, to remain connected, busy, and productive.

But 2022 presents telecom executives with a long list of agenda items. At the top of the list is the continued build-out of 5G telecommunications networks, which promise businesses and consumers faster connection speeds, higher-resolution graphics, and new industrial applications in coming years. Work on the networks will likely accelerate in 2022, following pandemic-related pauses in 2021.

Constructing the networks, however, is only half the battle. To spur adoption and cover the high costs of the build-out, telecoms must also demonstrate to customers, especially businesses, the value that 5G can deliver. That will require devising use cases that leverage 5G's capability to deliver end-to-end applications that integrate edge computing and IoT to afford business unprecedented visibility into and control over physical assets. The retail industry is one likely target of those efforts, with applications ranging from digital shelves linked to smart warehouses to dynamic pricing and contactless order fulfillment.

These necessary investments highlight a central challenge around high capital expenditures that this industry needs to sustain competitive advantage. Private equity, which has made significant investments here over the past two years, will likely see continued opportunities.

At the same time, telecoms will have to prepare to adapt to fast-changing privacy and consumer-protection rules. And like it or not, U.S. telecoms will likely have to wade into the net neutrality debate. While successive federal administrations have pursued radically different stances toward providing equal access to bandwidth, state regulators have emerged as a force for strong and relatively uniform regulation. Many telecoms are awaiting results of a federal court case that will likely determine whether states can impose their own regulations governing broadband access and affordability. More than a few would welcome oversight from states like California and New York, reasoning that while the states may propose

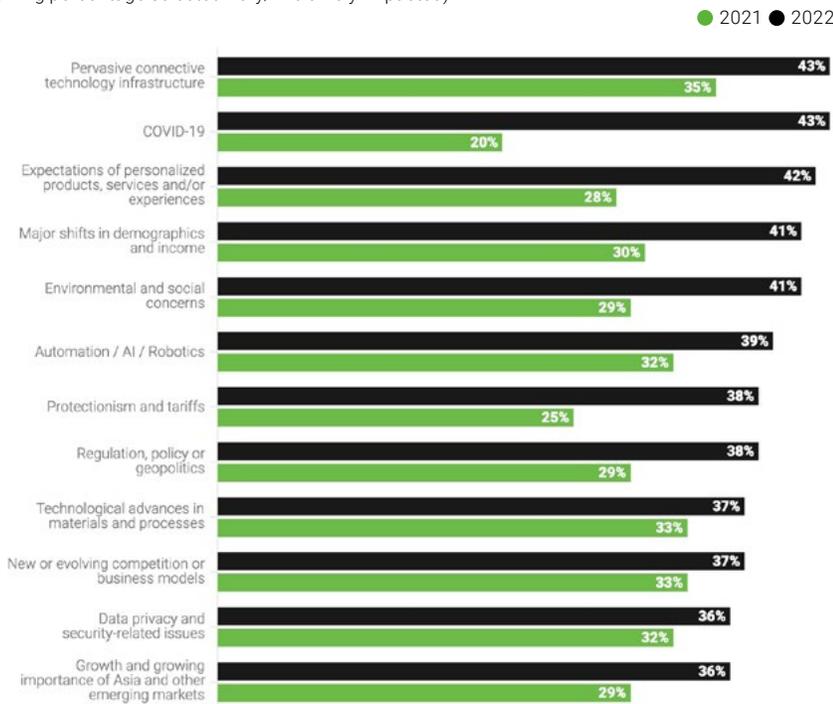
generally stricter rules than the federal government, at least the rules will be relatively consistent and stable.

All of this suggests four imperatives for success:

- 1) Radical leanness. Get rid of non-value-accretive complexity that is preventing data integration, efficiency, focus, and the funding of new investment.
- 2) Smart investments. Assess strategic options (e.g., network carveouts, sale, and lease-back of real estate and tower assets) to simplify offerings and architecture. Understand the ROI and redeploy funds more strategically to infrastructure investments.
- 3) Value-added partnerships. Focus on the size and scale versus niche platform plays.
- 4) Monetization. Integration cash flow and ROI calculations into every decision.

### IMPACT OF DISRUPTIVE FORCES ON COMPANIES, AGGREGATE: TELECOM & CABLE

(Showing percentage selected Very/Extremely Impacted)



Q4. (Tracking) How strongly has your company been impacted by each of the following disruptive forces? [Shown: % Highly Impacted (very + extremely), cross-industry disruptions] [Sample Size: 2022 n=299 / 2021 n=394]

Q2. (Tracking) Overall, how strongly has your company been impacted by COVID-19 in 2021? [Shown: % Highly Impacted (very + extremely)] [Sample Size: 2022 n=299 / 2021 n=394]

### Telecom and cable are the most disrupted of the TMT industries in 2021



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