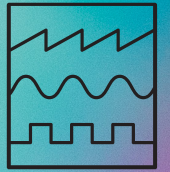




Think:Act

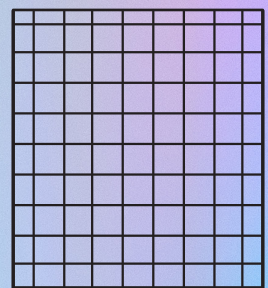


Leading thoughts, shaping vision



Journey to the future

Come on a time traveling trip and get the knowledge you need to win in the decades ahead



Think:Act #39 03|2023 JOURNEY TO THE FUTURE PRICE \$19.95



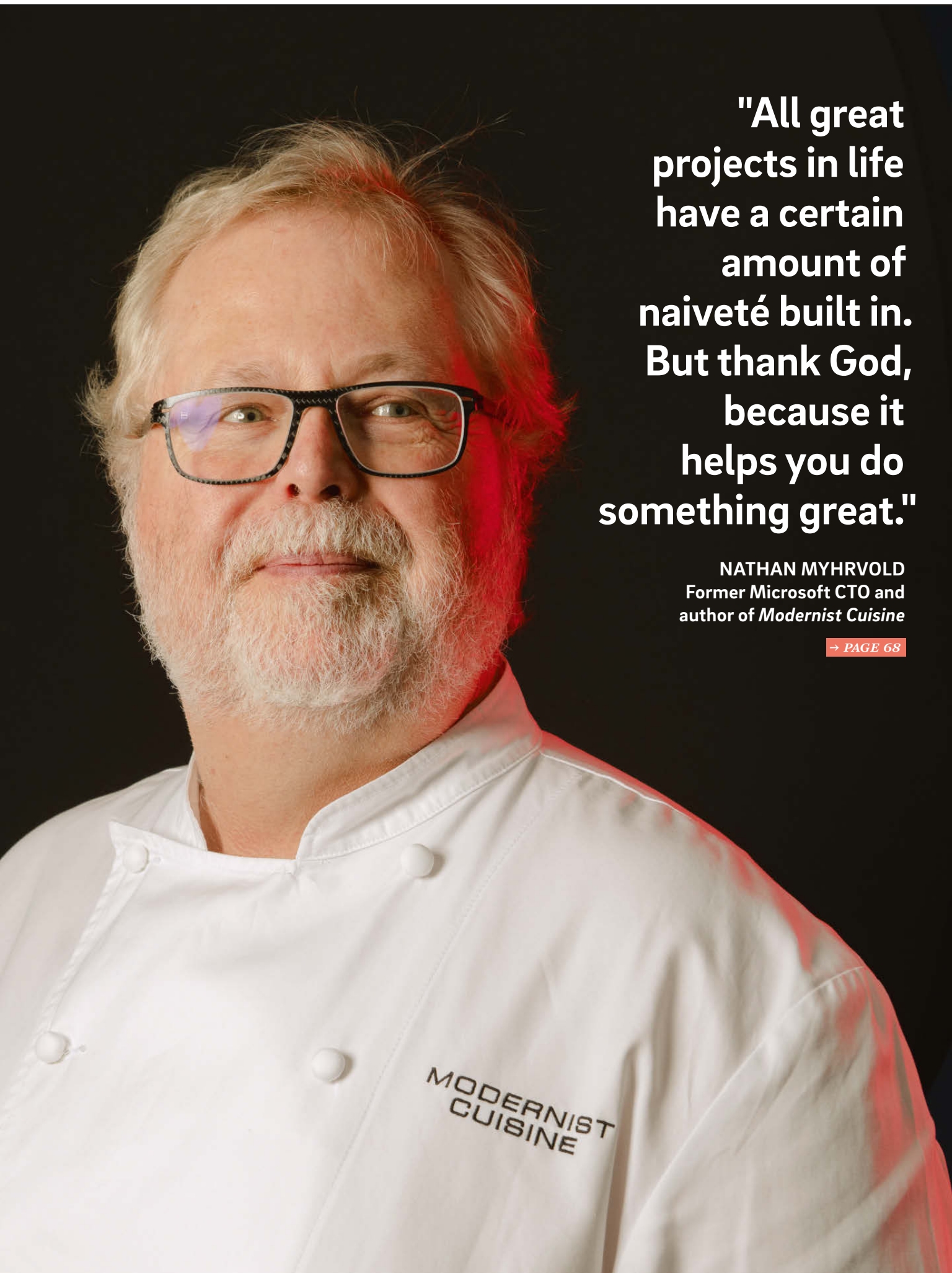
New goals

Why women's football means business

Stagflation ahead!

Ram Charan's guide for survival





"All great projects in life have a certain amount of naiveté built in. But thank God, because it helps you do something great."

NATHAN MYHRVOLD
Former Microsoft CTO and author of *Modernist Cuisine*

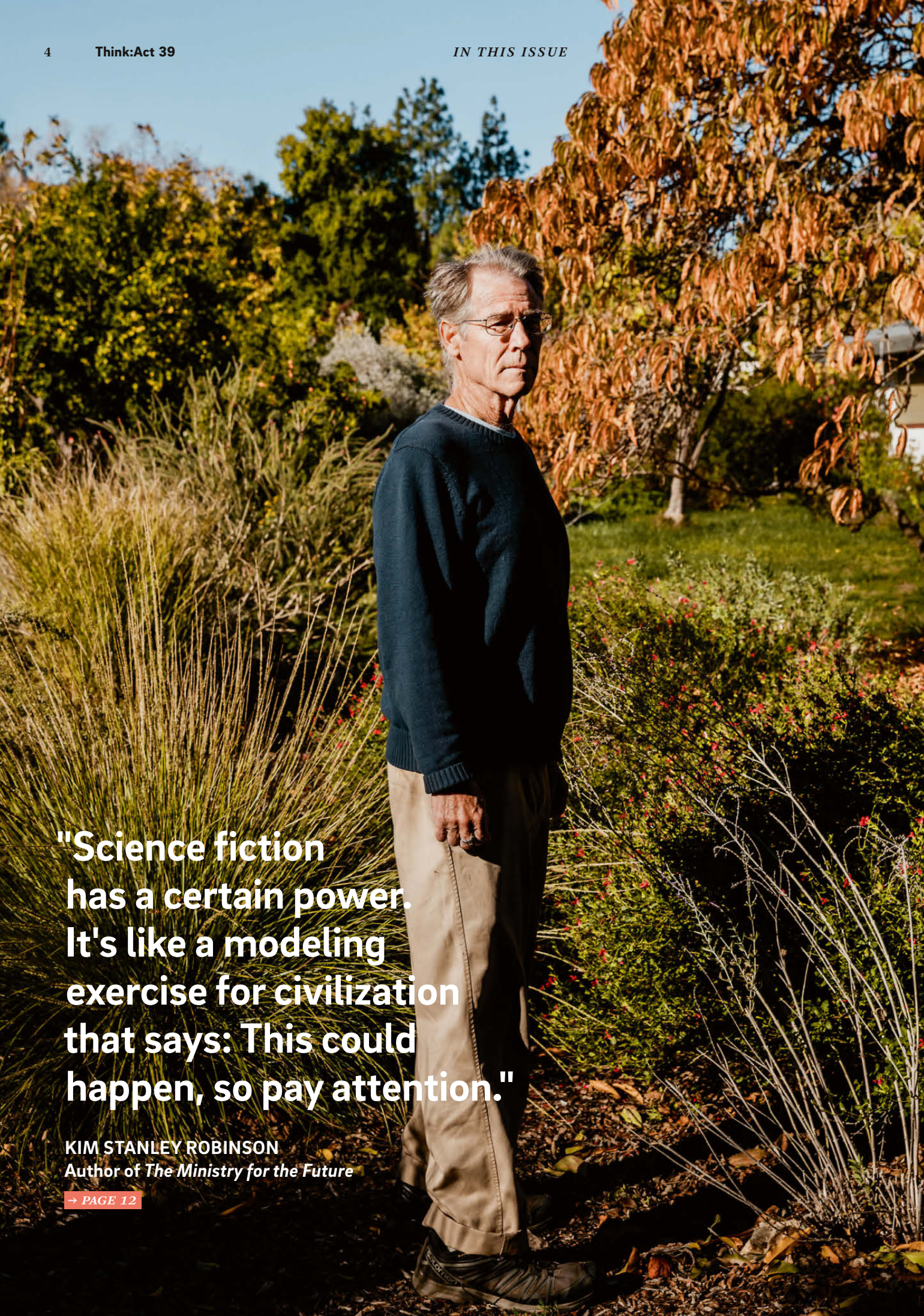
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"Employers should be asking their workers what they want. They would be amazed at how people work when they have a stake in the place."

ECE TEMELKURAN
Political columnist and author of *How to Lose a Country*

→ PAGE 82





"Science fiction has a certain power. It's like a modeling exercise for civilization that says: This could happen, so pay attention."

KIM STANLEY ROBINSON
Author of *The Ministry for the Future*

→ PAGE 12

PHOTO: CAROLYN FONG/THE NEW YORK TIMES/REDUX/LAIF

IN THIS ISSUE:
JOURNEY TO THE FUTURE



We don't have a time machine. Most fiction dealing with time travel is all about going back in time to fix the past. Only a few fictional time travelers visit the future. But if we could somehow have the insight of four decades hence, the knowledge would be awesome. We can't visit the future, though, other than with our imagination.

So we at *Think:Act* have done the imaginative work to paint the picture and help build a playbook for the future for you. We take you on a journey so that you can equip yourself with the advantage of knowing what the future might hold and how you can adapt now to make the best of it.

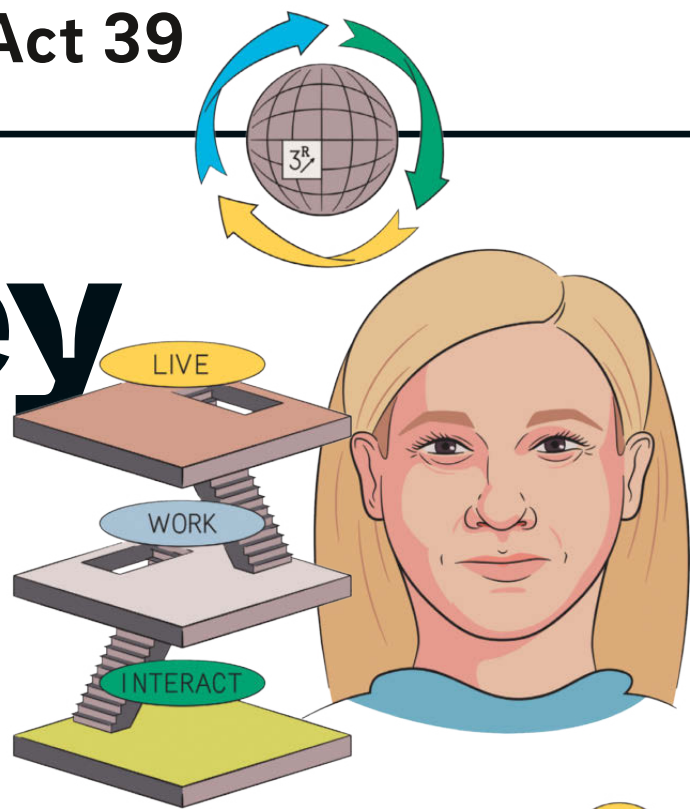
Hold on to your hats! This is what's in store: a journey in stages. So grab your tickets to the future and **we'll see you in a couple of decades!**

<p>JOURNEY TO THE FUTURE</p> <p>PART</p> <p>1</p> <p>Fact to the future</p> <p>*** <i>Think:Act</i></p> <p>→ PAGE 12</p>	<p>JOURNEY TO THE FUTURE</p> <p>PART</p> <p>2</p> <p>Report from the future</p> <p>*** <i>Leading Thoughts</i></p> <p>→ PAGE 30</p>	<p>JOURNEY TO THE FUTURE</p> <p>PART</p> <p>3</p> <p>Turning fiction into fact</p> <p>*** <i>Shaping Visions</i></p> <p>→ PAGE 54</p>
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Think:Act 39

In focus

Journey to the future



PART 1

Fact to the future

Bestselling science fiction novelist **Kim Stanley Robinson** offers visions that serve as a manual for future planning.

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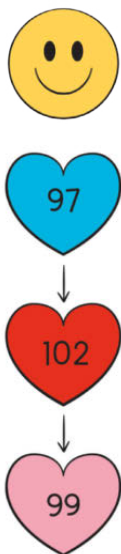
PART 2

Report from the future

Three specialists weigh in on how we might experience the world in the coming decades and beyond.

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PART 3

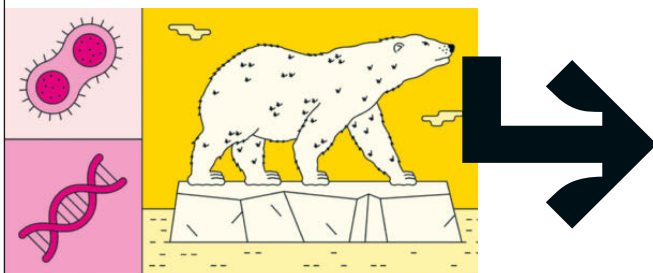
Turning fiction into fact

Artists' visions of the future have reshaped our reality and continue to influence how we think ahead.

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44 The trouble with capitalism

Some economists believe it's time to enact a new kind of system and reduce inequality.

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Bestselling author **Ece Temelkuran** argues for more democracy in the workplace.



"When cash is critical and borrowing is costly, usage must be razor sharp."

— Ram Charan, PAGE 28



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It's time to unleash the future!

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Ten years after the film brand's bankruptcy, experts are drawing different lessons from its collapse.

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Women's football clubs like Los Angeles' Angel City are proving the lucrative potential of tapping into a more diverse fan base.

68 Something's cooking

Former Microsoft CTO **Nathan Myhrvold** on how the secrets of the kitchen can help managers infuse the basics with creativity.

72 Bike to the future

In the wake of the pandemic, enthusiasm for battery-driven e-bikes has given the global bike business even more momentum.

78 Thought leader

Psychologist and heuristics pioneer **Gerd Gigerenzer** explains how Covid-19 exposed a need for better risk literacy and communication.

FUTURE NOW

Digital



Think:Act Ideas for Action

Sign up online to download this issue's Ideas for Action with insights on how to adapt to climate change as a company. Learn about climate risk analysis and what actions you can take. rolandberger.com/climate-adaptation

Tap your feet to the soundtrack for the future

Grab the past and shake it out! Listen to our playlist with tunes of tomorrow and hope for the future. Just scan the QR code or go here: rolandberger.com/future-playlist



Think in numbers

Putting a figure on ... GLOBAL POVERTY

\$2.15 PER PERSON/DAY

The new extreme poverty line set by the World Bank in September 2022 to reflect an update in purchasing power parities (PPPs) based on 2017 figures.

8.2% GLOBALLY

The percentage of the population estimated to be living in extreme poverty using the updated September 2022 World Bank PPPs figures.

50 MILLION

The increase in people living in extreme poverty in 2020 over 2019 as a result of Covid-19, a figure estimated to have decreased to 8 million by November 2021.

19.1% OF PEOPLE

The population across 111 countries – 23 low-income, 85 middle-income and three high-income – identified by the Global Multidimensional Poverty Index as living in acute poverty: 1.2 billion in total.

SOURCES: WORLD BANK; UNITED NATIONS DEVELOPMENT PROGRAMME; DEVELOPMENT INITIATIVES; GLOBAL MULTIDIMENSIONAL POVERTY INDEX

PHOTOS: SORCHA AUGUSTINE; CATHERINE FALLS/GETTY IMAGES | ILLUSTRATION: JULIA ZIMMERMANN

Food for thought

How can people from diverse backgrounds leverage "differentness" to their advantage?

by Laura Morgan Roberts

HAVING A MINORITIZED cultural identity in the workplace can have a silver lining for those who view it as a resource. The very tokenism and marginalization that create challenges for racial minorities can, paradoxically, also be sources of strength – not only to navigate racism, but also to make unique and powerful contributions to their organizations. For example, being one of few members of an identity group increases your distinctiveness, which some people use to their advantage – an idea I call "positive deviance" – by making a memorable impression. People who feel marginalized are also more attuned to social cues and this equips minorities with cross-cultural competencies that

promote relationship-building. Many leaders also take pride in their unique experiences and draw upon their minority identities to build self-esteem and enhance belongingness with similar group members, which is important for fulfilling human needs and protecting people from psychologically threatening experiences. Last, but not least, unique experiences generate forms of human and intellectual capital (e.g., abilities and knowledge), particularly creativity.



AVAILABLE ONLINE Laura Morgan Roberts on making deviance a strength rolandberger.com/positive-deviance



LAURA MORGAN ROBERTS is an associate professor of business administration at the Darden School of Business and an expert on diversity, authenticity and leadership development. Along with Anthony J. Mayo and David A. Thomas, she co-edited the 2019 book Race, Work and Leadership: New Perspectives on the Black Experience.



AT A GLANCE

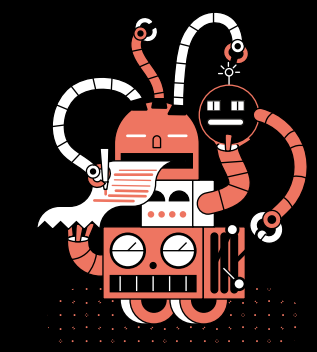
Thoughts to live by

"The task is not so much to see what no one has yet seen, but to think what nobody has yet thought about that which everybody sees."

— Erwin Schrödinger Nobel Prize-winning Austrian physicist

Re-thinking buzzwords

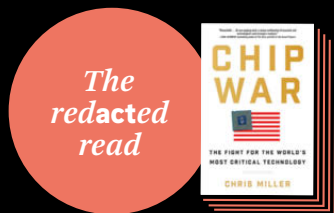
Get to grips with new industry lingo in a flash with our stripped-down explanations of the latest jargon.



"Hyper-automation"

The concept is automating everything in an organization that can be automated. That includes using AI, robotic processes and any other technologies that can run as much as possible without human intervention. It has been identified by some as being in the top 10 strategic tech trends which were accelerated by the 2020 pandemic.

ACT



Who will conduct the future of a critical resource?

Chris Miller, assistant professor of international history at Tufts University, on how the silicon chip brought the world economy together – and how competition over chips today could blow it apart.

GEOGRAPHICALLY, Taiwan is an island off the coast of China. Economically and politically, it's now in some respects the center of the world: It manufactures 37% of the world's most advanced silicon chips. But maybe not forever: As sparring between the United States and China over access to advanced chips threatens to turn into a new Cold War, their continued growth could be in jeopardy. Here's a few facts:

- In 1961, engineers could fit four transistors on a square of silicon the size of a fingernail. Since then, this capacity has doubled about every two years.
- Today, chipmakers can print as many as 11.8 billion transistors onto that same size square and each transistor is less than half the size of a coronavirus – and some theorize this miniaturization could continue for decades to come.
- Semiconductor manufacturing is so complicated that in the 2010s, China imported 85% of its chips – a vulnerability the government considers an existential threat.

Chip War: The Fight for the World's Most Critical Technology by Chris Miller. 431 pages. Scribner, 2022. \$30.

A war on food security

WHEN FLOUR DISAPPEARED from supermarkets in March 2022, two years after Covid-19 hit, consumers in the world's wealthiest countries experienced panic buying déjà vu. But for 276 million already facing acute hunger, the war in Ukraine and its impact on exports has deepened

an existing crisis. Before the war, Russia and Ukraine supplied 30% of the world's wheat – a staple for 35% of the global population responsible for more calories and protein than any other crop. Here's how Covid-19, climate events and war drove the wheat market to a crisis point.



2020-2021: Pandemic-driven supply and demand changes drive up the price of wheat 15% over March 2020 to reach \$5.72. La Niña weather events create lower yields in key wheat countries, including the US and Argentina, which supply 12% and 8% of global exports respectively.

FEBRUARY 2022: Russia invades Ukraine, further disrupting supply chains and putting more pressure on wheat exports. By March, the UN Food Price Index leaps 12.6% to an all-time high with the Cereal Price Index 17.1% higher than just a month earlier. The price of wheat alone spikes 35% to \$12.52/bushel on March 7.

MAY 2022: 49% of Ukraine's wheat – which had made up 10% of global exports – lies in conflict-affected areas. Wheat trades at a record high of \$12.78/bushel. Northern African countries dependent on Ukrainian exports see wheat prices rise as much as 750%.

JULY 2022: Russia and Ukraine sign the Black Sea Grain Initiative in Istanbul, a deal that unlocks at least 20 million tons of Ukrainian wheat for export via the Black Sea, triggering a 3% drop in wheat futures to a five-month low of \$7.86 per bushel.

LOOKING AHEAD: Following Russia's suspension of the Black Sea Grain Initiative, wheat jumped 6% to \$8.99/bushel on November 1, 2022. Although it resumed participation the following day, Russia continues to threaten terminating the agreement. Coupled with a third year of La Niña weather events, global access to affordable wheat remains uncertain.

SOURCES: THE ECONOMIST; WORLD FOOD PROGRAMME; BUSINESS INSIDER; INTERNATIONAL DEVELOPMENT RESEARCH CENTRE; UNITED NATIONS; TRADING ECONOMICS; WALL STREET JOURNAL; GRO INTELLIGENCE; AL JAZEERA; REUTERS



How not to write a management book ...

THERE COMES A TIME in a business leader's life when enough is enough. No more "leadership" books or "change management tips"; there is simply not enough time in the day. God forbid you should think of writing one and becoming a management guru yourself, but if you do, here are a few tips on avoiding clichés. First, don't make success sound easy. As much as your readers would like to download your abilities, don't lead them to believe they can. Second, avoid numbered lists and checklists. If you simply reduce what you learned to bullet points you are not doing yourself or your business area a service. There is no finite number of steps that will lead to the secret of success. Finally, keep away from gimmicks and hero worship, or worse looking to nature for analogies. Books on "why the lion is king" look desperate – nor do they speak the truth of real business experience.



PHOTO: JOHANNES MANN VIA GETTY IMAGES | ILLUSTRATIONS: JULIA ZIMMERMANN



Still reaching cruising altitude

STAFF SHORTAGES, RISING FUEL PRICES and rapidly increasing demand: Airlines are still navigating turbulence in the wake of Covid-19. Following a \$370 billion loss of gross passenger operating revenues in 2020 alone and a 60% decline of global total passengers in 2020 compared with 2019, the announcement by the International Civil Aviation Organization that passenger totals recovered in 2022 to just 25% lower than 2019 seemed to signal that the industry was finally pulling its nose up amid projections for full global recovery by 2024. The International Air Transport Association, however, doesn't necessarily see such clear horizons ahead – it expects traffic will still be 6% below pre-pandemic levels as far out as 2040. And there may be more delays ahead. The war in Ukraine put a halt to 3.3% of total air passenger traffic in Europe (0.8% of total traffic globally) and contributed to the 70% increase in the price of jet fuel over the first six months of 2022, exacerbating cost management pressures. Add the fallout of pandemic-induced layoffs and it's clear why the industry is struggling in the final approach to recovery. In June 2022, British Airways had 3,000 potential recruits held up in months-long background checks while US-based Flight Aware reported a 5% increase in delays and a 0.6% increase in cancellations over 2022 compared with 2019.

SOURCES: INTERNATIONAL CIVIL AVIATION ORGANIZATION; INTERNATIONAL AIR TRANSPORT ASSOCIATION; AIRPORTS COUNCIL INTERNATIONAL; FLIGHT AWARE; BLOOMBERG

Act

AT A GLANCE



In focus



In this issue we take a journey to the future to equip you for the challenges ahead.

FUTURE NOW



Bestselling science fiction novelist **Kim Stanley Robinson** has made it his life's quest to package somber scenario planning into riveting stories. The worlds he builds offer a blueprint for how humanity can course-correct to survive catastrophic climate change and offer new ways of thinking we all could use as **a manual for future planning.**

Fact to the future

BY **Steffan Heuer** PHOTOS BY **Carolyn Fong**

FUTURE NOW

<p>JOURNEY TO THE FUTURE</p> <p>PART</p> <p>1</p> <p>Fact to the future</p> <p>*** Think:Act ↳ PAGE 12</p>	<p>JOURNEY TO THE FUTURE</p> <p>PART</p> <p>2</p> <p>Report from the future</p> <p>*** Leading Thoughts ↳ PAGE 30</p>	<p>JOURNEY TO THE FUTURE</p> <p>PART</p> <p>3</p> <p>Turning fiction into fact</p> <p>*** Shaping Visions ↳ PAGE 54</p>
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RUSSELL BOULEVARD is a four-lane road that bisects the Californian town of Davis, just west of the state's capital Sacramento, funneling commuters to and from the campus of the University of California and downtown. If you leave Davis heading west, you will pass a collection of small communal gardening plots where cucumber and pumpkin plants creep along the ground, coexisting with patches of carrots, cabbage, onions and garlic, plus generous tufts of an inedible weed called purple nutsedge grass. Further back, persimmon and avocado trees and hedges of pomegranate shield homes from motorists' views.

To American eyes, the master-planned Village Homes community is a most unusual suburb. Completed in 1975, it was a deliberate attempt to design both a walkable and environmentally

conscious neighborhood where residents would forego garages, fences and front lawns, tending to and living off the land as a tribe of post-capitalist settlers instead. A total of 220 households would curate this small outlier of a biosphere, surrounded by freeways, malls and sprawl.

The most famous resident of this alternate world is arguably Kim Stanley Robinson, a prolific science fiction writer with 26 books and several prestigious literary awards under his belt. Most mornings, he puts on a battered North Face jacket, grabs a coffee and walks to his small plot to garden for a few hours. "Gardening is my refuge. I get my hands dirty and think about the scene I will write this morning," he says on a gusty fall day, surveying what a scorching California summer has left of his crop. "We had a terrible drought. Everything might die and California's in terrible trouble," Robinson adds a bit later, seated outside the house where he has lived and written all his books since 1991.

HE USUALLY TAKES HIS LAPTOP and settles into a beat-up, blue Ikea Poäng chair with a threadbare black footstool that he salvaged from somebody else's trash, typing away for hours under a tarp. "I will admit it, I have become a hermit or something like a weird monk when I am writing," the 70-year-old adds. It is here, in his village home, that Robinson keeps conjuring up worlds that have enthralled readers and, more recently, gotten him invitations from heads of state and planners at the Pentagon who are all eager to hear how human imagination can prevail over nature's rage.

Robinson's most famous book by far is *The Ministry for the Future*, published in 2020. A collage of gritty micro- and grandiose macro-level details, it chronicles humanity's painful journey through an unfolding climate catastrophe starting in the year 2023. After a heat wave kills millions in India, a newly created UN body – the Ministry – is tasked with combating climate change and dealing with an eco-terrorist network that is going after fossil fuel-burning jets and the meat industry. By 2050, the global community has finally set aside its differences and is pulling all the levers at its disposal to avoid the worst. A combination of large-scale geoengineering projects and a new global digital currency called Carbon Coin that pays petrostates to leave their resources in the ground have given capitalism a new face and Earth a second chance.

The book has propelled Robinson into the uneasy role of being a "public intellectual," as he

KIM STANLEY ROBINSON,
Science fiction writer

Oftentimes, I've learned things in my research that even scientists don't know because they are deep in their silos.

phrases it, certainly helped by the fact that former US President Barack Obama put the novel on his list of favorite books. He was invited to the COP26 climate summit in Glasgow, roaming the halls and conference rooms with a red all-access pass, and continues to give talks and presentations around the world.

AS ROBINSON SEES IT, he speaks before politicians and scientists to give them a literary pep talk and to jump-start high-level networking on Earth's behalf because time is running out. "I am aware that everybody in the audience knows more than me. What I know is what science fiction does and how it operates. It's discussing possibilities. I tell stories about the relationship between the individual and the collective. When facing a group of experts, I tell them a story about their area of expertise, pushed into the future, and I invite them to take over the thinking. Oftentimes, I've learned things in my research that even scientists don't know because they are deep in their silos."

This steady gaze at both planet Earth and the human condition, grounded in scientific insights and without resorting to aliens and starships

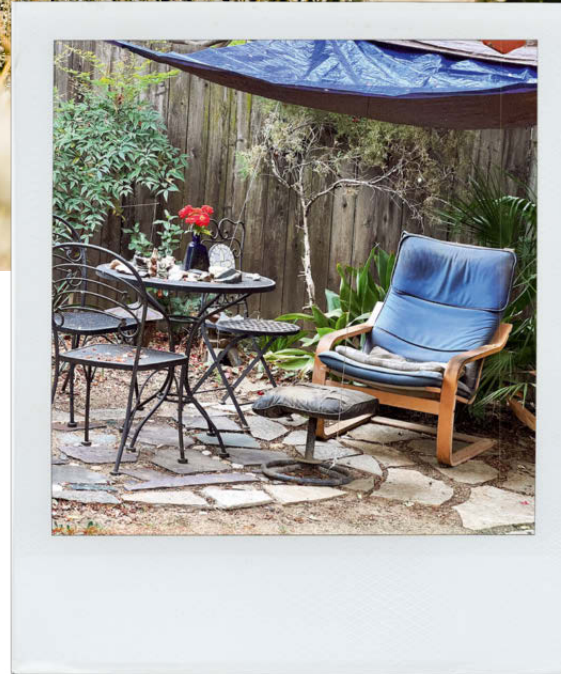


PHOTO: STEFFAN HEUER

traveling at light speed, is the thread that runs through all of Robinson's writings. At a talk in San Francisco in March 2022, he divided the science fiction genre into three categories: "space opera," or a fantasy where anything goes; "near-future science fiction" that extrapolates today's trends a few years out; and "future history" that explores what historical change is possible over larger expanses of time.

The latter is the "middle zone" where Robinson thrives because it allows him to lay out bold visions of how humanity might alter the trajectory of history if it only mustered the technologies and

SPACE TO THINK
Robinson takes time in his garden each morning to ponder how his stories can impact how people think about the future.



The Ministry for the Future
by Kim Stanley Robinson,
576 pages, 2020.

courage to drive systemic changes. "Science fiction has a certain power," he explains over another mug of coffee that his wife Lisa, a retired scientist with the US Geological Survey, has brought to the porch. "It's like a modeling exercise for civilization that says: This could happen, so pay attention. It's tapping into prophecy, like the Old Testament. If you continue to do these things, you will come to this horrible fate. So let's think about doing this or not doing that."

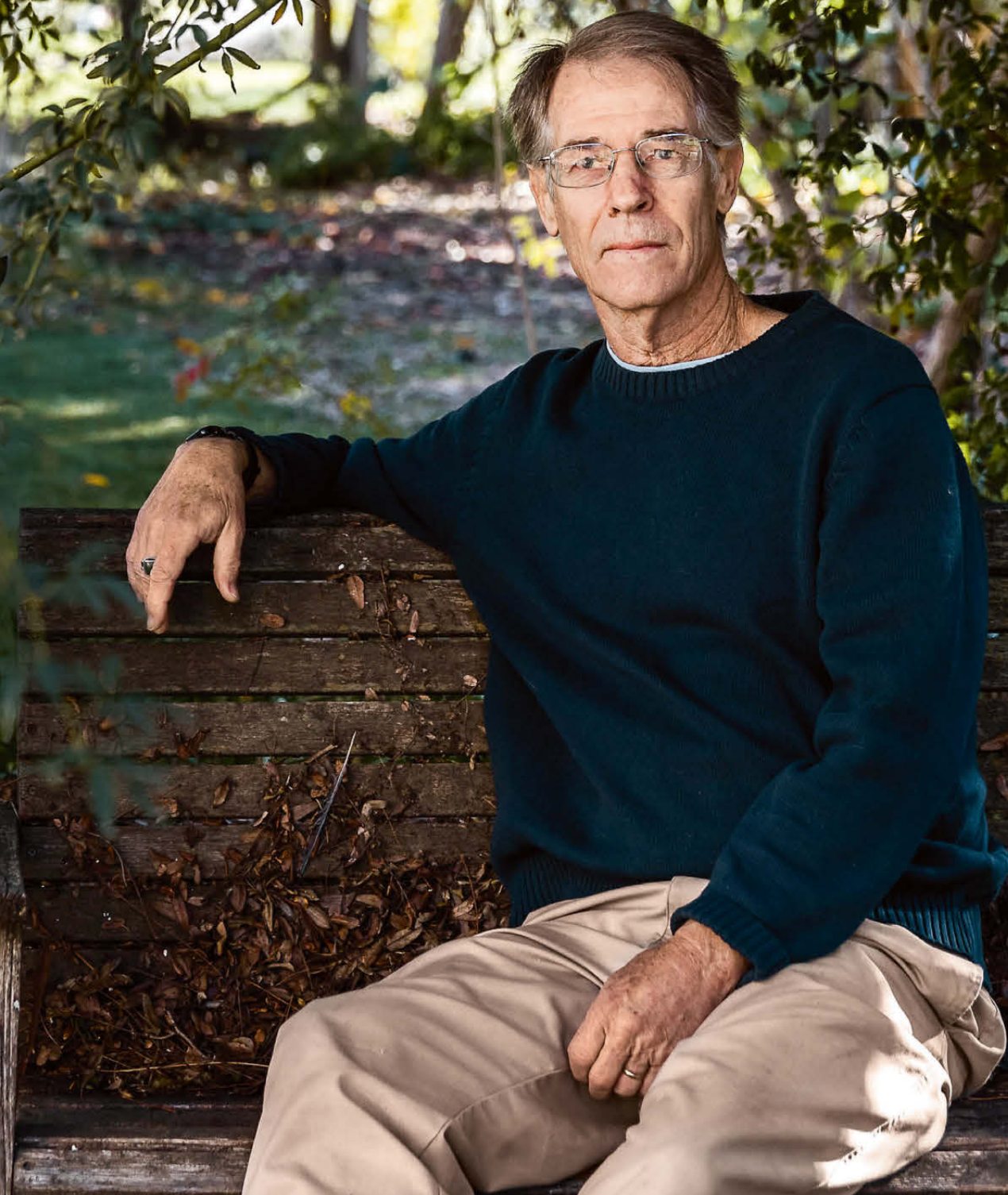
A just civilization of eight billion, in balance with the biosphere's production of the things we need; how would that look? What laws would create it? And how can we get there fast enough to avoid a mass extinction event?

↳ *The Ministry for the Future*

The approach was largely shaped by Robinson's academic mentor, the American philosopher and Marxist political theorist Fredric Jameson. →

“
” **KIM STANLEY ROBINSON,**
 Science fiction writer

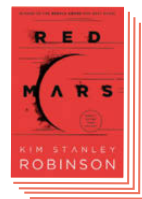
Everybody should have a good life. People talking about adaptation in the way that capitalism can solve everything are wrong. I think we're in a scary race between success and failure.





It was Jameson who steered Robinson toward the work of the famous science fiction author Philip K. Dick as the topic for his dissertation in 1982. His oeuvre, including *Do Androids Dream of Electric Sheep?* (which was later adapted into the movie *Blade Runner*) and *The Minority Report*, is usually populated by characters struggling with alternate histories and evil corporations or authoritarian systems. As a freshly minted Ph.D. in English literature, Robinson first taught composition to freshmen at the University of California for 11 years before becoming a full-time writer.

WHEN HE BUILDS WORLDS FAR OFF into the future, or in some cases centuries or millennia into the past, the critique of capitalism and elements of Marxian historical materialism are hard to miss. That is, the notion that it isn't the great men who shape history, but the people and economic development of societies. With a twist, though, since in Robinson's



Red Mars
by Kim Stanley Robinson,
592 pages, 1992.

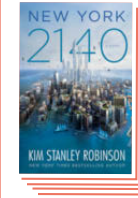
books, scientists are the heroes of the people who come up with evolutionary and sometimes revolutionary solutions to drive fundamental change.

To be twenty-first-century scientists on Mars, in fact, but at the same time living within nineteenth-century social systems, based on seventeenth-century ideologies. It's absurd, it's crazy, it's—it's—," he seized his head in his hands, tugged at his hair, roared "It's unscientific! And so I say that among all the many things we transform on Mars, ourselves and our social reality should be among them. We must terraform not only Mars, but ourselves.

↳ **Red Mars**

Take the *Mars* trilogy published between 1992 and 1996, a 2,000-page epic in which human settlers turn the red planet into a habitable place over the course of several centuries but can't shake off their baggage from the one and only home planet. "Stan dealt with the idea of a planet as a tabula rasa where humans bring all the ideas and philosophies from Earth. You have Greens, corporations, and religious groups duking it out," says Banning Garrett, a long-time friend and former Washington insider who worked with the intelligence community and ran the Atlantic Council's Strategic Foresight Initiative. "At its core, it's a book exploring how socioeconomic ideas play out when you put them on a planet."

Robinson admits that more recent discoveries about Mars' inhospitable environment make terraforming the planet an unfeasible fantasy. "These books dealt with what we knew about Mars at that time. It's a science fiction novel, not a blueprint."

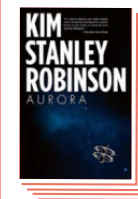


New York 2140
by Kim Stanley Robinson,
624 pages, 2017.

The laws are codes. And they exist in computers and in the cloud. There are sixteen laws running the whole world, ... distributed between the World Trade Organization and the G20. Financial transactions, currency exchange, trade law, corporate law, tax law ... you change those sixteen, you're like turning a key in a big lock. The key turns, and the system goes from bad to good. It helps people, it requires the cleanest techs, it restores landscape, the extinctions stop."

↳ **New York 2140**

Back on Earth, Robinson put economics front and center in *New York 2140*. The city has been largely submerged due to a 15-meter rise in the sea level and traders living and working in the upper floors of skyscrapers make a killing from "intertidal arbitrage," a euphemism for betting on global real estate that's quite literally under water, while rebel programmers want to rewrite the rules that ail the system.



Aurora
by Kim Stanley Robinson,
480 pages, 2015.

Human beings live in ideas. That they were condemning their descendants to death and extinction did not occur to them, or if it did they resented the thought, ignored it, and forged on anyway. They did not care as much about their descendants as they did about their ideas, their enthusiasms.

↳ **Aurora**

THEN THERE'S A MULTIGENERATIONAL spaceship called Aurora that takes off in the year 2545 from Jupiter, headed for the star Tau Ceti 12 light-years away to start a colony. Guided by a super-AI that also narrates large parts of the book, they make it to their destination, but realize too late that their best hope is to safely return to Earth. As a testament to Robinson's meticulous research to avoid producing a space opera, he sought out the help and mathematical firepower of friends at the NASA Ames Research Center in Mountain View and at UC Berkeley to help him map the crew's return to Earth. →

A NATURAL PATH
The breadth of Robinson's interests led him to speaking in front of politicians and scientists as well as writing.



PHOTOS: CAROLYN FONG/THE NEW YORK TIMES/REDUX/LAIF

Since the craft uses the gravitational push and pull of the solar system's bodies to slow down for re-entry, Robinson had to figure out a realistic way to slingshot them around space. "They told me you can only pull off this maneuver if the big planets are in a special configuration and that will not happen until 2894. That's why Aurora goes out into the year 2894. Ironically, nobody has noticed how careful a science fiction writer I am."

Earth was a mess, a sad place. And yet still the center of the story.

↳ 2312

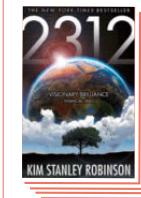
World-building against the odds also is the theme of the novel *2312* that takes readers to a human settlement on Mercury in the year 2312. It comes under existential threat by an artificially designed meteorite and is eventually destroyed by the sun. The protagonists go to work restoring and rewilding an Earth wrecked by market-based capitalism. The deficiencies of the free market and the need for transnational government action is a theme that Robinson would return to in *Ministry*.

This time, growth might be reconfiguring itself as the growth of some kind of safety. Call it involution, or sophistication; improvement; degrowth; growth of some kind of goodness. A sane response to danger.

↳ *The Ministry for the Future*

"I'm not for capitalism – it sucks," Robinson says. "Everybody should have a good life. People talking about adaptation in the way that capitalism can solve everything are wrong. I think we're in a scary race between success and failure." At his March 2022 San Francisco appearance he went into more detail: "There will be post-capitalism one day, but right now what we need is green capitalism and government intervention big time. I am an old hippie leftist, you know my angle. From that angle I say: tech. Whatever works to dodge the mass extinction and then solve the outstanding problems."

SILICON VALLEY FORECASTER PAUL SAFFO, a long-time acquaintance of Robinson's, sees this realistic scenario planning mixed with outspoken activism as the fundamental appeal of his work and what sets



2312

by Kim Stanley Robinson,
576 pages, 2012.

it apart from other sci-fi books. "What he's really talking about is humanity and adaptation. He is a systems thinker. His books are about how human societies create things, even if it's on other planets." He thinks the book has garnered attention in high places because of both its timing and its core message. "Until then, everything about the environment was doom and gloom. Telling people depressing stories about the future accomplishes nothing."

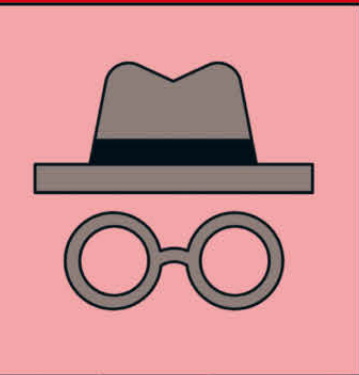
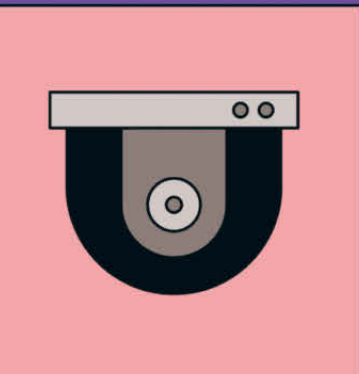
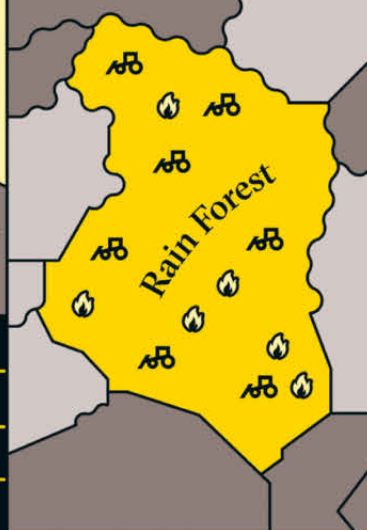
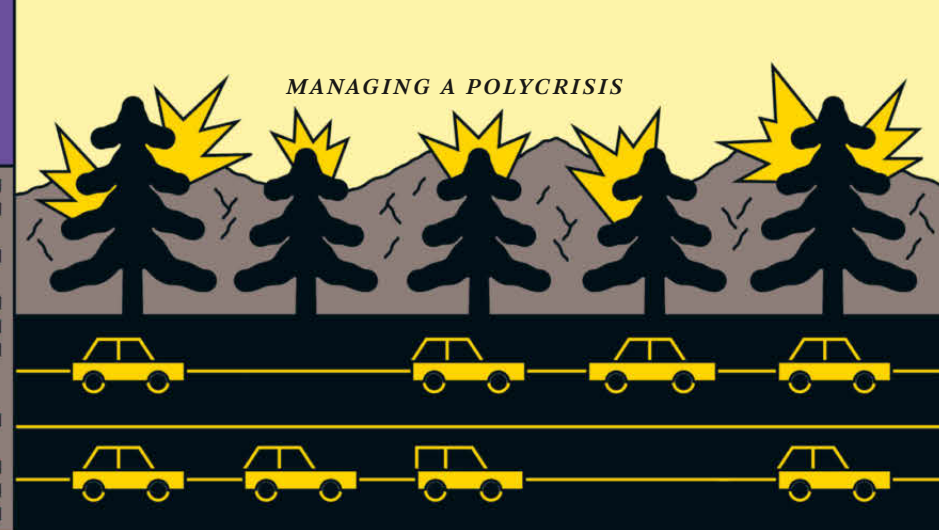
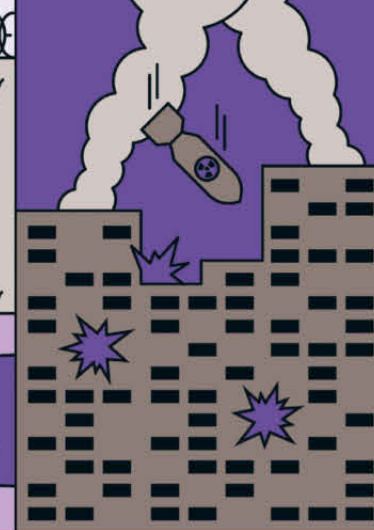
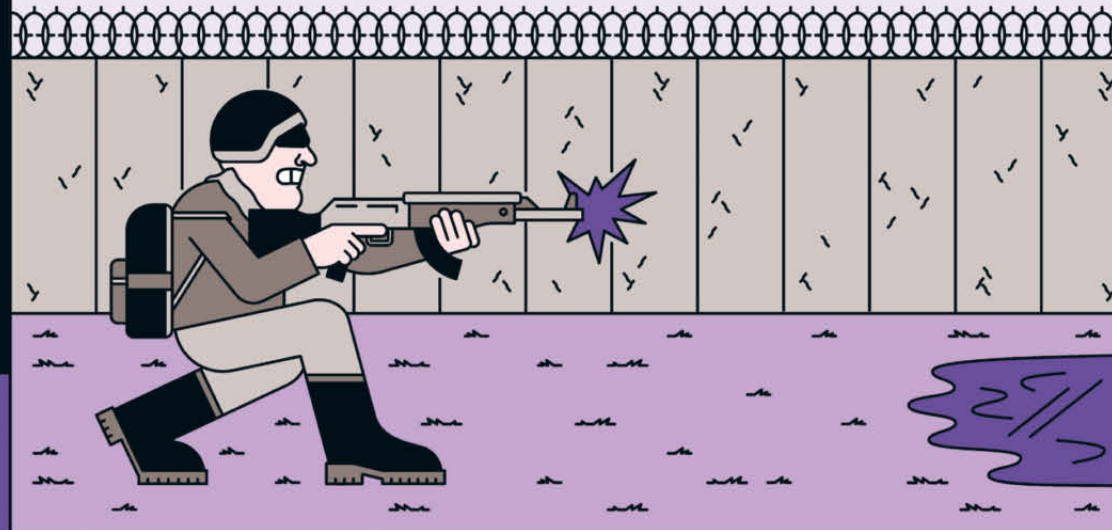
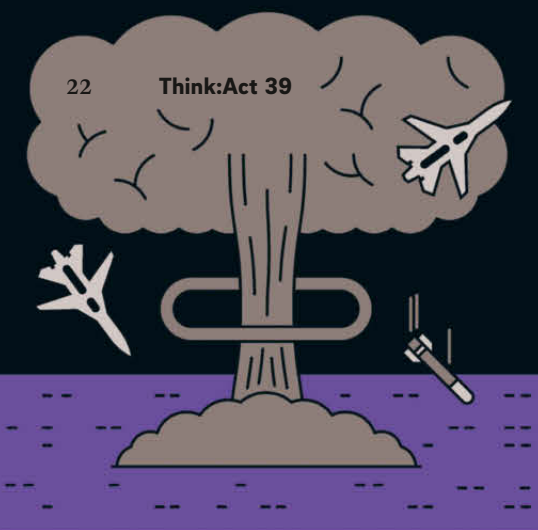
Garrett, who read the manuscript and gave frequent feedback, agrees: "*Ministry* is one of the most important books of our time. This is the book that helped us find a path for survival and sustainability. Stan told me he wanted to write a book about what happened if things go right. Humans make all the rules, so we can change them! It's an effort to say there are alternative futures out there."

THE OUTSIDE WORLD SEEMS to be taking cautious steps in the direction Robinson has sketched out. There is indeed a global network of 89 central banks called Network for Greening the Financial System and the recent COP27 summit was dominated by talk about mitigating climate change. Robinson is an avid reader of scientific journals and has a network of experts to help him work insights into his books. "I wouldn't say I'm an optimist. I'm frightened and say let's focus on what we can do. That's not quite the same thing as optimism. I try to tell good stories and try to save only 10% of my writing and speaking life to denunciations of bad practices."

In August 2021, Robinson added a coda to his novel in a talk for the influential content platform TED. Robinson read a letter from the year 2071, looking back on what humans pulled off to save themselves: seeding the atmosphere with dust to reflect sunlight, pumping meltwater from underneath glaciers, reorienting the world's fiscal system. He ends the videotaped address with a grateful look back on the present: "We now live on the carbon standard. We take that for granted. But it was a challenge no generation had had to beat. That they did it is something we should be grateful for, and indeed, the more historians like me look at the 20s, the more amazing they become. People really stepped up."

Given the international success of *Ministry*, Robinson says he will hold off on writing another science fiction novel, hoping that scientists and statesmen really do step up. Peering into the persistent drizzle that has set in, he says: "I can't possibly do anything as important – and I would be messing up my own project." ■

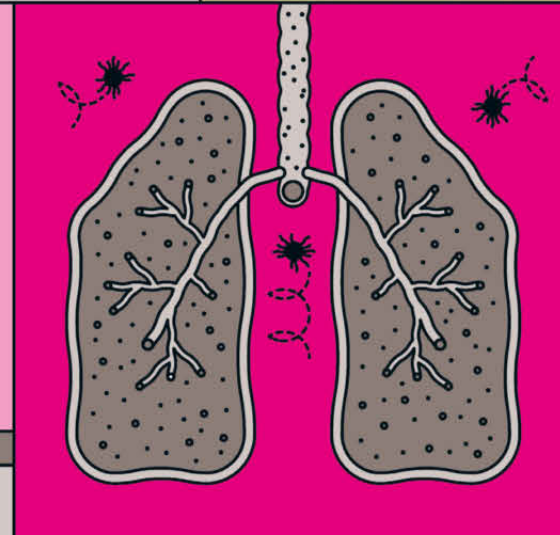
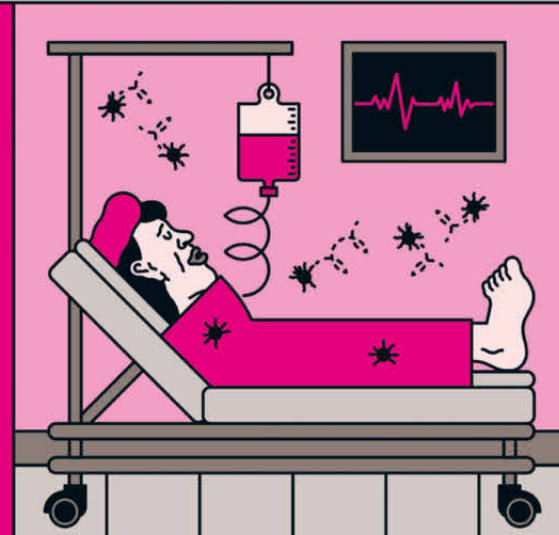
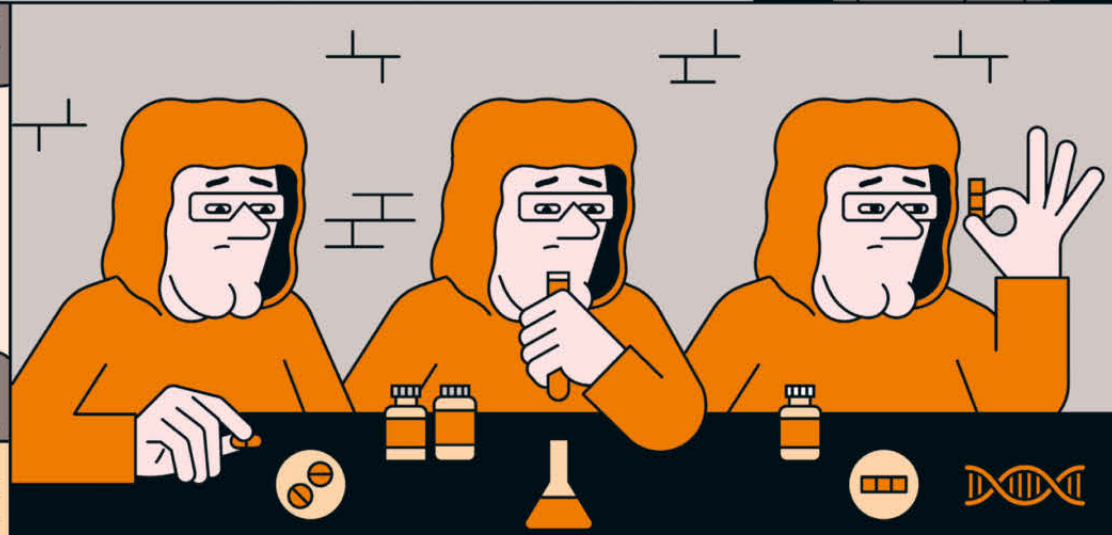
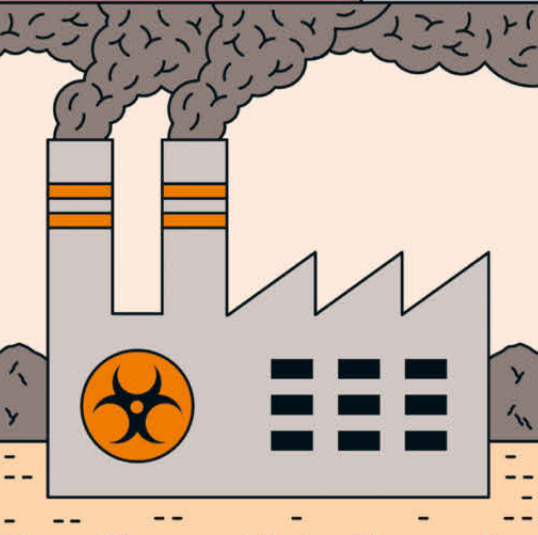
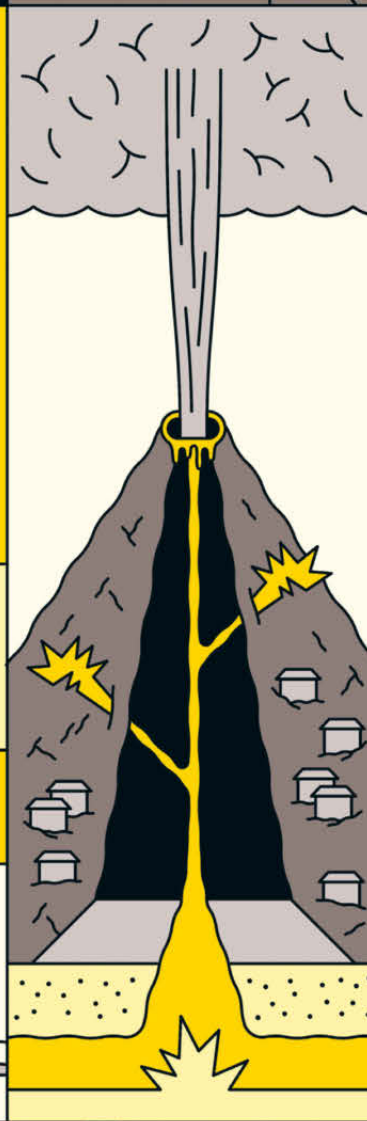
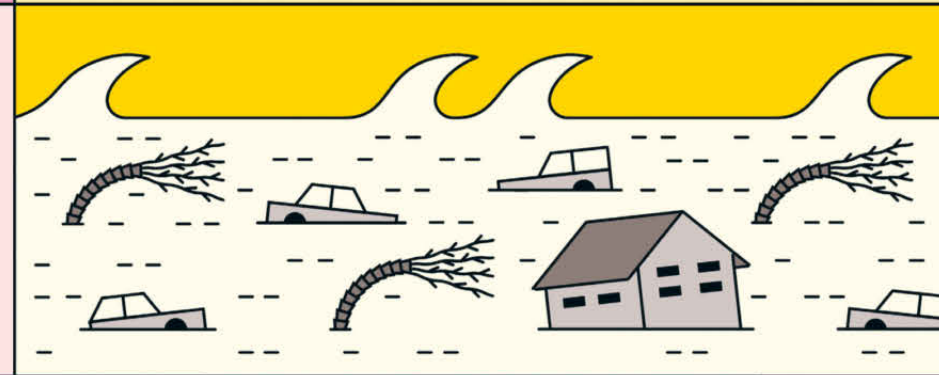
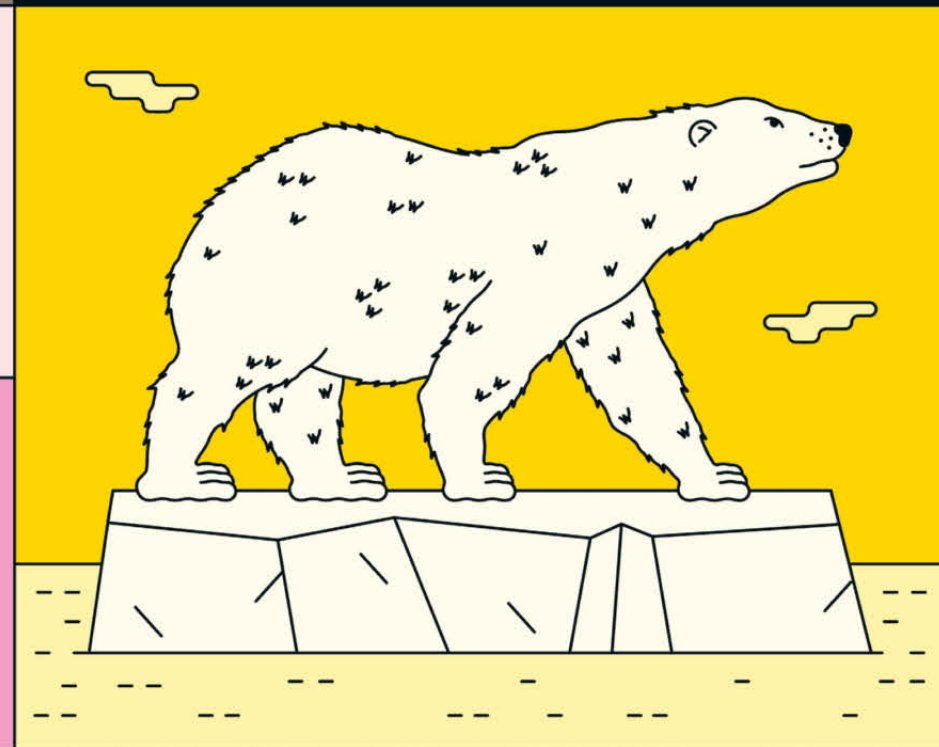
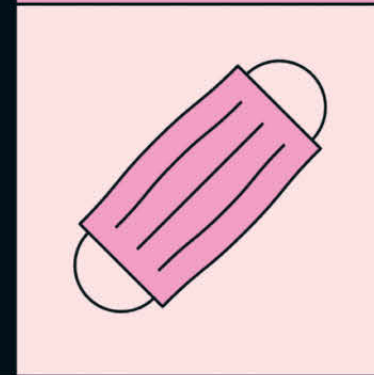
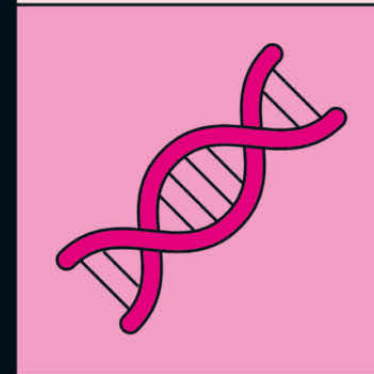
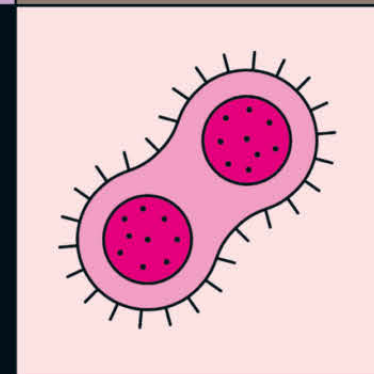
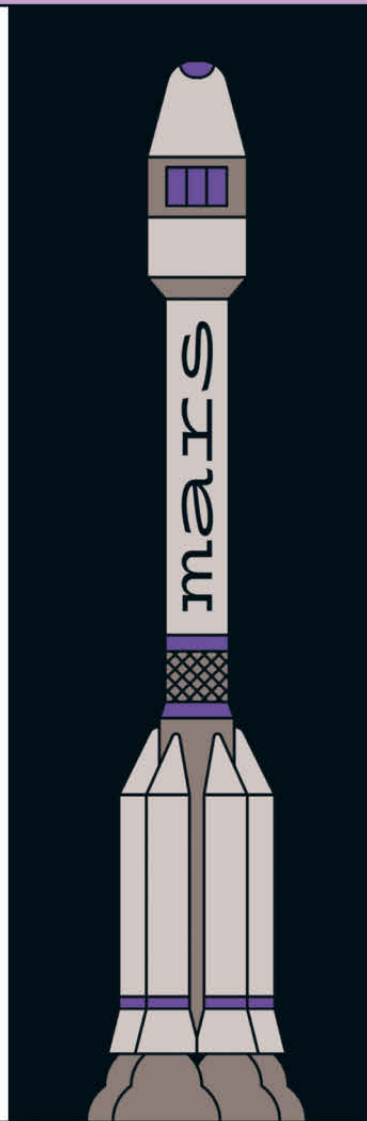
A WIDE VIEW
From his Davis home, Robinson talks with experts across several fields to ensure his stories' accuracy.

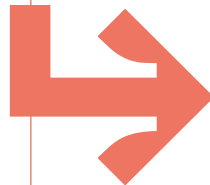


Getting out of a hot mess

BY **Steffan Heuer** ILLUSTRATIONS BY **Filippo Fontana**

As the world reels from simultaneous systemic risks, experts are grappling with the age of polycrisis and coming up with better tools for multitasking.



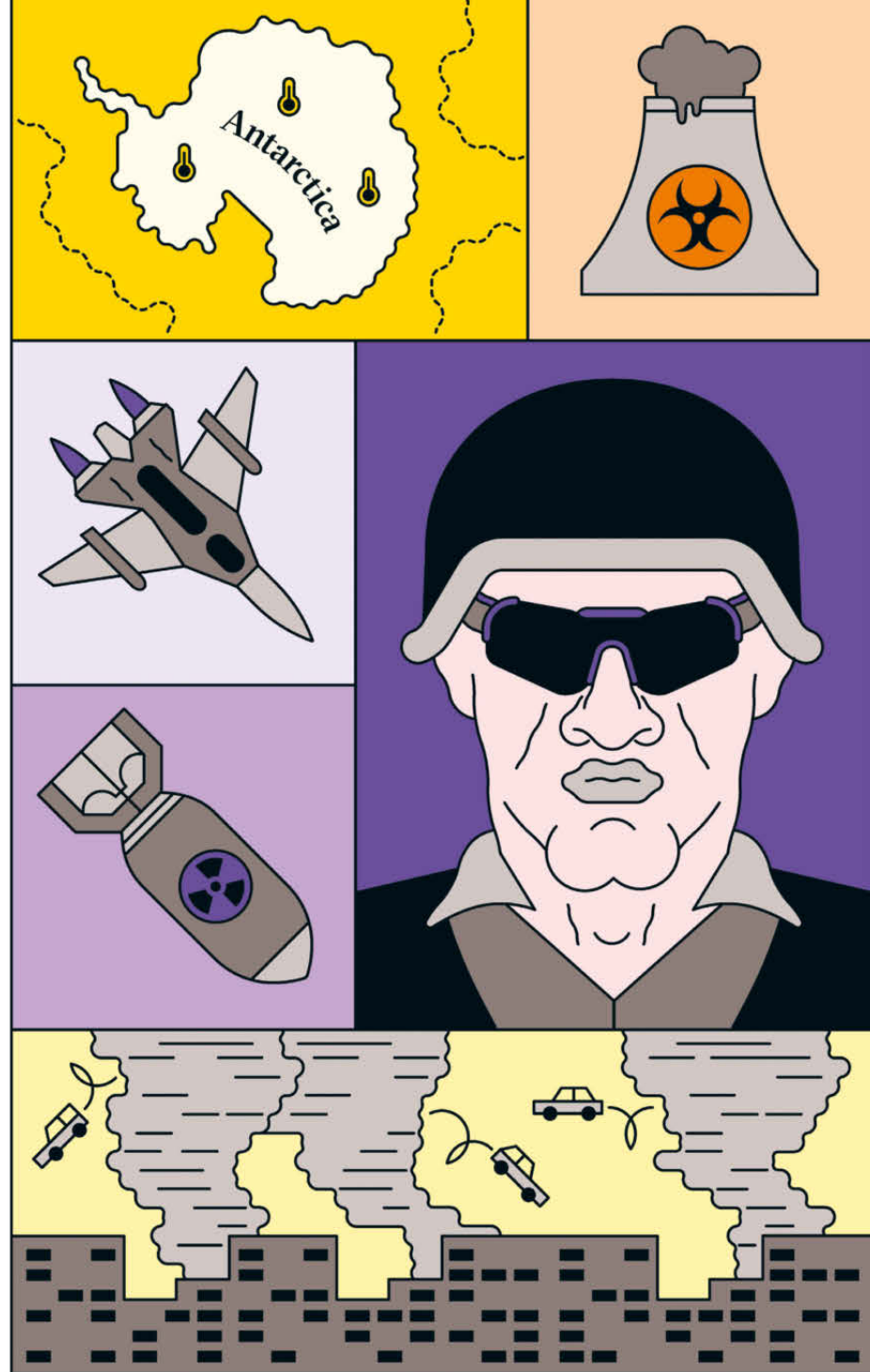


TO GET A SENSE of what humanity is currently up against, consider this smattering of headlines from fall 2022. Climate change is raising the specter that viruses will be released from melting glaciers and could infect local wildlife, becoming the starting point for the next pandemic. The war in Ukraine exposed some 70 million people to food insecurity, on top of the 765 million humans who already went hungry in 2021. Of the 193 countries that had agreed at the climate summit in Glasgow in 2021 to step up their climate actions, 26 actually followed through a year later, with some even reactivating coal-fired power plants to get through the winter.

Welcome to the age of polycrisis: an umbrella term to describe a world roiled by systemic risks ranging from climate change and the risk of new zoonotic diseases to geopolitical instability and the threat of nuclear war to food insecurity and mass migrations triggered by all of the above. Add seemingly further-off risks such as artificial intelligence or gene editing running amok, and the future looks rather dire. While the term is not new, polycrisis has taken on new meaning and urgency as governments, think tanks and ordinary citizens try to get their heads around how to respond. The definitions may vary, but there's consensus that short-term thinking and siloed approaches tackling just one problem won't get humanity out of this existential pickle.

WHAT MAKES A POLYCRISIS SO INSIDIOUS and scary, argues Columbia historian Adam Tooze, is its compounding effect and vicious feedback loop. A risk becomes a crisis when it has negative consequences to which we have to react. When several risks converge, their effects are amplified, according to the academic who specializes in disaster research from the financial crisis of 2008 to Covid-19. "In the polycrisis the shocks are disparate, but they interact so that the whole is even more overwhelming than the sum of the parts," Tooze wrote in a column for the *Financial Times*. He also writes frequently on his blog where he covers the latest risks and maps them in so-called crisis pictures and a risk matrix.

For academics, it doesn't matter how many crises or systemic risks are part of this maelstrom of maladies. The World Economic Forum's most recent *Global Risks Report*, for instance, tracks perceptions of 37 risks, while Tooze's matrix lists only eight "macroscopic risks." Wall Street doom-sayer Nouriel Roubini, for his part, identifies 10



STUCK IN A LOOP
When multiple risks converge at the same time, negative fallouts can start to feel like an endless cycle.

"megathreats" and warns in his book of the same name: "Expect many dark days, my friends."

While compiling lists is tempting, it shouldn't distract from the task at hand, cautions Michael Lawrence, a researcher with the Cascade Institute, a Canadian think tank. As Lawrence sees it, humans have not developed the foresight to deal with several fires at once. "We tend to use the past as a guide and assume that the future will imitate the trends of the past. That may be increasingly misguided. We are at a truly unprecedented moment," he says. "The basic parameters of our existence – such as the climate, or population levels – are shifting."

Lawrence is not the only expert who laments that we still lack the mindset – and the tool set – to

MICHAEL LAWRENCE,
Researcher at the Cascade Institute

The parameters of our existence – the climate, or population levels – are shifting.

respond. Conventional risk analysis, he says, treats risks as isolated events whereas we need new approaches to better understand how risks and crises interact. This comprehension deficit is not for lack of trying. Going back to the 1990s, futurists, academics and intelligence analysts have tried to map out paths through uncharted territory fraught with multiple minefields, from Cold War security threats and violent extremism to securing access to natural resources and handling disruptive new technologies.

A prime example is the National Intelligence Council's quadrennial paper *Global Trends* that spins risks and crises forward by two decades. Launched in 1997 as a classified document, it's since become openly available and widely read. The most recent edition, released in March 2021 and looking out to 2040, carries the ominous headings "a more contested world" and "expanding uncertainty." CIA veteran Mathew Burrows, who was the lead author of three editions, credits the multifaceted reports with raising awareness among policy planners but adds that "Western governments

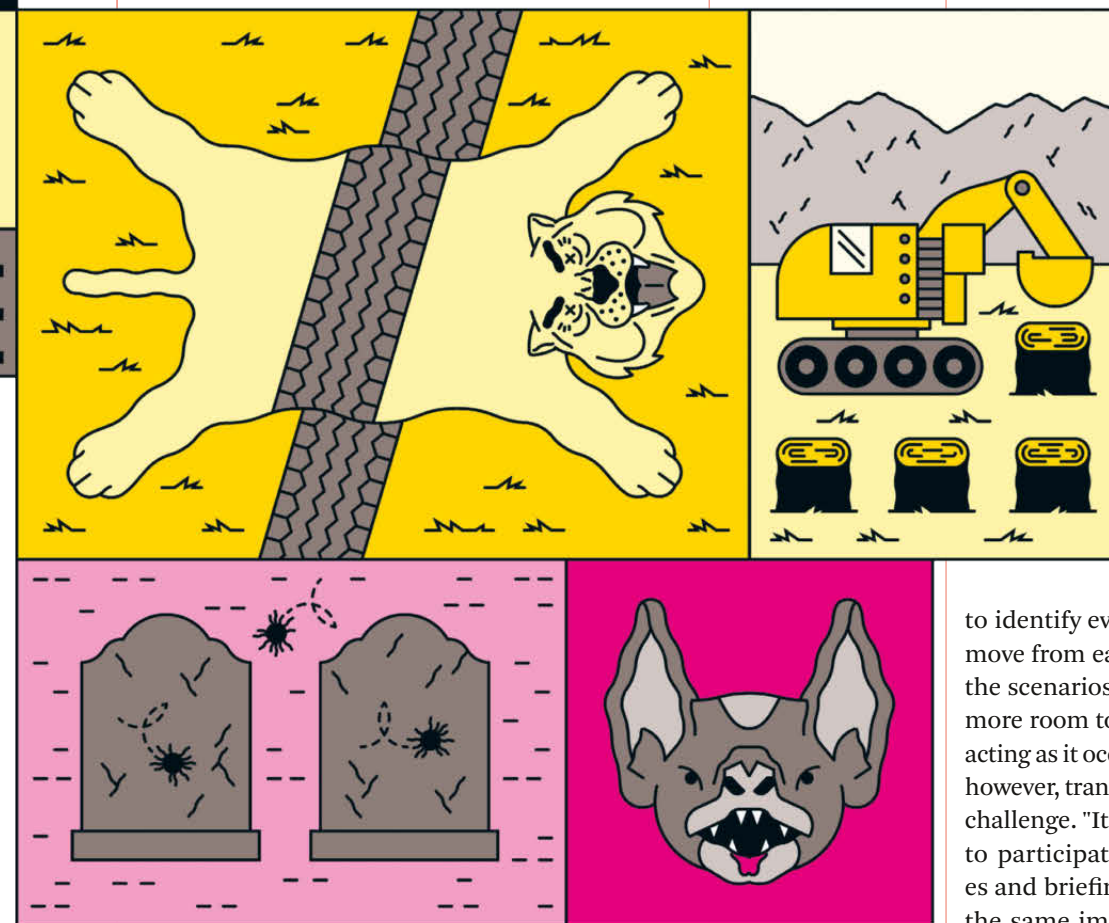
seem unable to work on more than one crisis at a time, which often means that the other dangers are left to increase while they're trying to solve one."

ANOTHER, BROADER ATTEMPT to think backward from multiple future scenarios was the Global Futures Forum (GFF), started in 2005 by the US

State Department. Susan Nelson was one of the civil servants who ran the GFF, which has since been discontinued. She calls it a "one-of-a-kind network of intelligence and security professionals from 24 member countries friendly to the US, working together to anticipate and solve transnational security issues of common concern." With 1,800 members, the GFF comprised self-organized communities of interest around various topics, even if the interlocking scenarios were not yet referred to as "polycrisis."

Participants would construct future scenarios around a best case and worst case and then try

to identify events or actions that could happen to move from each back to the present. "The value of the scenarios approach is to give decision-makers more room to shape the future rather than just reacting as it occurs," Nelson says. In the final analysis, however, translating those insights into policy was a challenge. "It was difficult to get busy policymakers to participate in these time-consuming exercises and briefing [them] on the findings didn't have the same impact it would if policymakers



had been able to participate directly." Getting decision-makers to understand how multiple crises interact is still a tall order, yet more urgently needed than ever, she adds.

The reason why thinking about the polycrisis hasn't evolved much comes down to one fact: institutional disregard for the long term. Politicians tend to be in office a relatively short time and need to deliver results. Sensitizing them always requires a trade-off, says Nelson: "We learned that when trying to get policymakers to consider how their decisions today might impact the future, it was vital to include a short-term win." Scoring quick points on national security issues, for instance. Yet short- and long-term goals don't always align.

DRIVEN BY A NEW SENSE OF URGENCY, the perspective of decision-makers in politics and business seems to be finally shifting. Take Cat Tully, who worked as a strategic planner in the UK government of Tony Blair and founded the School of International Futures. When she pitches her global nonprofit collective to international bodies and governments around the world, she opens with a bold statement: "Systems are cracking. We are excited." By that she means the opportunity to use a dysfunctional state of affairs to create new systems and institutions to

FUTURE NOW



The perception of risk

A 2021 survey prompted scientists to rank the likelihood and potential impact of risk factors.

Top risks by likelihood

- 1 Extreme weather -
- 2 Human environ. damage ↑
- 3 Biodiversity loss ↓
- 4 Climate action failure -
- 5 Infectious diseases ↑
- 6 Natural resource crisis *
- 7 Digital inequality ↑
- 8 Digi. power concentration ↑
- 9 Involuntary migration ↓
- 10 Cybersecurity failure ↑

Top risks by impact

- 1 Climate action failure ↑
- 2 Biodiversity loss ↑
- 3 Infectious diseases ↑
- 4 Human environ. damage ↑
- 5 Extreme weather ↓
- 6 Weapons of mass destr. ↑
- 7 Natural resource crisis *
- 8 Geophysical disasters -
- 9 Cybersecurity failure ↓
- 10 Involuntary migration ↓

Upward (↑) and downward (↓) arrows reflect a change in position compared with *The Risk Perceptions Report 2020*. An asterisk (*) indicates a new entry to the list; a dash (-) no movement (same position as 2020).



CAT TULLY,
The School of International Futures

We can't let old doomsayers colonize the future with their misery.

act as a scaffolding to build new, positive futures. "We can't let old doomsayers colonize the future with their misery," Tully says. Instead, she works with a network of young activists to compel CEOs and politicians to think about future generations. "Intergenerational fairness is baked into everything, from Covid to climate change," Tully reports from her regular high-level meetings. Examples include the UN secretary-general creating a special envoy for future generations and the EU declaration of 10 commitments, including the pledge to "safeguard the future for the next generations of Europeans."

Consultants and influential thought leaders try to leverage this growing openness to drive a lasting change in mindset and business practices. One is New York-based academic Ari Wallach, author of the book *Longpath*. He tells executives that we are at an "intertidal moment," a historic

A WAR ON DREAD Working to shape a new, more positive narrative in the face of ongoing crisis can be leveraged to create lasting change.

event where unprecedented waves of change and upheaval are crashing onto the shore, washing away the status quo. "The hyper-rationalized way of looking at the world, or what you could call techno-solutionism, is coming to an end," he argues.

Yet instead of despairing at all system failures in full view, Wallach exhorts leaders to develop a positive outlook and a new narrative. "If you don't develop an idea where you want to head to, you will wallow in this crisis moment. We need to have something on the other side." For him, that means personal introspection on what actions taken today can turn us into "great ancestors," or the best stewards for the future. Exercises such as leaving one chair empty around the table to represent future stakeholders may sound trite, but work well. "It gives C-level people a safe space to have a conversation about future generations and engage in exercises around multiple possible futures."

WILLING A POSITIVE OUTCOME in the face of polycrisis is also what drives the success and celebrity status of Oxford philosopher William MacAskill. His data-soaked *What We Owe the Future* has found eager readers who want to ponder what they can do now to impact billions yet unborn. The path to long-termism is "a risky expedition into uncharted terrain," MacAskill writes. "In trying to make the future better, we don't know exactly what threats we will face or even exactly where we are trying to go, but, nonetheless, we can prepare ourselves. We can scout out the landscape ahead of us, ensure the expedition is well resourced and well coordinated, and, despite uncertainty, guard against those threats we are aware of." Focusing resources on the dangers in sight is the main thrust of the Effective Altruism movement of which MacAskill has become a "reluctant prophet," as *The New Yorker* puts it.

A growing cadre of academics and theoreticians are laying the groundwork for understanding what humanity is up against, yet one big unanswered question remains. Are humans cut out to multitask when dealing with an increasingly chaotic world? As Cascade's Michael Lawrence sees it, "we are good at solving one problem at a time. That kind of siloed problem-solving is not suited to our present predicament." That's why he urges more research on the feedback mechanisms between crises which reinforce and escalate one another. "We need to think more about how the disruptions wrought by global polycrisis can be turned into moments of opportunity to reconfigure our societies." ■

FUTURE NOW



A guide to surviving stagflation

Choppy economic waters and challenging financial headwinds lie ahead. Finding opportunity and the best way forward requires a different way of thinking about business – here are some guidelines to bear in mind.

BY **Ram Charan**

EVERY DAY now we are hearing the drumbeat that a recession is coming and will likely spill into stagflation. And stagflation is ugly: The cycle of rising prices, declining demand and increasing layoffs eats at the core of humanity. People lose self-respect.

Central banks are compelled to keep increasing interest rates to break this cycle, but expect a painful process. Chair of the US Federal Reserve Jerome Powell acknowledged the challenge at a press conference in early November 2022, saying "the longer the current bout of high inflation continues, the greater the chance that expectations of higher inflation will become entrenched." Sustained rate increases and rising costs will force companies to make deeper cuts in 2023 and layoffs will spread. The psychology of hunkering down will take hold. It will be hard to break. It could last two or three years.

With adversity already hitting some countries hard – think Turkey, Argentina, Italy and the Netherlands – the time is now to get ready for what's coming. Business leaders will have to make some bold moves to get through the downturn. At the same time, they should prepare for a return to growth, because the depth and duration of the downturn are impossible to predict.

SUSTAINING THROUGH such a period of high inflation, recession and stagflation requires an intense focus on cash. In a growth scenario, the focus tends to be on profit margin in percentage terms. Now it should be on cash – cash gross margin, in particular. When inflation reared up, companies moved quickly to secure access to cash borrowing. Now they should look at every aspect of cash that is coming in and how it is being used. That analysis will indicate when making incremental cuts is not enough. That's when it's time to lop off whole

geographies, businesses or product lines to become a smaller, stronger company.

More insights still will come from analyzing individual customers' use of cash. Do they require you to hold excess inventory? Are they extending payment terms? When one company evaluated individual customers' impact on cash, management was surprised by the wide variation in the discounts and payment terms they offered. They took corrective actions to get the outliers in line. Customers' own cash situations bear watching as well. Maybe you can help a customer face the economic realities, but if their cash situation is teetering, look out.

When cash is critical and borrowing is costly, usage must be razor sharp. Remember that recent shifts in the economy make many linear projections of costs and interest rates unreliable. Predictions about market and consumer behavior may be unreliable too if they're based on historical patterns. Under new

assumptions, some projects that are consuming cash may have to go.

Another reason to evaluate current projects is to shift cash to projects that have new urgency. Some small-scale, fast-return digitalization projects could become a high priority to offset rising costs. A new generation of third-party vendors can create and even implement applications targeted at specific problem areas. I have personally seen companies reap financial benefits in six or seven months at relatively low cost. Speeding up payments processing, for example, is a relatively quick fix that cuts costs and conserves cash. Digitalizing inventory management is also a targeted, time-bound project that can free up cash return in a matter of months.

THE HARDEST CUTS TO MAKE, of course, are people. While earnings may have been strong through 2022, forward projections likely tell a different story and leaders should make necessary adjustments ahead of the drop in demand and take care in how they treat people. Be clear about why layoffs are necessary. Laying out the facts of the external reality will build credibility and set a positive tone for the people who remain. People will be less fearful if they understand why layoffs have occurred and how the company plans to get through.

Communication is a big part of leadership in adversity. When much of the economic information people pick up outside work is negative, leaders should communicate as directly and as often as possible to counter it. Help people understand exactly how the macro trends are affecting the company. Comparisons can be encouraging or downright depressing, so beware of comparing this year's performance numbers with pre-inflation numbers. Instead, show how the company plans to make gains in the emerging environment.

People who remain in their jobs will expect salary increases to keep up with inflation. The war for talent will not stop. Retaining those with specialized



RAM CHARAN,
Business advisor

The world economy is in flux, but if we look far enough out, we know that growth will resume.



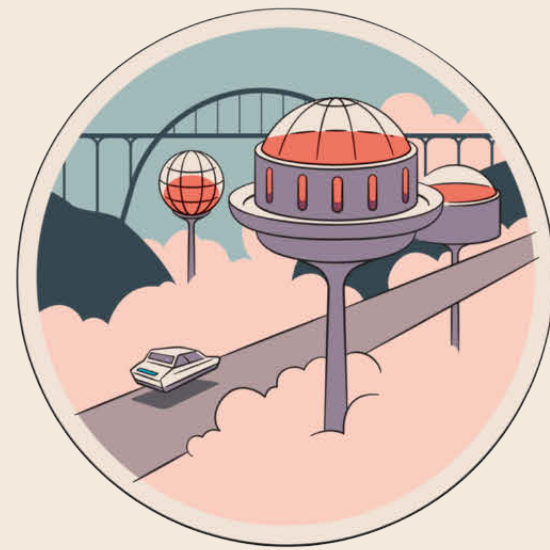
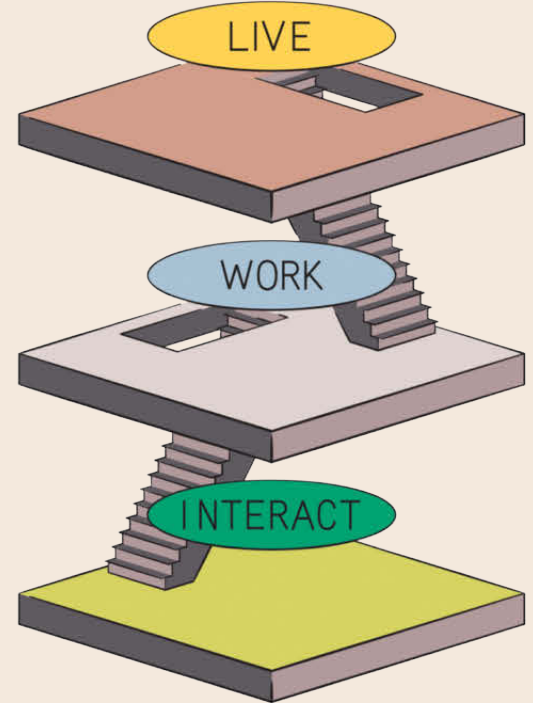
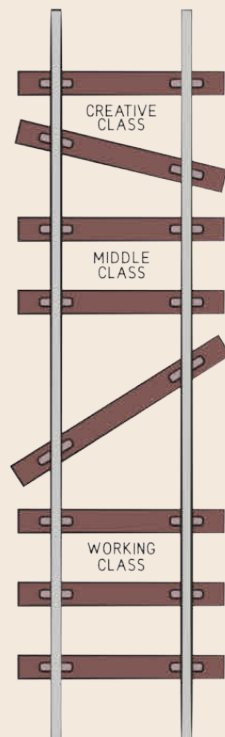
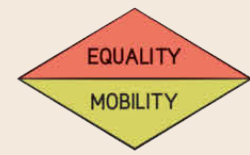
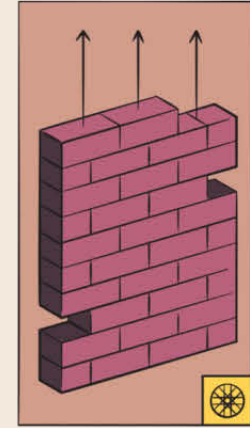
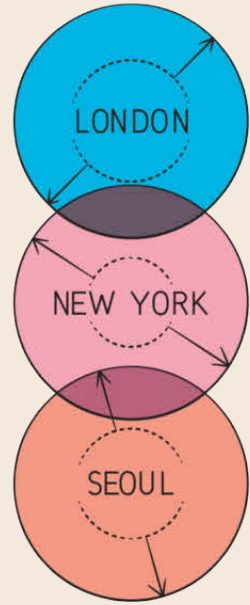
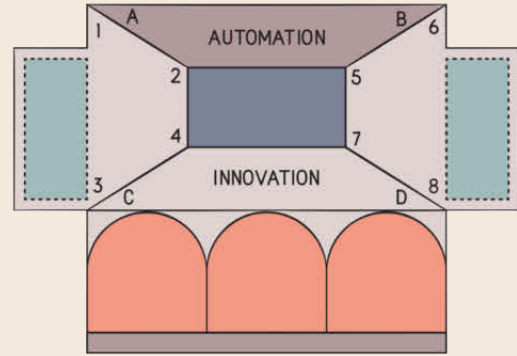
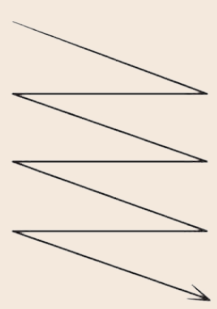
RAM CHARAN is a renowned CEO advisor, director of seven boards and the author or co-author of 36 books including *Execution*, a *New York Times* bestseller for 150 weeks, and *Leading Through Inflation*.

skills or expertise means keeping up with the market for that talent, but a positive work environment also helps. There's simply no way around the fact that companies will continue to compete for top talent, so you will have to fight to retain those with the skills and expertise you need.

WE ARE NOW IN A WORLD where actions – and reactions – change the landscape almost daily and noneconomic forces wreak havoc on the economy. Geopolitics is suddenly a huge economic disruptor. Russia's war against Ukraine is an obvious example. As are President Xi's increasingly hostile rhetoric toward the West and President Biden's actions to block the flow of technology to China.

The world economy is in flux, but if we look far enough out, we know that growth will resume. New needs and new businesses will be created in what could be a \$30 trillion global GDP 10 years from now. The bright side can't be found in numbers alone. Spotting it requires a different way of thinking about the business. It's a matter of looking at the external landscape from the outside in. It's a qualitative exercise that requires intuitive thinking.

Identifying the gaps in the market and needs that will increase when the economy stabilizes allow businesses time to build whatever capability is missing. Operational discipline and sufficient cash supply will position a company to pounce on opportunities as things open up. It takes a new kind of leadership skill to keep people energized through tough times and show them the pathway forward. Adversity will come, but there can be a new future of innovation, growth and prosperity. Overcome the psychological barriers and prepare for both. ■



Predicting the future is no longer the preserve of fortunetellers. Some experts can read the data as to what we can expect in the future – with some thoughts on how to prepare for the changes. We talk to three subject specialists to find out how **we might experience the world in the coming decades and beyond.**

Report from the future

BY **Geoff Poulton** ILLUSTRATIONS BY **Jacques Kleynhans**

JOURNEY TO THE FUTURE PART 1 Fact to the future

JOURNEY TO THE FUTURE PART 2 Report from the future

JOURNEY TO THE FUTURE PART 3 Turning fiction into fact

*** Shaping Visions ***

*** Leading Thoughts ***

↳ PAGE 30

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AT THE BEGINNING of the 20th century, writer H.G. Wells' predictions for 2000 got plenty of things right: suburban growth, the European Union, space travel and satellite TV. He also got a few things wrong: Submarines would fail and capitalism would collapse amid a series of chaotic wars. Today, Wells' work is widely considered to be the birth of futurology – the study of social, technological and environmental trends to anticipate life in the future. There are now thousands of futurists around the world, scouring data, observing trends and tapping into their imaginations to deliver forecasts to businesses, governments and the general public. Here, we cast our gaze forward a few decades and consult three experts on their expectations for a few of the most important changes, all of which will have a profound impact on how we live and work. →

→ RICHARD FLORIDA

URBAN & SOCIAL DEVELOPMENT

SOME PEOPLE THINK CITIES are going to change massively over the next couple of decades – I don't think this will be the case. Sure, in 2040, there'll be some lovely new buildings, robot deliveries, a few drones flying overhead and more automated vehicles on the streets. But cities will, for the most part, look and feel the same as they do today. The "Jetsons future" is still a long way off. What cities will be are more efficient places to organize human activity. That means better mobility and improved space utilization with more multiuse facilities, also thanks to remote work technology.

The days of the central business district (CBD) devoted to packing and stacking knowledge workers who commute in every day are over. CBDs are going to become more like CCDs – central connectivity districts. So we'll have different kinds of workspaces devoted more to interaction. They'll become more 24/7, with living as well as working areas. And because the likes of London and New York are the best places in the world to connect – in terms of flight connections, airport infrastructure, hotels, restaurants and so on – they'll still be just as important, if not more so.

WHILE THERE'S BEEN MUCH debate about the death of major, superstar cities, I think they'll actually get bigger, not smaller. And I'm not just talking about physical agglomeration and spreading out – there will also be more virtual agglomeration. We're going to see bigger networks of cities with the major urban areas at their hub. Cities will be physical and digital at the same time. If we take London as an example: Other cities in the UK will physically become part of a more London-anchored complex, but London also has increasingly strong virtual connections to cities and outposts around the world. And that means we're going to get digital suburbs. So, the center point of someone's work may be London, and they may have to commute there once a quarter, but they live somewhere completely different. In the US, we're seeing Miami emerge as a digital suburb of New York, for instance.

Demographics and social mobility will also be hugely important for the development of cities over the next couple of decades. Economic mobility

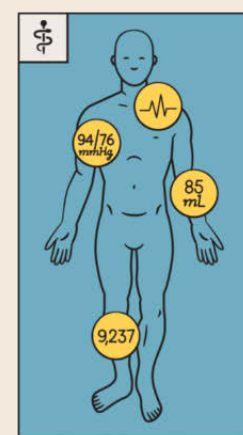
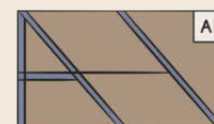
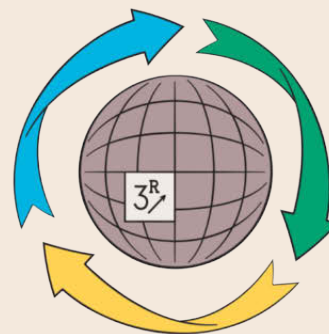
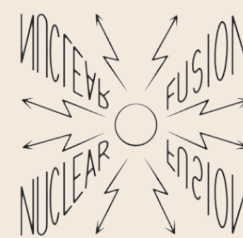
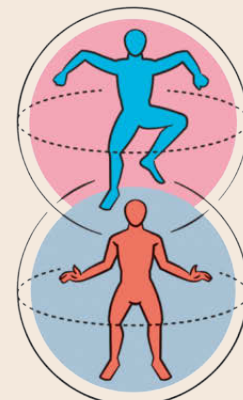
will require geographic mobility – the talented, educated and ambitious people will move more than ever before to look for opportunity, particularly the younger generation. This will make big cities even more cosmopolitan. They are the talent magnets for the world – that won't change. And because of communication and remote work technology, many more people no longer need to stay in these cities long term to continue to reap the benefits.

OF COURSE, IT'S VITAL WE CONSIDER those who don't have this mobility. We need to create a new social compact that gives people opportunity and enables them to lead purposeful lives. I have no doubt that we'll work it out, but it will take time. The great thing about cities is that they are so diverse. Solutions to these sorts of problems typically arise in cities before being rolled out at a national level.

Make no mistake: It's going to be a difficult adjustment period before we get there. And we're going to have to change things. We need to create more effective toolkits for building better cities – particularly in the developing world, which is entering its main period of urbanization. The institutions and frameworks that support leadership and policy direction at the national level don't exist for mayors and local officials. And we're moving far too slowly. Poverty, inequity, climate change – the great challenges of the world are nested in cities. But our cities and city leaderships don't have the tools and the capabilities they need to solve these problems they face. They need more autonomy if we are to build better cities around the world.

RICHARD FLORIDA,
Renowned urbanist and author

It's going to be a difficult adjustment period. And we're going to have to change things.



→ GERD LEONHARD

AI AND MACHINE LEARNING

THE NEXT 20 YEARS WILL BRING more change to humanity than the previous 200 as the exponential curves for a number of technologies really take off. We'll go from 3D-printing small, simple things like dental implants to rapidly creating complex, vital objects such as houses, body organs and food, for example. Quantum computing will help deliver unlimited clean energy via nuclear fusion. And we'll have outsourced most of our dull, repetitive and dangerous work to machines. In fact, by 2040, many of us may only need to work just three or four hours a day.

Which is not to say that machines will have taken over completely. Humans will have more freedom to focus on other, more creative kinds of work. People have many kinds of intelligence –

*FUTURE-READY
Focusing on the digital, human and sustainability revolutions is a better position than fixating on the past.*

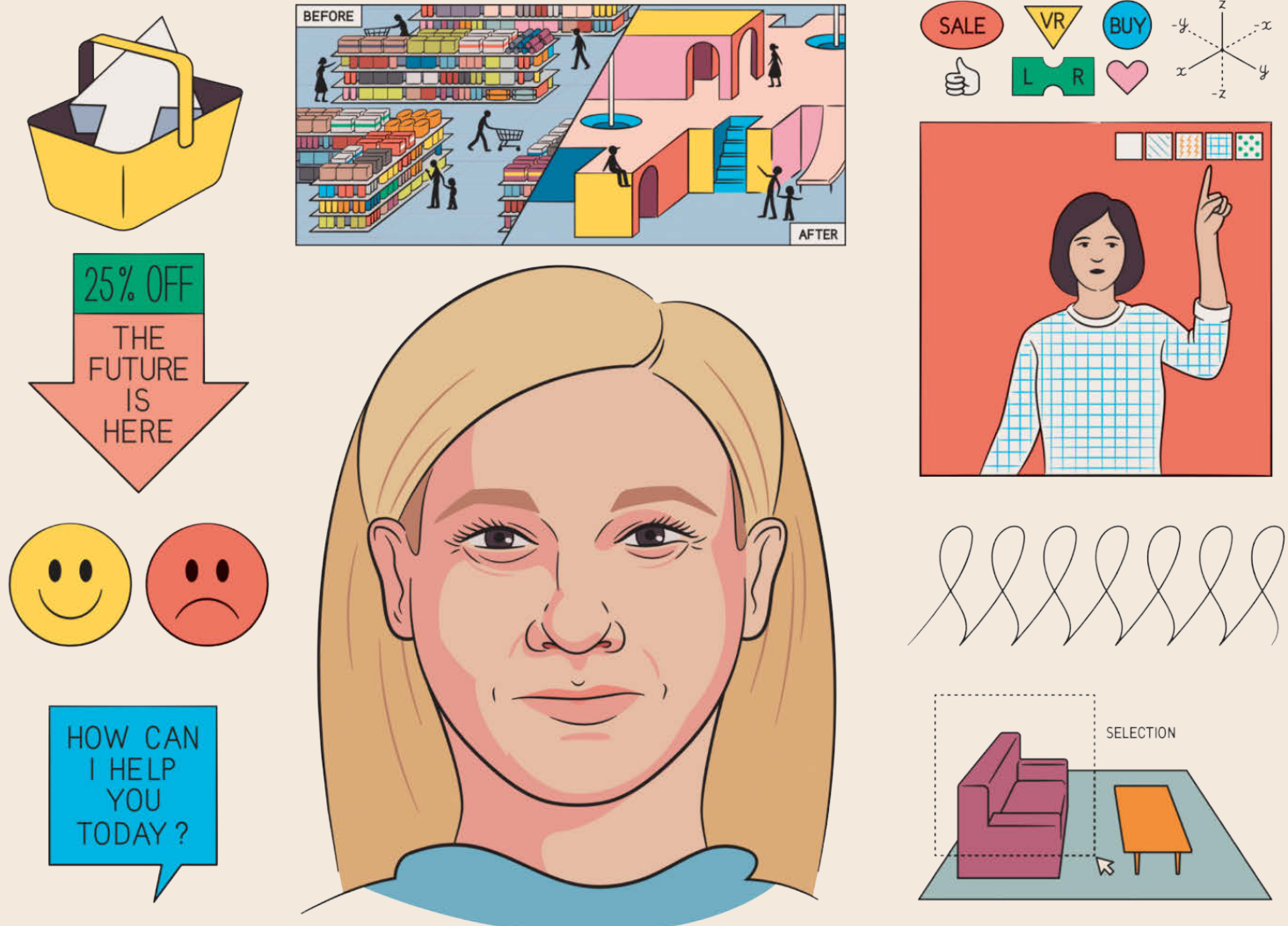
emotional, social, kinesthetic and so on. Machines only really have one – logic. While they are already much better than humans in this area – a gap that will continue to grow wider – we will remain ahead of machines in many other aspects for a few decades yet. Until the singularity, at least. But that's another story.

When it comes to the world of work, we need to be mindful of who benefits from the huge jumps in efficiency and productivity that AI and robotics will bring. The financial gains must be distributed fairly. This is something both the private and public sectors need to figure out in the relatively near future. Policymakers can't just ignore the externalities of automation.

BECAUSE THE PACE OF CHANGE is accelerating so quickly, governments are really going to have to shape up and get future-ready. They need to know what's coming. Most of them are still too fixated on the past or the next election cycle – this will have to change. While we don't want to inhibit the development of science and technology, we do need to ensure that it is controllable and to our benefit.

One crucial area that technology will improve tremendously over the next 15-20 years is health care, which is still extremely expensive and inefficient. But in 2040, most of us will have personal devices that constantly record all sorts of health-related data – weight, blood sugar, heart rate and so on. AI systems will be able to analyze this data and provide tailored recommendations for ways we can improve our health – food, drugs, exercise. This will help us to massively reduce the prevalence of diseases like diabetes. Instead of "sick care," we'll have real, proactive health care. But, just like with the workplace, we'll need a supervised public mechanism to make sure this is done safely and securely.

I THINK WE'RE GOING TO SEE three revolutions: the digital revolution is ongoing; the sustainability revolution is just beginning; and we'll also have the human revolution. People are sick and tired of hearing that machines will take over and that we're heading toward a dystopian future. We're going to realize that we need rules, regulations and social contracts that ensure we respect humanity. And we're going to realize that we need to work together to create what I call "the good future." Because we're not short of solutions or money; we're just short of collaboration. →



→ **BLAKE MORGAN**
CUSTOMER EXPERIENCE

SHOPPING WILL BECOME much more about the experience than the products people buy. That's because the shopping experience of the future will be more personalized and technology-driven, able to move seamlessly between the physical and digital worlds to give customers exactly what they want when they want it. Stores will become experimental showrooms where customers can connect with brands in new ways, rather than to purchase items. They want to touch products, see how they work and then have them personalized and delivered quickly to their homes. Physical stores will leverage technology to create unique customer experiences, such as using augmented reality (AR) or virtual reality (VR) to showcase the product. It will be the best of both worlds: a customized product with quick and

*TAILOR-MADE
A unique sale approach will foster loyalty in consumers looking for more authentic relationships with brands.*

convenient delivery, while also providing the human touch of personalized service and a memorable experience. People aren't going to suddenly disappear from the shopping experience – brands have to strike a balance between innovation and the human element. Personalization also extends to sales as well as marketing. In 10-15 years' time, customers will be much more aware of companies' techniques to get their attention and try to sell them things. The future of sales and marketing is extremely targeted so that customers feel like they are being recommended products and experiences they don't yet know they need instead of constantly being pushed to buy the same items as everyone else. Marketing will feel more like a good friend telling you about a product they know you will love and use before you realize you need it, rather than constantly being yelled at to buy the newest product. And

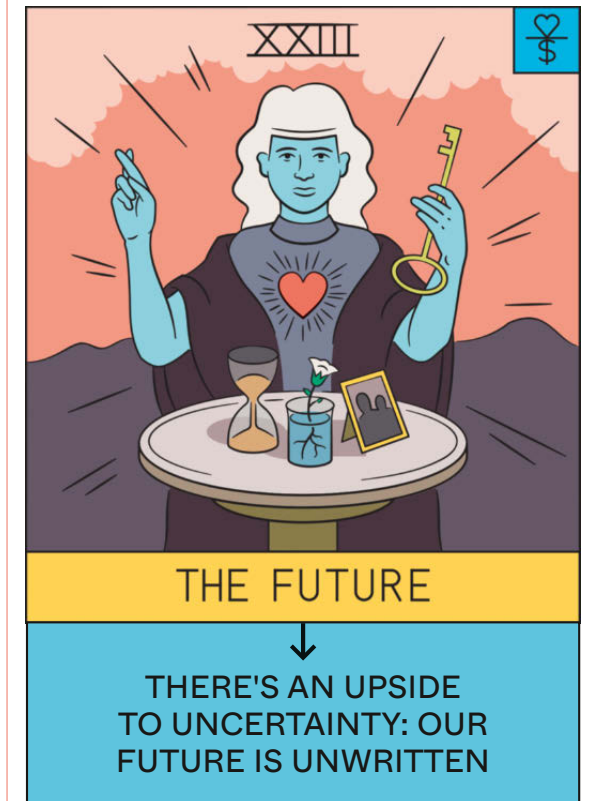
with that in mind, companies will need to tone down their mass-marketing efforts and focus on data and personalized outreach. They need to understand their customers completely and translate that understanding into a unique experience almost instantly.

I EXPECT CUSTOMERS TO GAIN even more power over the next couple of decades. They won't choose a brand simply on product or price – it will be about the entire experience, especially around what the brand stands for and the good the company does in the world. If a brand isn't transparent or authentic and doesn't take a stand on important issues, customers won't want to use it. Sustainability and community involvement will be much more important – something that companies still underestimate today. In the future, customers are more likely to connect with brands that take a stand and make a difference in the world – and they will stay incredibly loyal to those brands.

Ultimately, customers trust companies to make a difference in the world more than they trust governments. Brands have an incredible responsibility – and opportunity – to change the world through sustainable efforts, getting involved in their communities and standing up and raising awareness for critical social issues. Brands that don't showcase authenticity and transparency will be overlooked by customers and become obsolete.

BLAKE MORGAN,
Customer experience futurist

Marketing will feel more like a friend telling you about a product they know you will love before you realize you need it.



WHILE THE WORLD seems especially full of uncertainty and unpredictability right now, it's worth remembering that this is nothing new – societies have evolved for thousands of years. What is different about today is the pace of evolution, driven mostly by technological innovation. Industries, supply chains and much of the global population are more connected than ever, ensuring the ripples of change quickly spread far and wide. Of course, this has brought – and will continue to bring – huge benefits to much of the world, from improved health care and sanitation to better mobility and communication. But are we reaching a tipping point? While each of our three experts focus on very different areas of society, a common thread is the importance of human experience and connection; in creating our future, we must remember that technology should make us better, healthier, happier people, not just more efficient ones. Viewed through today's lens, this seems like a positive, logical goal. But, of course, values, perceptions and priorities can – and likely will – change. As Chuck Klosterman reminds us in his book, *But What If We're Wrong?*, what once seemed reasonable can become absurd, from cultural tastes to scientific "laws," which makes predicting the future decades from now almost impossible: "When you're gazing into the haze of a distant tomorrow, everything is an assumption."

*The growing pace of climate change, pandemics and geopolitical tensions ... the prospects for our world today might seem dark. But there's reason for hope: Freethinking projects now offer a way to **break through to a brighter vision for tomorrow.***

It's time to unleash the future!

PHOTOGRAPHY BY **Luca Locatelli**

NEW ATTRACTIONS
Six hundred miles from the North Pole and previously a center for coal mining, Svalbard, Norway, is switching its main industry to tourism and drawing a small number of tourists annually to take in its Arctic landscape and polar bears.



ONE OF THE most characteristic symptoms of the time in which we live is the growing sense of loss of a better future, of a hypothetical tomorrow perceived as something promising – and yet unknown.”

That's how photographer Luca Locatelli expresses the impulse and thinking behind his series of photographs *Future Studies – Look at the Present to Unleash the Future*. The title sounds like instructions or a call to arms, which in some ways it is. His photographs subtly address what could be pessimism of a dark future and offer instead an alternative take for a positive tomorrow. The wide-ranging scope comes from a long and thoroughgoing

process that began in 2011. Photographs, videos and data have all formed a part of his analysis to look at new ways to live on the planet. His intention is “to trigger the viewer on a critical debate on the precarious balance of humanity on Earth.” The images have a science fiction-like quality, which he says is a direct intention; its effect is to show us that the future is here now, with new ways of doing things that could find solutions to the huge problems we face. As he puts it, it's all about “reestablishing a healthy relationship with the planet.” His hope is that his images might contribute in some way to restore hope. It's a noble aim and his images do in some way expose the possibility of a brighter future. ■



GLOWING POWER
A volcanic greenhouse in Iceland uses water enriched with nutrients and energy from a nearby geothermal power plant.

FLY FARMING
A startup company in London cultures black soldier flies as a protein source. The larvae are fed local food waste and are then used to feed pets and farmed animals, such as fish and livestock.

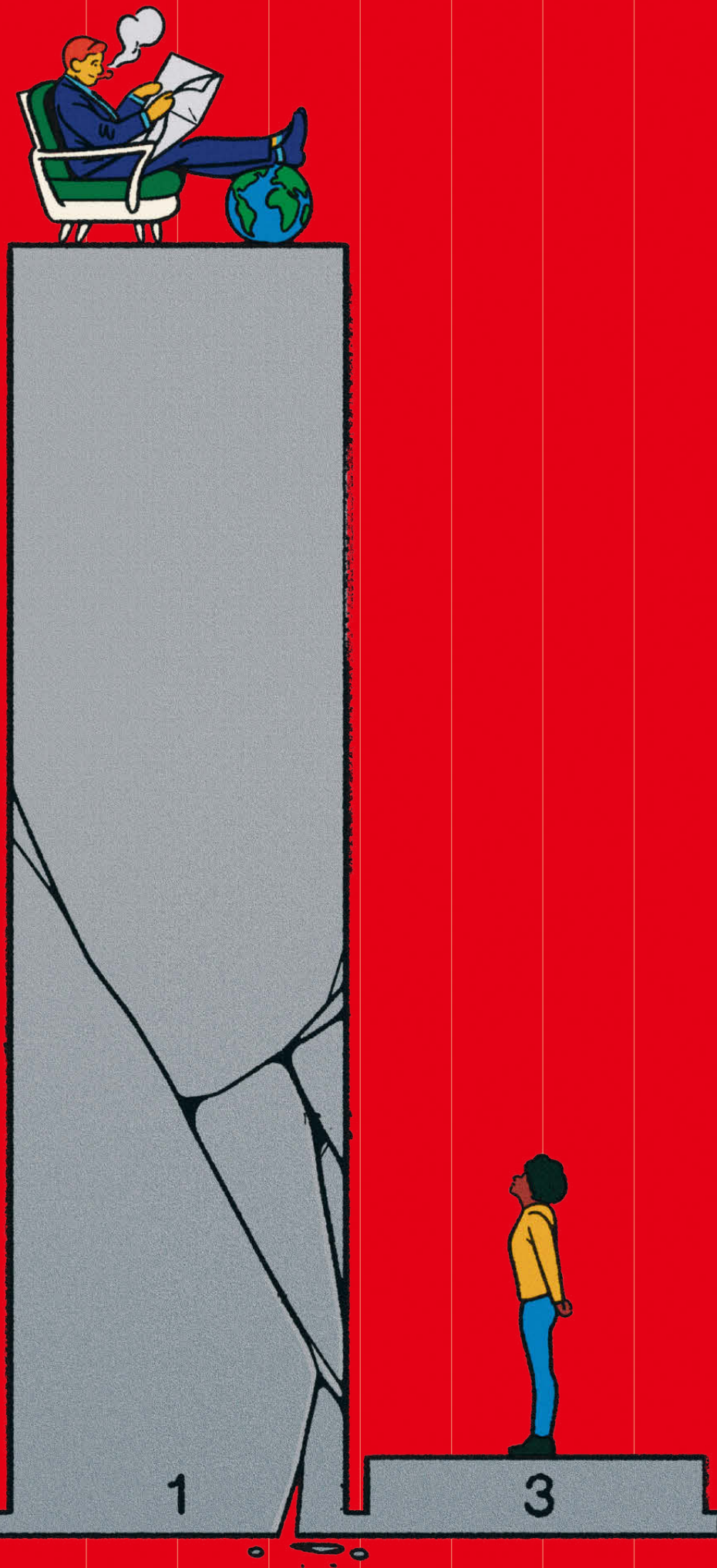
FUTURE NOW



STACKING THE ODDS
 Vertical farming facilities like this one in Maasbree, Netherlands, are using technology to grow more food in less space – and closer to urban areas. The technique reduces the land needed for farming by up to 90%.



GROUNDING
 The largest aircraft "boneyard" in Arizona, USA, handles some 3,300 planes. Parts are reused and some aircraft are reassembled to be put back into service. At the very least they become part of the circular economy as scrap for steel and aluminum recycling.



A PRECARIOUS PODIUM
 With a growing disparity in wealth distribution, capitalism's winners are increasingly finding themselves isolated in an ivory tower.

The richest 10% of the global population own roughly 190 times as much as the poorest 50%.

The world's richest 1% own nearly half of the world's wealth.

And the 10 richest men on the planet have, since the start of the pandemic, seen their wealth double, while many others have watched their income fall.

The trouble with capitalism

BY **Farah Nayeri**
 ILLUSTRATIONS BY **Alberto Miranda**

*Unrestrained capitalism could be catastrophic for business as we head into the next few decades. To see a bright future, argue some economists and thinkers, **we need to rethink the system and enact a new kind of model that reduces inequality.***

T

THE SOBERING STATISTICS on the previous page point to one unmistakable fact: A tiny group of individuals has been swallowing an increasing share of the planet's wealth at the expense of everyone else. Income inequality is one of the consequences of capitalism, an economic system that, in large parts of the world, is the only game in town.

Capitalism is predicated on maximizing profits and delivering value to shareholders. And in the last few decades, corporations and investors in the West have done just that. They have put those aims ahead of all else – including the well-being of their workforce. Governments have largely stood back and kept taxation and regulation at minimal levels to allow business and finance to go about their activity. The prevailing attitude has been that markets are to be left alone, because they know best.

Yet in the decade and a half since the 2008 global financial crisis, capitalism has started to be called into question, even by those who profit from it the most. The billionaire Warren Buffett has repeatedly asked that he and other very high net worth individuals be taxed more, noting that his secretary is taxed at a higher rate than he is. Fellow billionaire Bill Gates has acknowledged that companies "need to take a long-run view of their interests and not just focus on short-term profits," and that when it comes to capitalism, "we should do more to curb its excesses and minimize its negative aspects."

Beyond the billionaires themselves, the voices clamoring for a different and more humane economic system are growing in number and intensity. The consensus seems to be that after decades of American-style, free-market, laissez-faire capitalism – during which shareholders reigned supreme, markets ruled the roost, and workers were regularly laid off to shore up the bottom line – the time has come to inject doses of what one might loosely

define as socialist practices into Western economies. In other words, the time has come to tax the wealthy, regulate corporations, compensate wage earners more fairly and spread the gains more evenly.

CRITICISM OF CAPITALISM is particularly acute in Europe where French economist Thomas Piketty, in his global bestseller *Capital in the Twenty-First Century*, has denounced income inequality as a primary cause of social injustice. Another skeptic of the system is Mariana Mazzucato, a professor of economics at University College London. She points to alternative models of capitalism as practiced in Germany, Scandinavia and Japan, where companies are under no obligation to maximize short-term profits, where they pay their executives less and where they are accountable to a wider set of stakeholders, including employees. Yet some of the loudest critics of American-style capitalism are to be found in America itself.

One such longstanding antagonist is Professor Richard D. Wolff, who taught economics at the University of Massachusetts at Amherst until 2008 and is now a visiting professor at The New School university in New York. His views are suddenly in tune with the zeitgeist. "I have done more public

RICHARD D. WOLFF,
Economist, professor and author

I want to convert the businesses of this country, factories, offices, into one-person, one-vote democratic communities.

TURNING THE TABLES
After decades of laissez-faire capitalism, there's a call to distribute a larger portion of wealth to wage earners' plates.



speaking, and had more invitations from the most legitimate sources you can imagine, in the last six years than in the previous 50," he says. Born in Youngstown, Ohio, Wolff says he was the son of a steel worker whose factory was once the city's nerve center: It produced the steel that was then used by car manufacturers in Detroit to make the automobiles that were a shining symbol of postwar American prosperity.

The professor recalls that for a long time, the ethos in America was as follows: "If you work hard, and keep your nose to the grindstone," you will get a good job and earn enough money to "get this bundle of things which should make you happy." Yet in the last 40 years, that promised bundle had been "increasingly shrinking and withheld from the average American person," he says. And this was happening not in an economically disadvantaged nation, but in the United States, the world's richest country. That's because a few decades ago, American corporations were given incentives to

\$3
THOUSAND

The approximate average annual income (purchasing power parity) of the global bottom 50%. The average for the global top 1% is approximately \$335,000 – or 112 times higher.

SOURCE: THE WORLD INEQUALITY REPORT 2022

"make a lot more profit by going to China or India or Brazil." They also automated their production capacities using computer robots and artificial intelligence – drastically reducing the need to hire living, breathing American workers. The result was "a 1-2-3 punch to the working class," says Wolff.

THE PANDEMIC ADDED INSULT to injury. Between the first month of 2020 and the middle of 2021, roughly 18 months, more than 80 million people in the US lost their jobs, meaning half the workforce. Some were only unemployed for a few weeks, but others were jobless for the duration of the pandemic. It was a "terrible crash" that was second only to the Great Depression. Add to that the mismanagement of the pandemic, inflation and high interest rates, and you get a situation that is likely to lead to "spectacularly disruptive, explosive social effects."

According to Wolff, the "[the US has] peaked: The American Empire is now in decline." The solution? Introduce far more democracy into the →



RESPECT 'THE LITTLE GUY'
Big-handed capitalism missed an important point – fair employee compensation contributes to sustainable returns.

community of shareholders. Under the current system, 10% of shareholders hold 80% of the shares. The rule is one vote per share. Switching to one vote per shareholder would be so much fairer, Wolff argues. "I want to convert the businesses of this country, factories, offices, into one-person, one-vote democratic communities," he says. "I believe you will get decisions that are radically different about our economic life if you do that."

HOW DID AMERICAN CORPORATIONS come to place the interests of shareholders above all else? The foundations of that philosophy were laid down in the 1970s, with a number of economists envisioning a bigger role for corporations in society. They identified profit maximization as an objective that should be achieved at all cost, in a free market, with minimal government intervention. The man who turned that philosophy into a mantra, not just for himself and his company but for all of corporate America, was Jack Welch, chairman and chief

35%

The total household wealth held by the top 1% of North America, based on the sum of financial and nonfinancial assets. The disparity is lowest in Europe (25%) and highest in Latin America and Russia/Central Asia (46%).

SOURCE: THE WORLD INEQUALITY REPORT 2022

executive of General Electric for 30 years – the man who, on departure, collected a severance payment of more than \$400 million.

In his book on Welch, *The Man Who Broke Capitalism*, David Gelles describes the late executive as "hungry for power and thirsty for money" and "an ideological revolutionary who focused on maximizing profits at the expense of all else." Under "Neutron Jack," he writes, GE went from "an admired industrial behemoth known for quality engineering and laudable business practices" to "a sprawling multinational conglomerate that paid little regard to its employees and was addicted to short-term profits." Because Welch got rid of more than 100,000 employees while at the helm and went on to be named "Manager of the Century" by *Fortune*, he became a model that other US corporations and chief executives followed: by dedicating themselves to the cause of short-term profit.

Today, it's getting "harder and harder to ignore how destructive this way of doing business is,

especially for the workers," Gelles says. "I am not calling for an end to profit," but to "how those profits are distributed." He recalls how different things were at General Electric in 1953, when the company had one of its best years ever. In the annual report, management "talked proudly about how well the company did," and described as a positive development the fact that "the payroll was maybe the largest ever." The message to investors was that it was a "great thing" to be able to pay workers and suppliers well, because it contributed to the company's prosperity and delivered to investors "a reasonable return."

Gelles says he is not advocating a cancellation of capitalism, nor does he believe companies should say: "We don't care about profits anymore." Rather, companies needed to focus on delivering sustainable, long-term returns: to explain to their shareholders that it is in their interest for the company to take care of its employees, that it would reduce turnover costs and training costs, and that regulating executive compensation is also a "good thing."

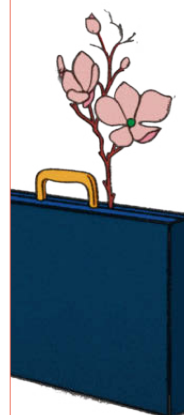
To Branko Milanovic – a senior economist at the Stone Center on Socio-Economic Inequality at the City University of New York – it is "factually incorrect" to describe the present as a "crisis of capitalism," because there are no efforts inside the world's big corporations, or within Western governments, to overhaul the system and make any noticeable reductions to income inequality. "It's been at least 10 years that inequality has become the main focus of conversation," he says. "But no policies were put in place." Admittedly, during the Covid-19 pandemic, inequality diminished as governments made "huge transfers" to citizens, "but that was a one-off situation of total emergency."

THERE ARE TWO REASONS why income inequality persists, he explains. First, it reduces social mobility, even for the middle classes. Rich families transmit their advantages to their next of kin through top-quality schooling and connections, which then lead to very high salaries and the inheritance of large amounts of money. That makes it harder for people who weren't born into similar privilege. Secondly, the contemporary political space and political discourse are dominated by what he calls a "plutocracy" – meaning "people who have money."

Money was everywhere, he says: in politics, in the media, in academia. It allowed the super-wealthy to "control the political process and also the narrative." As an example, he mentions the

DAVID GELLES,
Author of *The Man Who Broke Capitalism*

It's harder and harder to ignore how destructive this way of doing business is. I am not calling for an end to profit, but to how those profits are distributed.



ownership of *The Washington Post*, the US's second-most influential newspaper, by Jeff Bezos, founder of Amazon and one of the richest men in the world. "This is mind-boggling when you think of it, and yet it's not even mentioned," he says.

Rich people's pronounced influence on politics, in turn, made governments unwilling and unable to perform tasks that they ought to be performing: taxing the big corporations, the CEO compensation packages and the polluting companies; subsidizing and incentivizing the move toward green technologies, and so on. "That's why we are in a vicious circle," he explains.

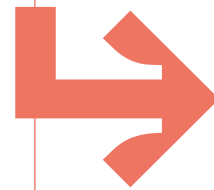
What if capitalism were to power ahead in its current form, ignoring the yawning income gaps and brutal inequalities? The capitalists would be "committing a kind of economic suicide," replies Wolff. "They cannot continue to do what got them to this point, because it will be counterproductive," he says. It would be the equivalent of "killing the goose that is laying the golden eggs." ■

Surviving a Kodak moment

Ten years after the bankruptcy of the world's most famous film photography brand, new ideas have emerged about **what it takes to survive a digital disruption.**

BY **Bennett Voyles** PHOTOS BY **Catherine Leutenegger**

FUTURE NOW



THE FAILURE of Eastman Kodak to adapt to digital photography is now one of the most popular business school cases. But now that a decade

has passed since Kodak's bankruptcy, the morals of the story are changing. Experts are drawing different lessons from its collapse – both with respect to the causes of its failure and the responses the firm might have taken – lessons that could be useful to companies facing a similarly disruptive digital transition.

The core of the story remains the same: In 1978, Kodak patents the first digital camera. In 1981, the company's market intelligence team predicts digital photography will be the future and says the company has 10 years to make the conversion. In 1986, Kodak builds a 1.4-megapixel sensor, the first to create high-quality images. In the nineties, the company finds critical success with

professional-quality digital cameras, yet fails to reach the mass market. By 2003, with his company lagging behind, CEO Dan Carp announces a \$3 billion initiative to drive Kodak's transformation, but an investor revolt stops it cold. In 2012, Kodak filed for Chapter 11 and was finished as a consumer brand.

AT FIRST GLANCE, it's hard to see why Kodak missed the curve. It had been an extremely research-driven company holding 1,100 imaging-related patents with more than a century of largely successful innovation behind it. Point-and-shoot cameras, film that came in rolls instead of on glass plates, color pictures – many important innovations were popularized by Kodak. While it's true that Kodak engineers had missed trends that other companies ran with, such as instant cameras (Polaroid) and photocopy machines (Xerox), Kodak had once sold 90% of the film and 85% of



POOR EXPOSURE
Kodak's failure to align with digital transformation would ultimately close the doors on its famous Rochester, NY, headquarters.

“ STEVEN SASSON,
Inventor of the digital camera at Kodak

We should have been thinking a little broader about how the customer was going to change.

the camera equipment bought in the US. It had been strategically smart: Besides its research, it put money in antitrust defenses, local philanthropy and employee profit sharing. The company took good care of investors, too – in the early 2000s, it paid out 66% of its earnings.

WITH ALL THOSE ADVANTAGES, why isn't "Big Yellow" still around? Vince Barabba, who led Kodak's market intelligence unit in 1981, says that company executives all tended to have little interest in anything that didn't involve silver halide, the key chemical ingredient of analog film. "The problem was all these guys grew up in the silver halide era," says Barabba. The company's internal digital inventions weren't enough to overcome the C-suite's predisposition

toward film-centered business models. "They only heard what they wanted to hear," Barabba recalls. "And when something was telling them that silver halide was going away, they got deaf in a hurry."

Jaideep Prabhu, Jawaharlal Nehru professor of business and enterprise at the University of Cambridge, doesn't think the problem is ever really lack of understanding disruptive technology.

"The problem is committing – and when to commit and how much," he explains. In addition, Kodak executives also underestimated the degree to which consumers' photographic priorities were changing. Where analog-era customers cared mostly about quality, digital-era consumers cared more about convenience and sharing images online, recalls Steven Sasson, the Kodak scientist who invented the digital camera. "We should have been thinking a little broader about how the customer was going to change and what they were going to value," he says.

Kodak executives faced the classic challenge of trading current profits and cash flows for future cash flows that might or might not materialize. "Often, a successful transition can come down to a matter of months," Prabhu explains, noting that Fuji, Kodak's rival, timed its shift better and survived. Kodak didn't. As digital cameras advanced and caught on with the public, film-related sales began to drop about 20% year after year.

RESPONDING TO DISRUPTION can also be complicated by the fact that the disruptive technology may have next to nothing to do with a company's traditional business. Jérôme Barthélemy, professor of strategy and management at ESSEC Business School in France, argues that what killed Kodak was the failure of investors to support the transformation. When Carp announced his plan in 2003, investors panicked and stock dropped 18%. Rather than transform, stockholders wanted Carp to cut costs, continue to harvest the profits of traditional photography and, crucially, not cut the



dividend. "The shareholders played a key role in blocking the transformation effort," Barthélemy says.

How do you keep new ideas from being strangled by stakeholders invested in the status quo? One approach many people believed in soon after Kodak's collapse is that a company's digital initiative should be organized as a separate startup. In fact, says Steve Blank, co-author of *The Startup Owner's Manual*, this structure can't really work for major companies that must please so many different stakeholders. "What happened – and this is my contribution to the problem – is in May 2013, *Harvard Business Review* put on its cover, 'Why the Lean Startup Changes Everything,' which gave corporate innovators a tool set to say: 'Oh, I get it. We could use all these tools. And now we'll have magic. It will solve our innovation problem.' But in fact, it created innovation theater, not innovation," he says.

In fact, big companies need to take a very different approach to innovation,

THE END OF AN ERA

The community around Kodak's Rochester, NY, HQ lost thousands of jobs as a result of its 2012 bankruptcy.

Blank says. Leaders of new initiatives need to focus on internal sales and the company as a whole should create a structure to encourage innovation. "What we really need in a company, which we don't need in a startup, is an innovation pipeline and an innovation doctrine, a set of rules that says how we create a company that executes and innovates at the same time, realizing – and this is my favorite phrase now – that execution pays your salary, but innovation pays your pension."

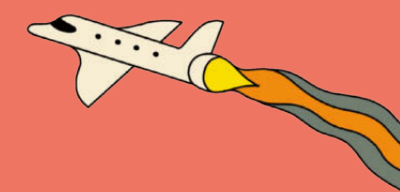
FOR ANOTHER WAY to stay focused on change, Barabba stands by a suggestion he made in his 2011 book *The Decision Loom*: keep careful records of your important decisions, particularly the underlying assumptions that informed a

particular course of action. This can be useful for revisiting an issue later on in case the assumptions that underpinned an earlier decision, such as the superiority of silver halide, no longer fit the reality. Among those assumptions, consumer preferences should be key. "Remember that your customer is going to change on you," Sasson warned. "What you think is their behavior is not going to be their behavior forever. Something will change it."

One added challenge is that it's very hard to see the direction a technology will take. Barthélemy advocates careful monitoring of potential candidates of disruption, while minding that most disruptions don't actually materialize. In the beginning, such changes happen very slowly. Later on, a few of those technologies will suddenly explode – at which point, a big company will need to respond right away. "What these big companies should do is not rush, but wait. But then," he adds, "they have to be ready to make the jump." ■



Imagined futures portrayed through the eyes of artists have a huge influence on **how we envision what could be**. Some have even gone on to inspire scientists to reshape our reality.



Turning fiction into fact

BY **Detlef Görtler** ILLUSTRATIONS BY **Simon Landrein**

JOURNEY TO THE FUTURE PART 1 Fact to the future	JOURNEY TO THE FUTURE PART 2 Report from the future	JOURNEY TO THE FUTURE PART 3 Turning fiction into fact
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DID YOU EVER HEAR OF Konstantin Tsiolkovsky? Probably not. He's the Russian physicist who died in 1935. Even if you've never heard of him, you will certainly know one product that was developed – mostly after his death – and which relied heavily on his findings: the rocket. Alongside scientists such as the German Hermann Oberth and the American Robert Goddard, Tsiolkovsky is seen as one of the founding fathers of rocket science and astronautics.

And even though you may have never heard of Konstantin Tsiolkovsky, you also will certainly know the source of inspiration that propelled him to become a rocket scientist in the 1870s: *From the Earth to the Moon*, a novel by French science fiction author Jules Verne. In it, Verne describes how three men are shot to the moon with an enormous space cannon – and the teenage Tsiolkovsky, who

Shaping Visions
→ PAGE 54

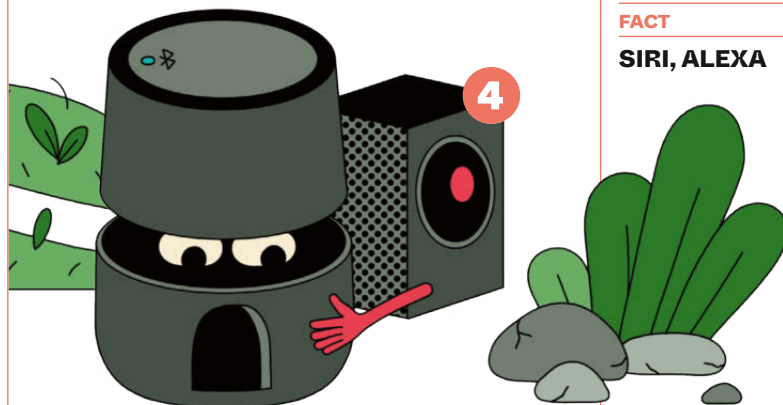
was not allowed to go to school because he was deaf, read the book, thought that a cannon could in no way be a tool for traveling into space and started to think about other ways of getting to the moon. And, at last, found one.

Would we have reached the moon without this one deaf Russian scientist? Possibly – there had been others around at that time who also thought about space travel. But would we have reached the moon without this one science fiction novel? Not so sure. Jules Verne gave us an idea of how our future might look like; a powerful vision, giving scientists' brains something to chew on, something to start with.

JULES VERNE IS NOT THE ONLY WRITER whose fiction became fact. And scientists are not the only ones to be inspired by imaginative literature. Just take two of today's most famous innovations. Mark Zuckerberg's Metaverse is by name and concept a copy of the virtual dreamworld in Neal Stephenson's novel *Snow Crash*, with the one exception that in the original Metaverse from 1992, the avatars have legs. For Neuralink, a company co-founded by Elon Musk in 2016 to produce brain-machine interfaces, the concept is 100% identical with a technology described by the Scottish science fiction author Iain M. Banks in his novels of the *Culture* series. The name, though, is slightly different: Banks called it "neural lace."

Artistic stories about an imaginary future are an important component of the creation of the future in our real world. And that's not because the artists are clairvoyants who know centuries in advance where technology is heading. It's because their imaginations are sticky: They give a vision of what future technology might look like – and once you've seen it, you can't unsee it.

The kind of influence fiction has on real-world development is fourfold: It influences children,



1
FICTION

BIG BROTHER
GEORGE ORWELL,
1984

↳ An omniscient state controls every aspect of life of every citizen

FACT

SOCIAL CREDIT SYSTEM, MASS SURVEILLANCE

2
FICTION

OMNISCIENT DEVICE
DOUGLAS ADAMS,
THE HITCHHIKER'S GUIDE TO THE GALAXY

↳ A small device or book containing all the information you need right now

FACT

SMARTPHONE

3
FICTION

THE FORCE
STAR WARS

↳ Altering things and minds by pure willpower

FACT

BRAIN-COMPUTER INTERFACE

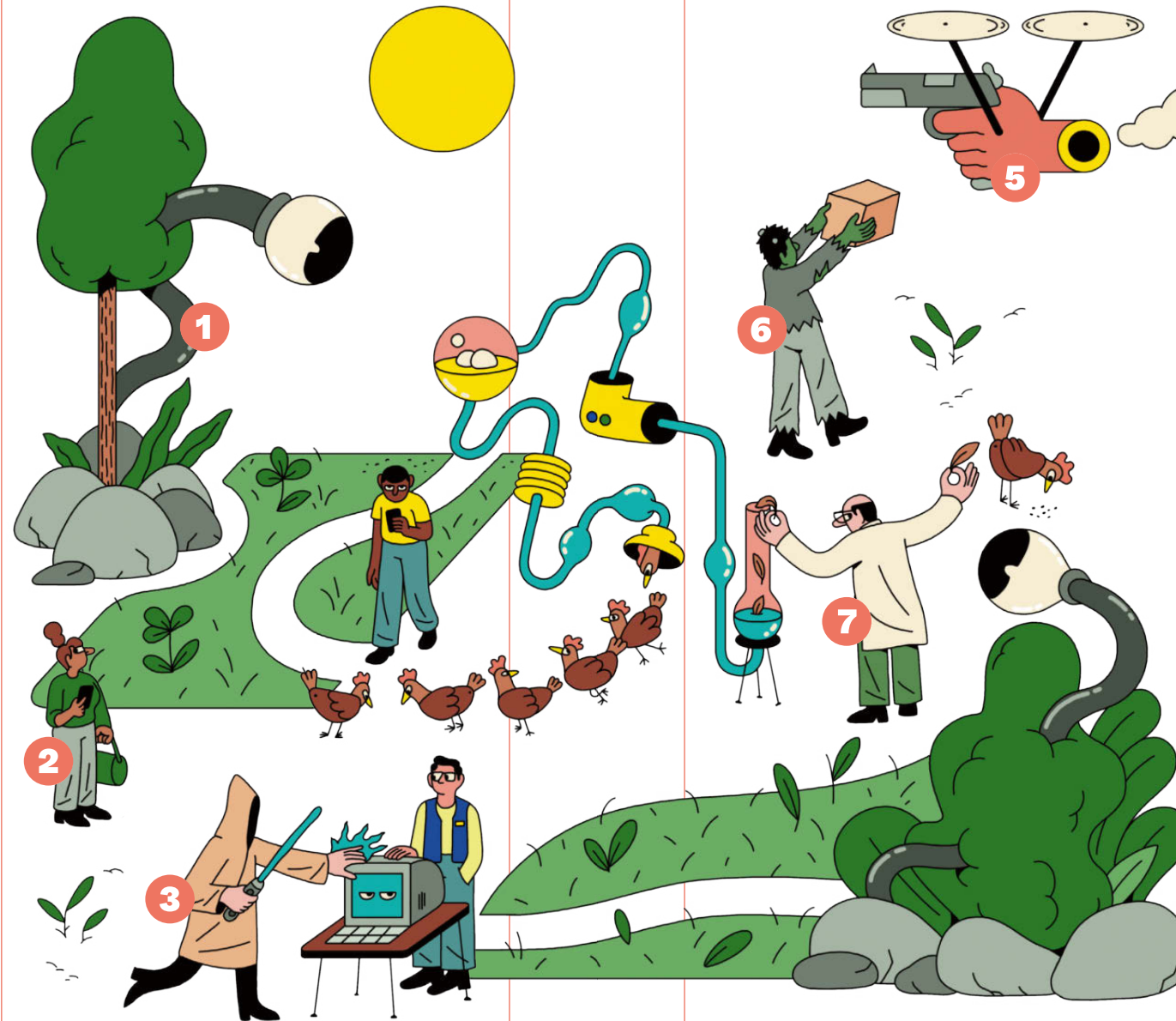
4
FICTION

SENTIENT AI
HAL 9000 IN *2001: A SPACE ODYSSEY*

↳ Intelligent computers interacting with humans

FACT

SIRI, ALEXA



creators, decision-makers and customers. For children, it's a source of inspiration for their career choice. Like the young Konstantin Tsiolkovsky who became motivated to create rockets, children can be inspired by novels or TV series to become scientists or engineers. And wherever their career leads them to, they will never forget what made them tick in the first place.

For creators, the influence is creative: Let's face it, the imaginative powers of engineers or scientists are limited. They have learned how to make machines, or how to research. But how to envision a future no one has ever been to is not part of their job description. If someone does that for them, their work gets some kind of orientation.

That influence extends to investment decisions becoming easier: It doesn't matter whether you are a banker, a venture capitalist or a CEO, it's a challenge to decide which new developments you should invest in. But if its features or its

Artistic stories are an important component of the creation of the future. They give a vision of what future technology might look like – and once you've seen it, you can't unsee it.

5
FICTION

BATTLE DROID
STAR WARS

↳ Military robots that can replace human soldiers

FACT

KILLER DRONES

6
FICTION

ARTIFICIAL CREATURE
MARY SHELLEY,
FRANKENSTEIN

↳ Bringing inanimate matter to life

FACT

HUMANOID ROBOTS

7
FICTION

BODY COPIES
E.G. STANISLAW LEM

↳ Living creatures can be replicated identically

FACT

CLONING

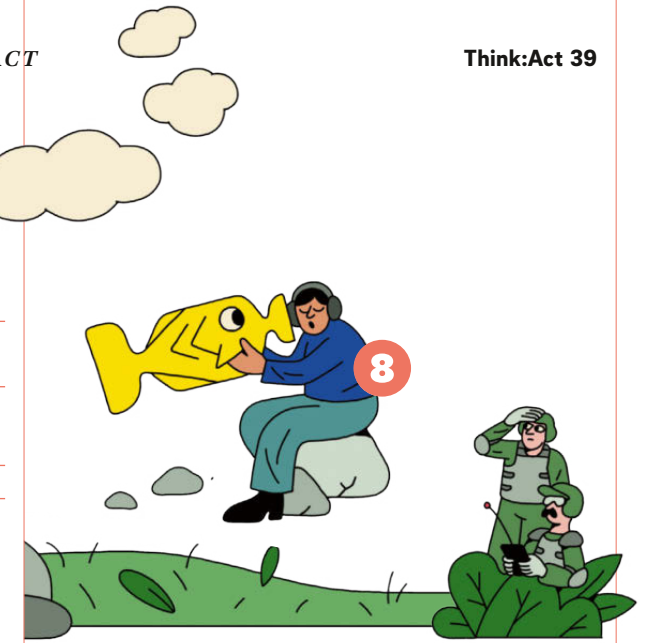
8
FICTION

BABEL FISH
DOUGLAS ADAMS,
THE HITCHHIKER'S GUIDE TO THE GALAXY

↳ An object or service that allows us to talk to people in any language

FACT

EARBUDS + GOOGLE TRANSLATE



description match with an image you already know, decision-making becomes easier. "Wireless ear-phones with near simultaneous translation capacity" is harder to swallow than "a babel fish device." Whoever read Douglas Adams' *Hitchhiker's Guide to the Galaxy*, and millions of people have, knows instantly what is meant.

Finally, customers need fewer explanations: It's a demanding task to launch a completely new product. No one knows it, no one has ever seen or used it – you're going to have a lot of (expensive) explaining to do. That's why smart home technology is often advertised with magic-mirror-like gadgets, taking their cue from the Brothers Grimm and their "mirror mirror on the wall" fairy tales; and why 3D printers often get connected with the "replicator" machine made famous by *Star Trek*.

THE BETTER KNOWN A WORK OF FICTION is and the wider reach it has, the greater the stickiness. No wonder that *Star Trek* is one of the leading sources for real-world creations: The Holodeck and holograms, 3D chess and the replicator, "phaser" guns and "beaming" teleportation have all inspired children to become engineers – and engineers to build futures. The teleportation, though, has only as yet reached single-atom level. Whether humans can ever be beamed like Kirk and Spock remains to be seen.

So should we just hire science fiction authors for our product development department so that they can envision what our future product portfolio might look like? Unfortunately, it's not that easy. That's what the high-flying augmented reality startup Magic Leap learned the hard way. In 2014 they hired the Metaverse inventor Neal Stephenson as "Chief Futurist." He promised "to continue working on the sorts of transmedia projects that I have been interested in for many years." →

The artist's vision of a future where no man has gone before can open up business-focused minds and entice them into a trip to uncharted territories.

Magic Leap's performance however was severely underwhelming – and in 2020, when the company had to fire half of its employees, Stephenson also had to go without leaving significant traces at Magic Leap.

ONE OF THOSE AUTHORS – Tom Hillenbrand, the Munich-based creator of sci-fi novels like *Drone State* (2018, English translation) or *Montecrypto* (2021, still only available in German at the time of printing) – says: "Authors do not know more about the future than other people. It is not our intention to make predictions about the future. Science fiction is always more of a commentary on the present from a future perspective."

In *Drone State*, which was first published 2014, Hillenbrand envisioned a country that tries to prevent crime with 100% surveillance via cameras and drones. But then, a politician is killed and the near omniscient police computer screws up – the killers have learned how to beat the digital system. "*Drone State* has become reality more quickly than I would



1 FICTION

CYBORG E.G. TERMINATOR

↳ Man-machine combinations develop skills which are superior to those of purely biological people

FACT

E.G. EXOSKELETON

2 FICTION

PINOCCHIO NOSE CARLO COLLODI

↳ Emotions become transparent – you can see immediately if someone is lying or what a person thinks

FACT

LIE DETECTOR/ FACT-CHECKING

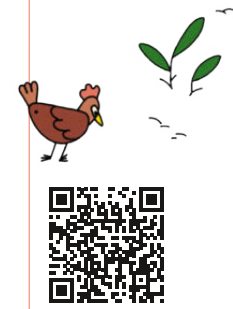
3 FICTION

TIME MACHINE H.G. WELLS

↳ Traveling into history and/or the future

FACT

VIRTUAL REALITY TIME TRAVEL



ONLINE EXCLUSIVE
Want to know what the future sounds like? Listen to our Think:Act playlist: rolandberger.com/future-playlist

have expected," Hillenbrand says today. When he wrote the book, he thought that crime prevention via digital surveillance would need at least a few decades to become technologically and politically feasible – but "China is already almost there."

When he thinks about a future, it's not about product design. It's about people. What happens to free will in times of omniscient technology? What do you do when death can be reversed? What happens to love when genetically perfect matches can be defined? The stuff around those basic questions is more metaphorical: "*Terminator* uses the killer robot to point out the dangers of artificial intelligence. But of course you could also use other, less apocalyptic metaphors."

THE POWER OF SCIENCE FICTION is not the literal translation of imagined tech into real-life tech. It's the openness for the unknown, says Hillenbrand and quotes the US sci-fi writer Ursula Le Guin: "You can read science fiction as a thought experiment." The fiction is a kind of laboratory where anything can be tried out and anything is possible because it's in the future. And that's, indeed, where science fiction can become productive for corporations. The artist's vision of a future where no man has gone before can open up business-focused minds and entice them into a trip to uncharted territories. It's a kind of disruptive experience that is used by global players like Volkswagen or Intel – though more as a spice than as an ingredient of their business strategies.

There's just one industry that has regular long-lasting business relationships with science fiction authors: futurists and trend researchers. When your main job is to think about "the future of xyz," whatever that xyz may be, the disruptive creativity of science fiction is probably one of the ingredients of your secret sauce. Science fiction author Marcus Hammerschmitt has been a long-time contributor for the Swiss trend researcher Gottlieb Duttweiler Institute. For him, "one crazy question" is at the heart of the development of a story. That question could be something like "what does a society look like where you are born in debt and have to work your whole life to pay it back?" or "how do you compete when there's no more scarcity?"

In Hammerschmitt's writings, each book is an endeavor to answer one question. In his contributions to trend research, these questions are more like a bridgehead to the unknown side of the →

Then came the industrial age and everything became possible – the dreams went from ending scarcity to creating technology.

river and tempt the trend researchers to imagine what the bridge from today's reality to that other side could look like.

TODAY'S MOSTLY GLOOMY FUTURE VISIONS, however, make "temptation" perhaps sound a bit too bright. Ancient and medieval myths dreamt of an end of ever-looming hardships: Fountain of Youth stories and never-ending paradises had magic potions and golden egg-laying geese to overcome scarcity. It was a long way from ever becoming reality, but the images became part of folk culture.

Then came the industrial age and everything became possible – the dreams went from ending scarcity to creating technology. From Jules Verne to Douglas Adams, from *Star Trek* to *Star Wars*, all

4 FICTION

METAVESE NEAL STEPHENSON

↳ We can create a nonmaterial reality and live in it

FACT

METAVESE

5 FICTION

MOON TRAVEL JULES VERNE

↳ Sending humans into space

FACT

APOLLO PROGRAM

assumed that a sci-fi future would provide a (more or less) good life. Since the 1980s, the picture has become darker. Cyberpunk entered the stage, with William Gibson's *Neuromancer* as a frontrunner in 1984. The future is not necessarily something to hope for, it can be just the opposite. Stuff like *Mad Max*, *Black Mirror* or *Squid Game* is still around as a kind of background music for civilizational clashes and climate conundrums – more a lab for new ways of survival than for new technologies. All of which provides us with something to think about.

So where can we turn to get back into future inspirations? The Austrian tech philosopher Peter Glaser recommends to look at the oldest sci-fi texts we know: stories of myth and religion. They are full of wonders and magic – and isn't technology a little like magic? "Healing the lame, feeding the world and reviving the dead: That's what Jesus Christ did 2,000 years ago and that's what humans can aim at," Glaser says. And it's not just the Christian religion that is full of wonders. Just take the ancient Greeks as an example: Their gods could calm the storm, send rain or sun and save the harvest. Those are some powers that we could really use quite soon. ■



“ We shall one day travel to the moon, the planets and the stars, with the same facility, rapidity and certainty as we now make the voyage from Liverpool to New York!

JULES VERNE,
French novelist, poet and playwright



Wide angle



Read on for diverse insights into the wider world of business and ideas.

*A WINNING PITCH
The England team celebrates their win at the UEFA Women's Euro 2022. The event smashed records with 250,000 more tickets sold than for the previous competition in 2017.*

Kicking off a new era

Long plagued by lack of investment and false starts, women's football clubs like Los Angeles' Angel City are taking a fresh approach and proving the lucrative potential of tapping into a more diverse fan base.

BY Alistair Magowan



ENTREPRENEUR JULIE UHRMAN had never been to a women's football match and didn't even know a league existed in the United States when she was approached to start Angel City FC in 2019. But after growing up playing basketball on the courts of Los Angeles and having built a reputation as a consumer-facing entertainment expert, the chance to combine her twin passions of sport and business turned into her "holy grail."

It helped that one of the two women who were trying to convince her was Academy Award-winning actress Natalie Portman, who, fresh from highlighting equality issues in the film industry, now wanted to make a difference in the sport world. "The following weekend, I went to the men's 'El Tráfico' derby between LAFC and the LA Galaxy and I was so inspired by the incredible fan base," she says. "I said: 'I want to do this for women.'" After finding out more about the National Women's Soccer League (NWSL) and being inspired by the US winning a fourth World Cup the same summer, she was ready to take it on. "The idea to build a team in my hometown for a global sport, with literally the best players in the world, was really exciting to me," she says.

ANGEL CITY IS NOT YOUR AVERAGE TEAM, but they have shown what is now possible in a sport which has had its detractors for decades. After Uhrman, Portman and venture capitalist Kara Nortman got together, their vision for the club was to be "bigger than the game, to build a team that combined mission and capital," according to Uhrman. After the trio received "100 nos," the team now has 27 sponsors, which is set to bring in a combined \$43 million in revenue. They are playing in front of sellout crowds of 22,000 fans and there is now a 99-strong investor group that includes tennis legend Serena Williams, actress Eva Longoria and singer Christina Aguilera. Uhrman says their unrivaled profiles helped grow the business and the plan is to be profitable in five years.

Not every team can command star-studded investors drawn from the Hollywood Hills, of course, but after years in which investment and interest have been lacking, the team represents a new dawn in a sport which is surging both in



"The idea to build a team in my hometown for a global sport, with literally the best players in the world, was really exciting to me."

— Julie Uhrman
Co-founder and president of Angel City FC

PHOTOS: ANGEL CITY

the US and Europe. As Uhrman says: "If you invest and lean into it, women's football can be a profitable endeavor."

The journey to the birth of Angel City started 20 years ago, only 22 kilometers northwest of the Banc of California stadium that they share with LAFC near downtown Los Angeles. It was here in 1999 at the Rose Bowl in Pasadena that the US women's national team won their second World Cup in front of 90,000 fans to kick-start a boom in the sport. The victory was crowned by the iconic image of Brandi Chastain whipping off her shirt after scoring the winning penalty against China and it led to the team dominating at the international level, both at World Cups and the Olympics.

In turn, it led to the formation of a professional league which the best players have flocked to over

FULL OF PRIDE
Angel City played Houston Dash in front of 16,000 fans on the club's inaugural Pride Night in June 2022.



Angel City's first season

16 thousand

The number of season tickets the club sold for 2022. When it began planning in 2020, it had aimed for 5,000.

90%

The club's season ticket renewal rate for its second season in 2023.

\$11 million

The club's total sales of corporate partnerships. The club had anticipated \$3.25 million.

4

The total number of sold-out games at the 22,000-seat Banc of California Stadium.

SOURCE:
THE WALL STREET JOURNAL

the last two decades, yet in many ways it was a venture plagued by false starts. In addition to stars from the national team, such as Mia Hamm and Abby Wambach, clubs signed players from around the world such as Brazil forward Marta or Canada's Christine Sinclair. But they overstretched their budgets and the league, under previous guises, went bust on two separate occasions in 2003 and 2012. In short, the lack of investment or crowds was unsustainable. Although national team players and star names were paid well, many others were amateurs and the product suffered.

ACROSS THE ATLANTIC, the English Women's Super League (WSL) was trying to catch up. Launched by the Football Association in 2011, it took a more cautious approach – budgets were initially capped and growth would be more organic to avoid the pitfalls of the US league. Many believed the investment was mediocre given it was the same Football Association which decided to ban women from playing the game for 50 years between 1921 and 1971. But at the London 2012 Olympics, the Great Britain team beat Brazil in front of a record 70,000 fans at Wembley. Although the growth has been gradual since, the likes of Manchester City and Manchester United have joined a league which is now fully professional. Matches are broadcast across TV each weekend and multimillion-pound sponsorship deals have followed.

The culmination of that investment was England winning the European Championship in July 2022, where an aggregate 574,000 people attended matches and over 300 million watched worldwide, according to European governing body UEFA. But at club level, attendance records have been broken as world-renowned teams such as Barcelona, Bayern Munich and Paris Saint-Germain have realized the sport's commercial potential and its attraction to a new fan base.

A UEFA report claims there are now 144 million supporters across Europe. "I think for quite a long time society still genderized women's football," says former England international Eniola Aluko, who now works as a sporting director at Angel City FC and also as a football pundit. "It was 'oh, it's women playing football.' Whereas now →

people want to watch it because it's an event that you want to be at. I think there's been a massive shift and that affects people's willingness to pay for the sport. It's become a cool product."

NOWHERE IS THAT COOLNESS more apparent than at Angel City where celebrities are often seen in the crowd as the TV cameras pan towards them. The team played its part in a new NWSL attendance record in September 2022 where 32,000 fans watched a Californian derby at San Diego Wave. NWSL commissioner Jessica Berman called the attendance a "historic moment for the league and the global community." She added: "I hope we're done on whether women's sports is viable and whether it's a good investment."

But there are signs that the US is now playing catch-up as Europe's reboot becomes a bigger draw for players and fans. Aluko says the salary cap that exists in the NWSL has led to "tentative growth" rather than the "free market" and "exponential growth" seen in England. It's one of the reasons why the likes of Australian forward Samantha Kerr left the US to join London club Chelsea in 2019. Player salaries in Europe can now reach \$500,000 a year. NWSL teams cannot match that outlay, even if the salary cap has increased in 2022. Football agent Alan Naigeon says another reason that European sides are growing fast is the added competition between them in the continent's elite competition, the Champions League. Greater visibility on TV and online, plus the added heritage of European football have helped too, he says.

Champions League games are now watched by millions of viewers on YouTube or on DAZN and that approach is replicated in England where the WSL recently signed broadcast deals to show games on the BBC and Sky Sports. That compares favorably with the NWSL, where Aluko says the games are on subscription channels and "can be a nightmare to find." Naigeon, who has Kerr and Norway and Lyon forward Ada Hegerberg among his clients, adds: "Both models in America and Europe have their advantages but I think culturally, people have such a passion for football in Europe that I think there's a massive untapped business that people are starting to realize."



"I think there's been a massive shift and that affects people's willingness to pay for the sport. It's become a cool product."

— **Eniola Aluko**
Sporting director at Angel City FC

PHOTO: NAOMI BAKER/GETTY IMAGES

SOURCE: UEFA, THE BUSINESS CASE FOR WOMEN'S FOOTBALL

SO HOW DO CLUBS REALIZE THIS GROWTH and turn it into a potential profit? The good news for many of them is that the demand is already there. The use of men's stadiums has led to the Barcelona women's team twice breaking their attendance record in 2022 with more than 91,000 fans packing into the Camp Nou on each occasion.

In September 2022, Arsenal's north London derby against Tottenham saw the WSL attendance record smashed with 47,367 fans watching at the Emirates Stadium, London. Naigeon says while the numbers are encouraging, the type of supporters is just as important. "When they do analyses of the games held in the men's stadiums, a large chunk of the attendance is coming to the stadium for the first time." In its report *The Business Case for Women's Football*, UEFA says almost one in three fans is new

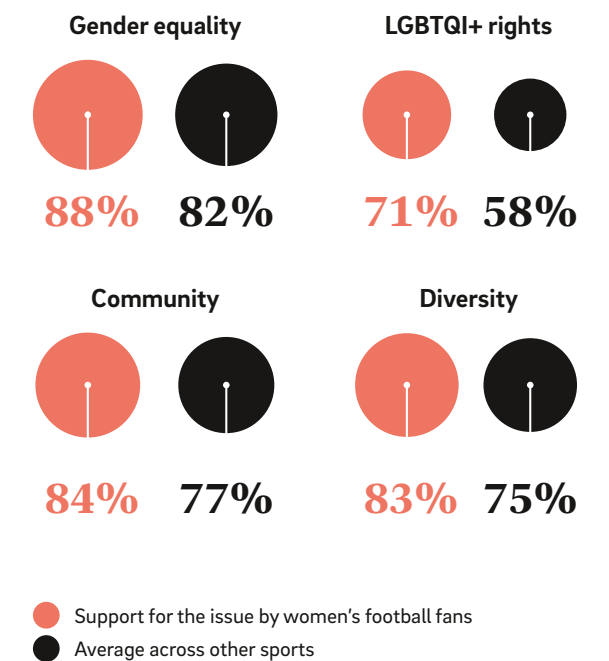
IN THE SPOTLIGHT
Ellen White of England poses with the trophy after her team's win against Germany at the UEFA Women's Euro 2022 final match.

to football. "I've always told the clubs they should also look at their women's football project as a commercial and marketing project," he adds.

Revenue and profits are not Angel City's only barometer of success. Uhrman says expanding women's sport is the team's "North Star." Each of its sponsors also gives 10% of their funds back into the community through its social impact program. But even though there may be questions about whether the team is more about celebrity than football, they have shown that a bold vision, led by women, is as much about a commitment to investment and how women's football can be independent of existing structures. "We say that we're unapologetic about sharing our story," Uhrman adds. "It helps Angel City, but it also helps the sport grow because we've shown there's a different way to build a sports club." ■

Progressive goals

Women's football offers integrated leagues and investors a greater opportunity to engage and align with a socially conscious fan base.



Something's cooking

Nathan Myhrvold, Microsoft's first chief technical officer and a genius in his own right, is now applying his scientific mind to the secrets of the kitchen. Here the polymath explains why preparing dazzling dishes can teach managers how to infuse the basics with creativity.

BY **Steffan Heuer** PHOTOS BY **Daniel Berman**

WHEN NATHAN MYHRVOLD sets his mind on getting to the bottom of an interesting problem, he spares no expense or effort to do just that. Some have even compared the elaborate test kitchen of the former Microsoft CTO to the lab of James Bond's gadget master Q. It measures roughly 85,000 square feet of space and includes not just all the high-end cooking equipment any chef could wish for – there are also tools for material tests normally performed by chemists or biologists and a whole machine shop for metalwork or 3D-printing molds for porcelain plates. Not to mention an array of cameras and lights to capture close-ups of ingredients in various states of preparation and whole kitchen appliances sawed in half.

Custom-fabricating a pizza pan in the shape of Italy was one of the easier tasks, Myhrvold says during the interview, where we met in the middle of his cabinet of culinary wonders and enjoyed a wide-ranging conversation from choosing the right flour to building the right team.

WELL COMPOSED
*In his **Modernist Cuisine** book series, Nathan Myhrvold has explored the science behind pizza, bread and food photography.*

Modernist Cuisine, your book project, was initially supposed to be just a single book about sous vide cooking running to a few hundred pages. Yet it has turned into a small library. Was that a well-laid-out plan or did it just keep growing by accident?

You could argue I'm the world's worst planner. But all great projects in life have a certain amount of naiveté built in. Being a parent is like that. You're usually a little naive about all the implications. But thank God for that, because it helps you do something great. Sous vide was the first modernist technique for which I tried to figure out the fundamentals. Up to that point, chefs had primarily cooked with high heat sources on a stove, an oven or a grill. Sous vide is about cooking with very low, very gentle heat and there were a number of things that were really quite counterintuitive about it. So I thought you better explain how they work. The project went from being something that I thought would be a little book to a huge one with 800 pages to eventually five volumes with 450 pages each, plus a manual on the side. The books take things that were either unknown to almost all chefs or →



at most known to a very small number of kitchens. I view it as an attempt to democratize or making the whole notion of cuisine more egalitarian.

One of your collaborators, the chef Chris Young, once said you consider food "water with a bunch of impurities." Is that the physicist and scientist shining through?

It's true for lots of results. Here's an example. One of the questions that I asked early on when I looked at pizza is the following: The rim of the pizza is usually high and puffy, while in the middle, the crust is very thin. Why? Nobody knew. The first theory people came up with is it's the weight of the toppings that holds it down. We baked pizza side by side, one with the real ingredients and one with the same weight in sand. Sand, metal, anything we put there, just got pushed right up. The dough is actually quite strong. So then people say: Oh, well, it's because the pizzaiolo is leaving extra dough around the rim. Sometimes that's true, but even if you make one dead-flat pizza, it happens. It turns out the reason is this: Sauce is water with impurities. And water boils at 100°C. It doesn't matter how hot the rest of the oven is, as long as that sauce has not dried out completely, it's no hotter than 100°C. While you're putting the pizza in an oven that may be 500°C, you are putting this very cold layer on top of the crust. That's what prevents it from rising.

Much about making good food, then, is really applied science and doing experiments. What part of cooking is about gut feeling and habit?

There's a mixture. I like to use architecture as an example. It can be an art, but it also has to be pragmatic. Most buildings in the world are not great art, they are made to keep the weather out and be cost-effective. But occasionally, you can construct these amazing buildings – if you understand how buildings hold up. Look at Frank Gehry's museum in Bilbao with its soaring curves. You can't build that unless you understand structural engineering very well. People would figure out the design for a traditional house or church and copy it for 100 or 1,000 years because they knew it worked. In cooking, we call that a recipe. If you want to be that Frank Gehry of food, you need to get into art. But as you deviate



Nathan Myhrvold

is a jack-of-all-trades. The Seattle native started college at 14 and went on to study mathematics, geophysics and space physics before earning a Ph.D. from Princeton and briefly working under Stephen Hawking at the University of Cambridge. The long-time chief technical officer at Microsoft and founder of the company's research arm has also made waves in a wide range of disciplines, from astronomy and paleobiology to nature photography. He is the co-founder of Intellectual Ventures, a private equity firm that gained notoriety for monetizing a portfolio of more than 70,000 patents.

more and more from the recipe, you're eventually going to fail if you don't understand the standard or what made the recipe work. This kind of understanding of your medium enables you to create art.

So, is a beautiful plate of food comparable to a painting or a piece of music?

Art is generally defined as a way of provoking thoughts, feelings, emotions, and possibly even a dialogue with those that consume the art. In the case of food, you consume it directly. I wouldn't consider every piece of food art, but in the hands of someone with the right creativity to me it meets every definition of art as much as painting, music, dance or architecture.

You spent 13 years at Microsoft, including as the company's first chief technology officer and founder of Microsoft Research. Do you find working in tech and writing code similar to working in the kitchen?

My experience in technology has many facets to it. Certainly one was realizing the incredible power computing has in many areas. Writing software is a creative endeavor that also involves a great deal of science and technology and rules. Software is as close to magic as anything we've ever created. In Harry Potter books, you have people say Latin-sounding words and someone turns into a frog, or sparks fly. Software is like that in the sense that all you have to do is arrange a set of words in a very tactical meaning and you get something that not only is very valuable, but takes on almost a life of its own.

You are a man of many interests and passions, ranging from your current business endeavor, a private equity company called Intellectual Ventures, to photography, archeology, astronomy and nuclear physics. How does one keep the mind open for so many different disciplines?

We reward people who learn more and more about less and less until they've become an expert on a very narrow topic. Now, if I had to have brain surgery, that's the kind of person I'd want. I've always had trouble being interested in only one thing. Mainly through a force of will, I could make myself do it. I was lucky that I was able to develop the breadth of



my interests when I was 9 or 10. I think premature specialization is problematic for children.

How so?

It's bordering on tragic when people early on get locked into doing something as their life's work they don't really love. First of all, it's very hard to be good at something you don't really love because you're just not going to spend enough time thinking about it and trying. It'll be just a job. Delaying specialization as long as you reasonably can makes a lot of sense because it's through that delay that you are more likely to experience things. Most adults do a job they didn't know existed when they were a child. The more you channel people at a very young age directly into jobs, particularly jobs that don't have a deep educational background, the more you're going to trap them in something.

Can a manager or executive gain new perspectives from working in a kitchen?

Cooking is a task that has multiple attributes, starting with planning. It's got a certain amount of



Modernist Pizza
by Nathan Myhrvold and Francisco Migoya,
1,708 pages.
Phaidon, 2021.
\$425.

"Cooking is a sort of microcosm of what you would do in almost any large project. Because of that short time frame, you get to practice it over and over."

– Nathan Myhrvold

science and engineering behind it regarding what foods or raw materials you have to combine to make a cake versus roasting a chicken. It also has a creative aspect. Unlike most things in business, that cycle of planning, acquiring the raw materials, preparing them, getting ready and serving them is relatively short. For most people, it happens in a single day or a few hours. So cooking is a sort of microcosm of what you would do in almost any large project. And because of that short time frame, you get to practice it over and over. Practice is something cooking really reinforces. I would say for an executive, cooking is a great way to teach team building and practice in a microcosm that has a complicated enough set of steps that it's non-trivial, but still simple enough and low-enough risk. So what if the cake doesn't come out or dinner's a little burned on the edge? ■



ONLINE EXCLUSIVE
See the Short Takes interview video with Nathan Myhrvold online:
rolandberger.com/en/myhrvold

Bike to the future

The bicycle industry has been thriving in many markets around the world for some time. But enthusiasm for two-wheeled travel seems to have gone up a gear in the wake of the pandemic. While battery-driven e-bikes have given the global bike business even more momentum, how big is the boost really – and how far can it go?

BY **Oliver Geyer**

BERLIN. IT'S A BIG CITY and it's big on bikes. Even before the pandemic struck, about 500,000 Berliners were using pedal power and the counting stations installed by Berlin's senate at 17 locations recorded an increase with the pandemic. From 2019 to 2020 alone, the number of bikes on Berlin's roads grew by a good 22.5%. Along with that accumulation of cycle traffic, there are reports of fantastic growth in the German bike trade. So, what better way could there be to get an idea of the situation than a little Berlin bike tour?

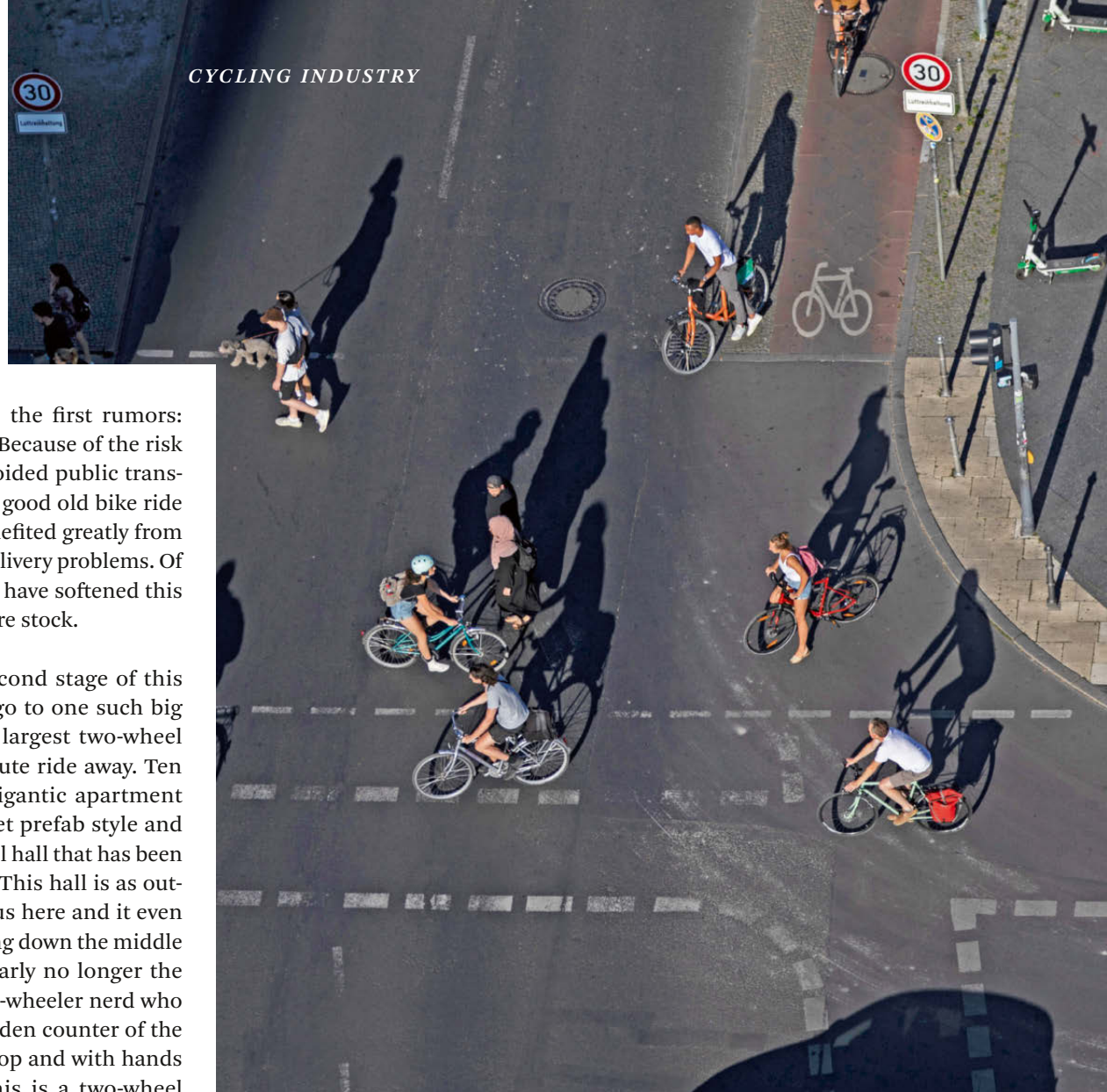
So, saddling up to ride the German capital's network of recently expanded cycle paths, which

RIDING ON A HIGH
Bicycle commuting is seeing a boom in popularity as a healthy and sustainable alternative to other means of transport.

will soon have grown to over 2,000 kilometers due to additional pop-up lanes built during Covid-19, this reporter pedals off to quiz a few Berlin bike shops – starting with local insight from a humble neighborhood Berlin bike shop before going global. The first leg leads over the bumpy cobblestones of the "Bötzowviertel" district in the city's former East, past organic food shops, chic cafés and restaurants behind fine stuccoed facades. One of these buildings is also home to a small neighborhood shop called Bötzwrad. Co-owner Benjamin Kardorf is the classic slightly alternative, hoodie-wearing bike-shop-buddy type, where some deep and intensive bike small talk is part of the →



PHOTO: JAKE STANGEL



service package. He confirms the first rumors: "Covid created a run on bikes. Because of the risk of contagion, many people avoided public transport and also rediscovered the good old bike ride for leisure." For a while, he benefited greatly from this trend, but then came the delivery problems. Of course, the big suppliers could have softened this problem a little better with more stock.

SO THAT SUGGESTS that the second stage of this bicycle research tour should go to one such big player. Stadler is "Germany's largest two-wheel center" and it's only a 10-minute ride away. Ten minutes that take you past gigantic apartment blocks in that distinctive Soviet prefab style and then on toward an old industrial hall that has been converted into a bicycle shop. This hall is as out-sized as the highway that led us here and it even has a street for test rides running down the middle this massive shop. This is clearly no longer the environment of the classic two-wheeler nerd who stands behind the scuffed wooden counter of the neighborhood store talking shop and with hands besmeared with chain oil; this is a two-wheel wholesale site to match the times.

While there were only two models with electric pedal assistance in the local neighborhood shop, this hall is, to a large extent, filled with e-bikes. A friendly expert offers an explanation. There are, he says, new groups of consumers from the suburbs who want to cover longer distances – and who also have secure storage facilities at home for these more expensive bikes. And they are the ones who are increasingly buying e-bikes here.

All that helped to confirm a theory that was taking root. The last stage leads quite a bit further out of the city, through the fields and meadows and forests of rural Brandenburg to the small town of Prenzlau. Soon we are at the door of Rad der Stadt, a medium-sized bike shop whose name in German is a pun roughly translating as "wheel of the city" as well as "city council." Hauke Krüger, one of the staff, is standing in front of the small barrack-like building, which is right next to the picture-perfect small-town train station. He sums it up: "Yes, e-bikes have been booming here since Covid. Because holidays were cut short, many people who previously

17%

The growth in bike sales in Germany in 2020 alone according to ZIV, equating to a total sales volume of 5 million units.

43%

The increase in sales of e-bikes recorded over the same period despite an average price of around \$3,000.

had nothing to do with cycling have taken up the opportunity. They then discovered that these bikes are suitable for everyday use even in the countryside because of their longer range." Since then, there has been so much to do at Rad der Stadt that they will soon be moving to a larger building.

BUT HOW INDICATIVE is Berlin and its surroundings of a global movement or change? In a sense, it seems, Germany's capital is something of a microcosm and an indication of what is happening on a wider scale. The bike industry's enthusiasm for its own success has grown to such an extent as to spawn a bold slogan: "Cycling is freedom." It appeared in mid-2022 in a German Bicycle Industry Association's (ZIV) press release. Even a war in Europe and rising inflation can't seem to dampen the bike business's optimism. The opposite in fact. While the eco-crisis and new sustainable lifestyles have given the industry a boost for some time now, the pandemic and the e-model bikes have given the

PHOTOS: MAJA HITLJ/GETTY IMAGES; GETTY IMAGES



business a new push. And with energy prices on the rise, even that threat is being seen as less a problem and more an opportunity.

Tim Salatzki, who represents ZIV, counters skeptical questions with this calculation: "Think about how many tank refills will pay for a bicycle and then consider what you will immediately save." For him, everything points to a big switch to bikes; and since the pandemic, it's gone global too. But does it stand up to closer scrutiny? Has the cycling enthusiasm of urban western types really caught on in the rest of the world? And if it has, can the bike business cope with increasing demand? After all, there were reports of supply chain problems during the Covid-19 peak. And what kinds of innovation could help secure growth in the long term?

The Berlin bike tour seems to support ZIV's own statistics. Most of the distances people cover, whether in the city or in the country, are less than 5 kilometers, for which the two-wheeler is the transport mode of choice – especially the new

PEDAL POWER
Buying incentives from European governments and a growing number of dedicated bike lanes on roads are helping to fuel demand and sales.

"Covid created a run on bikes. Because of the risk of contagion, many people avoided public transport."

– Benjamin Kardorf
Co-owner of Bötzwrad

"pedelecs." In 2020 alone, around 5 million bikes were sold in Germany, a total increase of 17% over the previous year. For e-bikes, the increase was as much as 43%. All model groups were caught up in this pedelec hype, which continued into 2021 and even into the first half of 2022.

Recently, Germany's transport minister secured the necessary funding for the 2020 federal budget cycle path construction plan to run until 2028. But do the facts and figures warrant talking about a global two-wheel boom that is more than just a short Covid-19 sprint? "2020 and 2021 were record years in other parts of Europe as well," says Erhard Büchel, president of the World Bicycle Industry Association (WBIA) in Switzerland. And not just in traditionally two-wheeled countries like the Netherlands. Spain, too, has seen an uptick. The fact that there are state subsidy programs in many countries and that even a city like Paris is being rebuilt in a bike-friendly way speaks for a truly sustainable change in leisure and mobility habits. →

"With cargo bikes there is still a lot of potential. These can be used in everyday life almost like a small car."

— Sebastian Wegerle
Research and development director
at Canyon Bicycles



Something similar is happening in other parts of the world. For climate reasons, Büchel says, mopeds were the preferred mode of transport in the Global South for a long time. But there is much to suggest that the bicycle in its modern, electrified form will soon return en masse here as well.

LEAVING BERLIN'S BIKE LANES behind and looking for a more global pattern means taking to virtual pedals and cycling onto the web. The Markets International website, funded by the German Ministry of Economics, informs us that the Asia-Pacific region, with Japan, China, Australia, India and South Korea, is indeed the fastest-growing part of the world bike market. There have long been reports from China that the new middle class has rediscovered cycling as a sport, reminiscent of Beijing in the 1970s and 1980s when the capital's arterial roads were chockablock with bikes, earning China the nickname "The Kingdom of Bicycles." Now similar reports are coming in from Indonesia.

TEST DRIVE
Thousands of people on bikes took to the streets of Jakarta to celebrate World Environment Day 2022, when cars were not allowed to pass the protocol road for one day.

When the streets of the capital Jakarta were deserted during the lockdown, a few cyclists took to them and owned them for a while and then found many followed suit. Here, where cycling used to be a poor man's thing, high-quality bikes have now become a lifestyle object and more cycle paths are being built. Taiwan has particularly ambitious goals in this regard, investing more than \$50 million to expand its network of cycle paths.

And South America? In Argentina in particular, the demand for bikes has skyrocketed. The government now promotes e-bikes with cheap loans – even though Buenos Aires is dangerous for cyclists due to decades of car-only urban development. In this respect, Colombia's capital Bogota, which made headlines as Latin America's cycling metropolis long before the Covid-19 outbreak, is further ahead and already ranked 12th on the "Copenhagenize Index" in 2019. This index records how far metropolises all over the world have progressed with the bicycle-friendly reconstruction of their transport



PHOTOS: ALI TRISNO PRANOTO/GETTY IMAGES

PHOTOS: EKO SISWONO TOYUDHO/ANADOLU AGENCY VIA GETTY IMAGES; KEVIN YULIANTO/GETTY

infrastructure. Denmark's capital Copenhagen clearly leads the field. Using this comparison, large parts of Africa are still way behind, but there too many countries, such as Ghana, have recently started pedaling hard with the opening of bike sharing offers and cycling clubs.

According to Salatzki, it was precisely this increased global demand that caused the supply chain problems to become significant in 2020. "In China, Taiwan and Vietnam, where large parts of the production are concentrated, there have been complete plant closures due to their rigid zero-Covid-19 policies. This was compounded by staff shortages at ports around the world, an acute container shortage and the Suez Canal traffic jam in Spring 2021." The popular Shimano gears, for example, were no longer available. Manufacturers' purchasing suddenly had to be very flexible and adept to find new solutions. In the meantime, the situation on the world market has eased. But the lack of availability of components for power

electronics is still a problem, says Salatzki, and not every desired part is immediately available. But at least the shops are full again.

GLOBALLY, THE BICYCLE MARKET is a fragmented and competitive one with many national and regional players. But in terms of production, there has long been this strong concentration in Asia. But what if Asia is caught up in new Covid-19 waves? Salatzki also exudes confidence in the face of that particular threat: "There is now a trend toward reshoring, many German manufacturers are bringing production closer home again and setting up plants, especially in the eastern EU countries." This is supposed to increase crisis resilience.

But even in a two-wheeled world market with well-oiled supply chains, ideas will be needed as to how to keep the momentum going after the initial takeup and saturation. Which leads to a conversation with Sebastian Wegerle of the development department of Canyon, a German manufacturer considered an innovation leader. He makes it clear: "In view of the new models and consumer groups, market saturation is not to be expected for the time being. With cargo bikes in particular, the fastest-growing e-bike category, there is still a lot of potential. These are bikes that can be used in everyday life almost like a small car." He predicts that there will be an ever greater variety of models, each of which can be used more flexibly. This can already be seen in the popularity of gravel bikes, which take the drop handlebars and frame of road racing bicycles combined with bigger tires and wider gear ranges commonly associated with mountain bikes.

The confidence that has come from the recent global crises will continue to aid the bicycle industry and put suppliers in a good position – provided they plan their production capacities wisely. They can also build on innovative government programs, such as the flourishing company bike-leasing schemes in Germany, which could well find imitation abroad. These are where employers benefit from tax breaks if they choose to offer their employees a new bike. There's a sales machine right there, especially for the new, high-priced e-models, all of which leads to the conclusion: It could be high time to saddle up. ■

\$50 million

The sum Taiwan is investing to expand its network of cycle paths.

20 cities

The number of urban areas ranked on the Copenhagenize Index annually as the most bike-friendly places.



A TÊTE-À-TÊTE WITH

Gerd Gigerenzer

Psychologist Gerd Gigerenzer's research has changed how we think about intuition, uncertainty and risk. Here, he explains how Covid-19 exposed a need for better risk literacy and communication.

BY **Neelima Mahajan**

ILLUSTRATIONS BY **Nigel Buchanan**

AT SOME LEVEL the pandemic was a big social experiment. It laid bare how human beings think of risk and, when confronted with risk and uncertainty, how they often act in a manner that goes against all rational explanations. Using the pandemic as a backdrop, we spoke with Gerd Gigerenzer, a psychologist and director emeritus of the Center for Adaptive Behavior and Cognition at the Max Planck Institute for Human Development in Berlin. Gigerenzer, an expert on uncertainty and risk management, who spoke to us during the Global Peter Drucker Forum, helps us understand why we reacted to the pandemic the way we did and why, as a society, we need to lay more emphasis on risk literacy.

From your perspective, what did the pandemic teach us about how we, as humans, process uncertainty and risk?

I hope the pandemic taught us a lesson. I'm not so sure. First, I hope it taught us to accept uncertainty rather than thinking we are living in a world of calculated risk. We have seen in quite a number of people who are skeptical

about, say, vaccination, that they still cherish the illusion of certainty. So when the first news came that fully vaccinated people nevertheless got infected or even severely sick, there was an outcry: How can that happen? This is an example where the pandemic confronted us with our own lack of risk literacy.

What do you make of the spectrum of reactions to the pandemic – from extreme panic to nonchalance? What would have been a more prudent reaction, at least in the early days?

I've seen quite a number of young people who got highly interested in virology. I was very much impressed how a substantial group went the scientific way and tried to understand what's going on. This is what Marie Curie said: The more we understand, the less we fear. Not everyone went this way. Part of the problem was that most governments →



AVAILABLE ONLINE

Gerd Gigerenzer's advice on how to navigate risk and uncertainty rolandberger.com/en/gigerenzer



Gerd Gigerenzer is a psychologist and behavioral scientist whose research has revolutionized our understanding of bounded rationality and heuristics. A specialist in behavioral intuition and risk calculation, he is also the author of *Gut Feelings: The Intelligence of the Unconscious and Risk Savvy: How to Make Good Decisions*. His latest book, *How to Stay Smart in a Smart World: Why Human Intelligence Still Beats Algorithms*, was published in 2022.

were not prepared to communicate with the public in an understandable way, a way that the public accepted and trusted. Many institutions consider risk communication as a soft science – not really important, as opposed to toxicology and virology. If we want to reach the public, we need to have institutions and people who know how to reach out rather than to frighten and alarm the public.

The pandemic overshadowed a host of other risks – going to get a routine heart checkup, for instance, against the risk of getting Covid-19 by making that trip to the hospital. As humans, how should we be grading the risks in our lives and the way we want to react to them?

The first principles of risk literacy that we should teach everyone in society are to get rid of the illusion of certainty. Second, don't focus on one risk: weigh the risks. When they heard about the side effects of severe thrombosis from AstraZeneca, quite a number of people refused to take the vaccination. That was in early spring 2021. I would rather wait and be certain not to get this severe thrombosis. What the people hadn't learned is that by trying to reduce one risk to zero, you typically increase other risks – in this case, by waiting for the BioNTech-Pfizer vaccine for months, you might have a larger chance of ending up in an ICU. Today, risk literacy is as important as reading and writing some 150 years ago.

Many of us had our lives upended by Covid-19. Some were infected, others stayed cooped up at home, monitoring case numbers obsessively, trying to keep abreast of the latest news and vaccine developments – just living in extreme fear. Would you categorize this risk obsession as healthy or unhealthy?

We have seen both things. We have seen people who didn't dare leave their homes and were frightened to death. And we have seen people who didn't care, who thought at least if they were male, that it's a matter of being male to just go on like before and everybody else is a sissy.

The majority of people, I think, were quite reasonable in most countries and some countries managed it much better. Portugal and Spain, in particular, were hit early and today have vaccination rates that are over 90%. Other countries where the issue was politicized, as often happens, are split – like in the US. So it's also a mixture between political attitudes, vaccination, a lot of ignorance, fear and bravery that we witness – but that is what humans are about. What we really lack is risk literacy on the side of the people and risk communication on

the side of the governments. That needs to be improved. If you don't do it this time, the next time it will hit us again.

We rely on frames of reference to assess risk: our personal experiences, others' experiences, recent history. This time we were confronted with something we had no reference points for – at least in our lifetimes. How can we get comfortable with the idea of dealing with uncertainty for which there's no precedent?

There are some people who actually had larger problems, such as those in Third

Don't be a turkey: Is it a risk or an uncertainty?

1.

You get fed

Imagine you're a turkey in a pen. If you are fed on the first day there, you may assume there is one certain outcome each day.

2.

You don't get fed

If you are not fed 50% of days, you now know there are two possible outcomes each day. There is a risk you will not be fed.

3.

It's Thanksgiving

After 100 days in the pen, now you're the food. The risk is no longer if you will be fed or not. There was a hidden factor: uncertainty.



World countries where there's hunger and other things. But lucky us who live without war. It can be a reminder: Accept that you're mortal, that the world is uncertain, and do your best. And maybe don't think that you will be eternal. Think about how would it be if this would be the last day of your life: Couldn't you do something more useful than what you're going to do today? Covid-19 is a chance for us in many ways to wake up and to accept uncertainty and learn how to deal with it, emotionally and also cognitively.

Covid-19 was a perfect storm: half-baked information, misinformation, conspiracy theories ... In this fog of uncertainty, what are the guideposts we could have looked for?

At best, you can hope you have a medical system and a government that is responsible rather than trying to increase votes or fight the opposition. Also, an educational system that actively deals with that so you can bring Covid-19, as a topic, into schools. It can be in mathematics, about the statistics. It can be in sports: learning about how to keep distance, keep yourself in shape and also have personal development. Learn what questions to ask. Accept that there's no zero risk. Also, [regarding] the psychology of risk: Most people who love conspiracy theories tend to believe them because their peers believe them. Otherwise they think they might be out of their peer group. Realize how much you are dependent on the opinion of others, that you never checked many of your beliefs. Think about whether you want to take your life in your own hands rather than living a comfortable life being remote controlled by others.

What is the role of intuition in assessing risk? Is it something that gets in the way or is it something we should rely on?

Intuition is a feeling that is based on years of experience, where you know what to do or what not to do, but you can't explain it. It's important not to confuse intuition with an arbitrary decision or a

"Intuition will help you as long as you have experience. If you have no experience with a certain topic, then you shouldn't trust your feelings."

sixth sense. A doctor who sees a patient regularly thinks something is wrong, but cannot explain what it is – but then intuition leads and diagnostics begin. Intuition is often put in opposition to deliberate thinking and that's a big error: It is the beginning of deliberate thinking. It's an impulse. It goes together. All good experts work by intuition, but not only by intuition. There would be no innovation without intuition. So intuition will help you as long as you have lots of experience. If you have no experience with a certain topic, then you shouldn't trust your feelings about that.

Intuition is an important vehicle, but we live in a society where there is mistrust generated against intuition,

even by a number of psychologists who show with one experiment after the other intuition is going wrong. In *Thinking, Fast and Slow*, Daniel Kahneman says that the book is, in part, about showing that intuition goes wrong. In that research, there is rarely ever any attempt to understand when intuition works. That's the completely wrong track.

We know from other psychology research, including my own, that – for instance, in sports – an experienced golf player needs to go by intuition. A beginner, not. Experiments show if you have a group of novices and a group of experts, and you instruct them, the beginners will get better, but the experts get worse because they deliberately begin to think about something which is in the unconscious. I've worked with many large corporations and asked top executives to think about the last 10 professional decisions they made or were part of: How many of them were, in the end, a gut decision? Everyone works with data but the data doesn't always tell you what to do.

The answer I get is about 50% of all decisions are gut decisions. The same executives would never dare to say this in public. We live in a society where fewer and fewer leaders are willing to take responsibility. And what I typically see is that an intuitive decision is made, but it's not publicized, for fear. Rather someone is told to find the reasons. After a week, the employee found the reasons and then the decision is marketed as a fact-based decision. ■



A simple rule for risk evaluation

Big numbers make for spectacular headlines, but may not be transparent. Therefore, always ask if the numbers you're seeing represent relative or absolute risk increases – the absolute figures are more accurate, but are likely less eye-catching.



Put trust in human beings

Bestselling author, journalist and political commentator *Ece Temelkuran* makes a case for more democracy in the workplace.

INTERVIEW BY *Farah Nayeri*

What's wrong with the way the workplace is managed nowadays?

Capitalism tells you this story: Everybody is free to make a choice, that workers can sell their labor at a fair price if they want, that there is supply and demand and the free market economy will stabilize everything. It doesn't work like that. There is the law of the market, which is protected by the state. We need to democratize the workplace and make regulation sexy again – economic regulation, financial regulation – and practice self-management in the workplace.

What kind of solutions do you recommend?

Employers shouldn't be afraid of practicing workplace self-management and of sharing the profits a little bit more fairly. They should be asking their workers what they want, listening to them, and deciding together what to do in the workplace. They would be amazed at how people work when they have a stake in the place. I was reporting from Argentina during the economic crisis. Workers had invaded a factory and were running it. I asked them why, and one of the guys said: "The boss wasn't saying hello in the morning!" ■

Ece Temelkuran has been twice named Turkey's most-read political columnist. She is the author of *How to Lose a Country: The Seven Steps From Democracy to Dictatorship* and has appeared in *The Guardian*, *The New York Times* and *Der Spiegel*.

How did we get to where we are today?

In the beginning of the 1980s, organizations defended the rights of the working classes and the middle classes were weakened. We now look down on labor unions. Workers' organizations, workers' rights, working week reduction: All of these things are seen as bad, because they are bad for the shareholder.

A few of our contributors



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→ COVER AND PAGE 30



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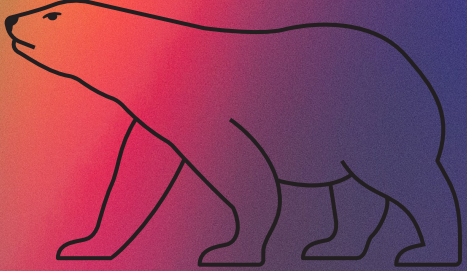
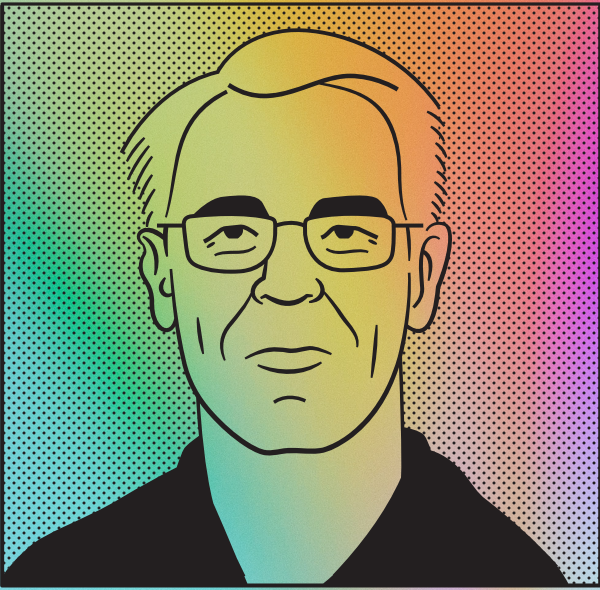
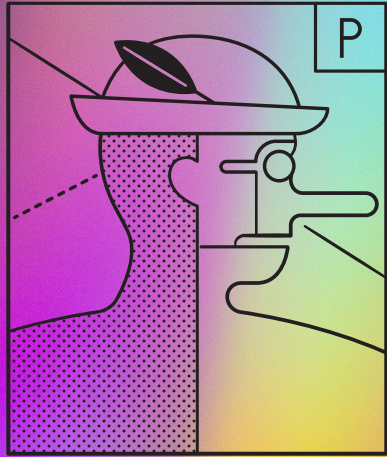
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THE FUTURE
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NET ZERO

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