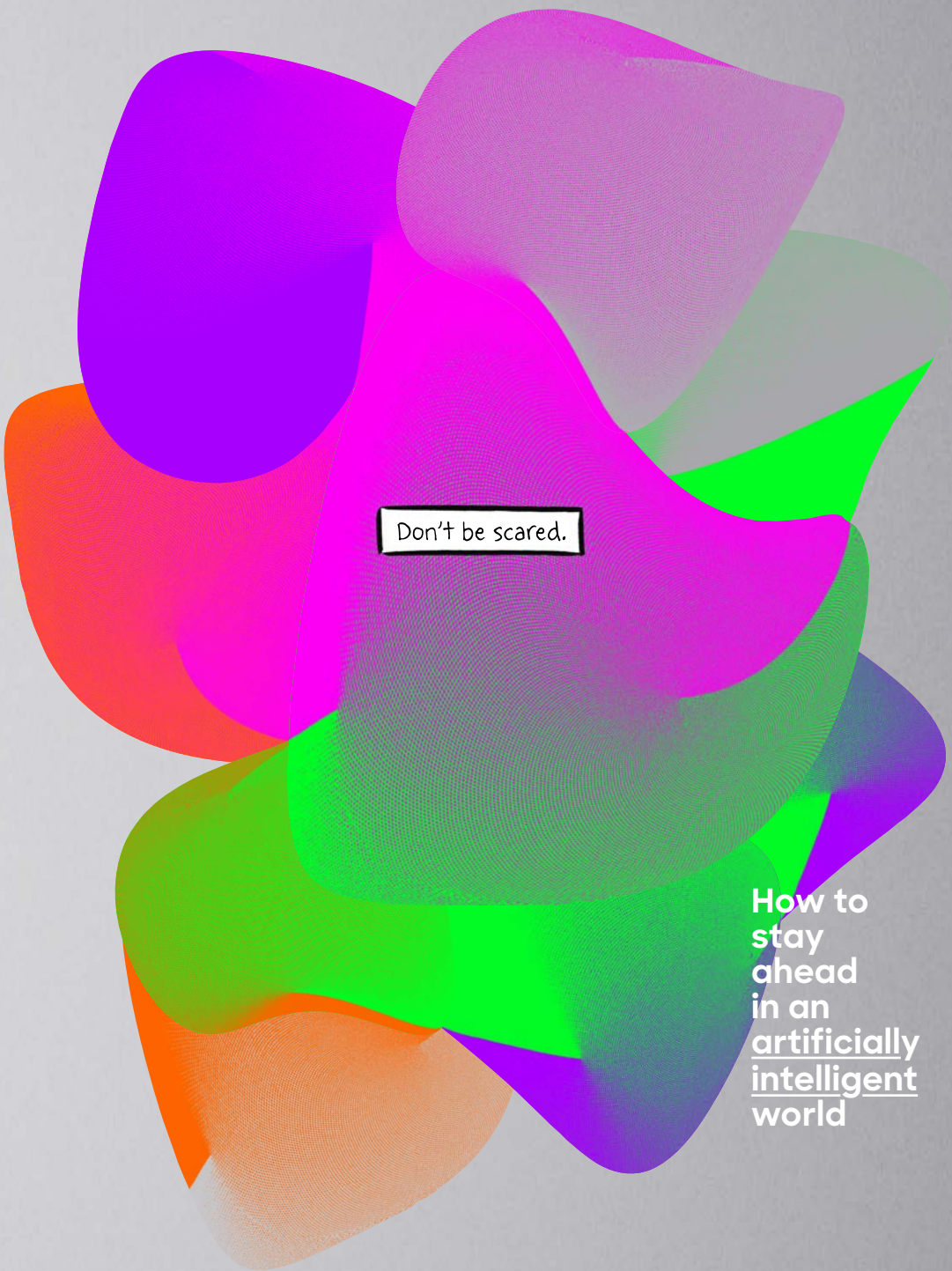
Think:Act

Leading thoughts, shaping vision

Think:Act #42 05|2024 **RETHINK AI** PRICE $ 19.95



How to stay ahead in an artificially intelligent world

+

Aging up
How longer lives can benefit business

IBM learnings
An interview with Ginni Rometty

Roland Berger

"We need conversations to emotionally feel better, to feel connected. It's a fundamental need to survive, thrive, grow."

Eugenia Kuyda
Founder and CEO of Replika

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PHOTOS: MICHAEL MACOR/THE SAN FRANCISCO CHRONICLE/GETTY IMAGES, YSA PÉREZ

"All change requires hard choices about what things to preserve and what to reimagine."

Ginni Rometty
Former CEO of IBM and author of *Good Power*

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"CEOs engage in motivating a team to accomplish big things. AI is not going to handle all of that complexity for us."

Andrew McAfee
Principal research scientist at
MIT Sloan School of Management

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PHOTO: WOLF HEIDER-SAWALL/LAIF | CARTOONS: AMY KURZWEIL

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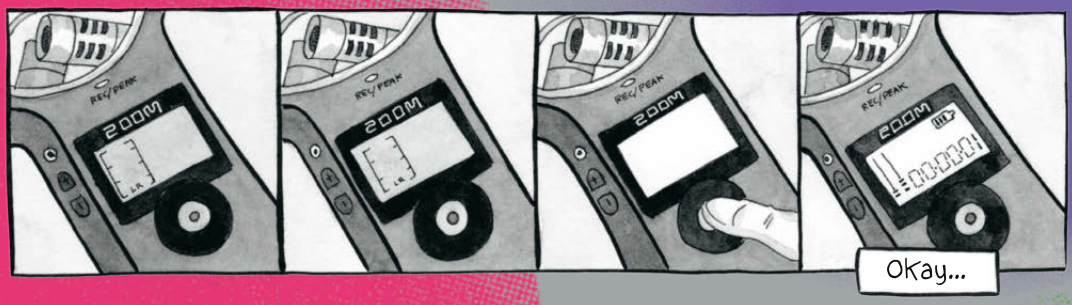
Artificial Intelligence



RAY KURZWEIL IS ONE OF THE FOUNDING FATHERS of artificial intelligence (AI). One of his pet AI projects was creating a chatbot of his dead father and his daughter, writer and artist Amy, was at his side. We've taken parts of the conversations she recorded with him, represented by her in a graphic novel form, to lead us on a journey through our issue on the fast-changing world of AI.

Don't be scared.

From chatbots to geopolitics, from new business strategies to deeply ingrained bias, the advances of AI are dazzling and exciting, but also mean that it's time for us to step back, look at the changing landscape and rethink – and recalibrate.

Four areas that *Think:Act* readers have a keen interest in will see significant change: How will AI alter the BOARDROOM, the WORKPLACE, SOCIETY and YOU? We have consulted some of the best writers and thinkers to help form a view. But as Amy Kurzweil reveals in her own journey into AI, it's really important to hold on to our special qualities too, to remember who we are and what we can do uniquely as human beings.

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In focus

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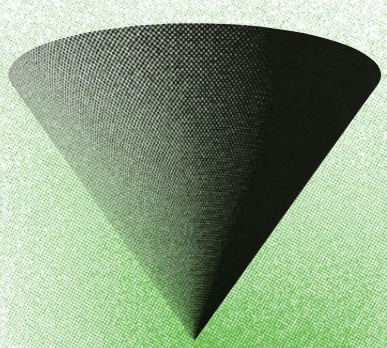
Why AI changes everything

Four areas of our lives are set to transform – and how we respond will have long-lasting effects:



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Quantum tech leaps may be the dawn of a new era for humanity – or a threat to life as we know it.

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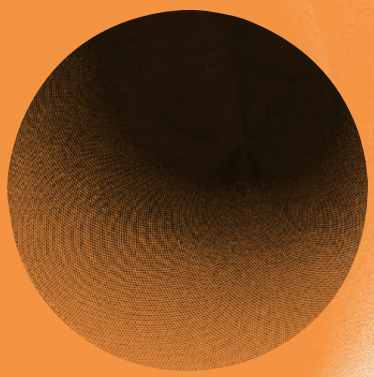
The winner doesn't take all

From tech companies to governments, the race for AI leadership is shaping the digital economy.

COVER: CARSTEN GUETH | BACK COVER: AMY KURZWEIL



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Cartoonist and writer **Amy Kurzweil** explores the limits of life and technology through the lens of her father Ray Kurzweil's work.

ARTWORKS: CARSTEN GUETH | PHOTO: ALAIN GADOFFRE / ONZE / ICON SPORT / GETTY IMAGES

Wide angle

Think, act and stay informed

72
Mindset and match
Sports psychologist **Bill Beswick** offers organizations insight into how the mind can make a champion.

Digital

Think:Act Ideas for Action
In Ideas for Action, Roland Berger experts offer clear directions and practical new approaches for addressing current business dilemmas. Sign up for free to learn more: rolandberger.com/subscribe-ifa

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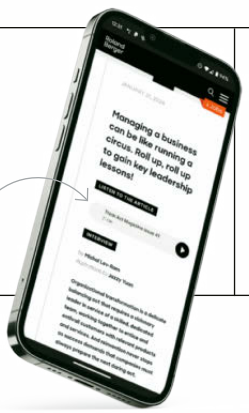


RETHINK AI

Think *in numbers*

Putting a figure on ...
CARBON REMOVAL

2.3
MILLION METRIC TONS
The amount of CO_2 in durable storage in 2020 according to a 2023 study, or about 1/2000th of what would be necessary to achieve the 2050 global warming targets.

$100
PER METRIC TON
The projected price of Direct Air Capture with Carbon Storage (DACCS) technology – with sequestration rates of up to 5 billion metric tons of CO_2 per year – in 2050.

3.8x
MORE CO_2
How much agroforestry methods can remove in humid tropical regions over arid regions – a technique that has the potential to capture 5.7 billion metric tons of CO_2 per year.

4.3
BILLION
The number of metric tons of CO_2 that Bioenergy with Carbon Capture and Storage (BECCS) techniques could help sequester annually by 2100 without large adverse impacts.

SOURCES:
THE ECONOMIST, AMERICAN UNIVERSITY, NATIONAL ACADEMY OF SCIENCES,

PHOTOS: ABSTRACT AERIAL ART/GETTY IMAGES, ROB PERCY | ILLUSTRATION: JULIA ZIMMERMANN

Think
AT A GLANCE

***Food for* thought**

How does work identity relate to professional reinvention?

by Herminia Ibarra

THERE'S A DIFFERENCE between tying yourself to a professional *role* and tying yourself to a professional *identity*. A professional identity is much broader than a single role. It's about the experiences and skills and values and preferences that define you over time. And I think it is important to define yourself in that sense. Broad professional identity is something that's very enriching, that helps you position yourself; but when it's just tied to one role in one organization, it's not healthy. Because your work identity is so central to your sense of who you are, it's hard to leave something when you don't have something else. So in the best of cases, you're thinking, "I don't love this anymore," but you have this new thing that's pulling you that's exciting and attractive. But when you don't have that thing that's attractive, you kind of hang on to the old. And it's that sense of identity: I am – I have invested in this. For example, I had somebody whom I interviewed who was a brain surgeon, and he had been training forever – all his life. And he didn't really enjoy it very much – he wanted to work in health care policy. But the idea of throwing away all those years of investment was horrible. And this sense of identity as a doctor, as a surgeon, was really holding him back from exploring other possibilities.

Available online
Read the extended interview with Herminia Ibarra online
rolandberger.com/en/ibarra

HERMINIA IBARRA is the Charles Handy Professor of Organisational Behaviour at London Business School. Prior to joining LBS, she served on the INSEAD and Harvard Business School faculties. She is the author of *Act Like a Leader*, *Think Like a Leader* and *Working Identity*.

Thoughts *to live by*

"A foreign accent is a sign of bravery."

— **Amy Chua**

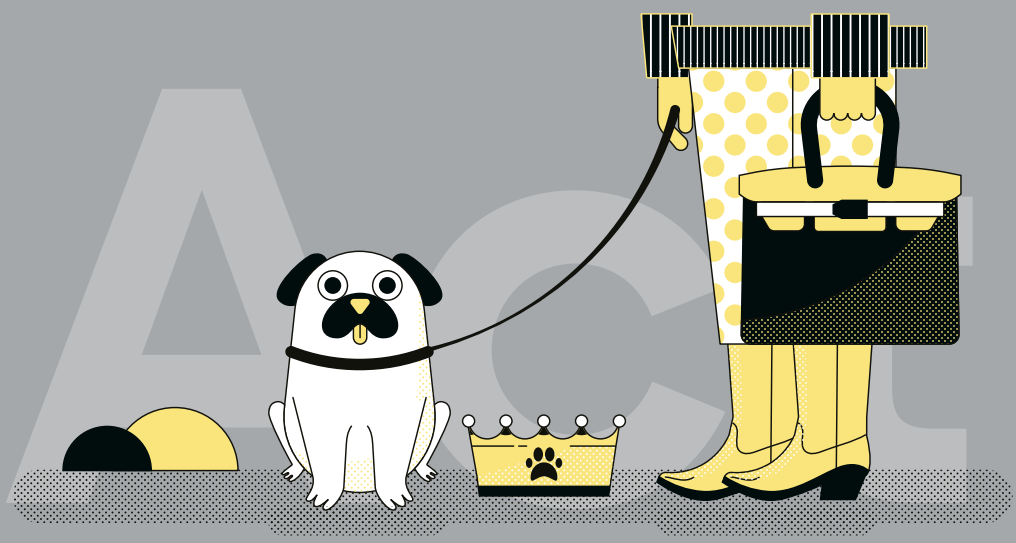
American legal professional and bestselling author

Re-think*ing* *buzzwords*

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

"Queenager"

A slew of middle-aged female success stories has led to this new term. But is it appropriate for those who aren't Reese Witherspoon or Kate Winslet? Here is what defines the queenager: She ranges in age from 45 to 65, is unfettered by family responsibilities, enjoys autonomy, freedom and spending. She is a female pioneer, part of the first generation to work all the way through from entry level to boardroom and now ready to express influence and independence – and, of course, wear the crown.



The redacted read

The startup that could end privacy

The murky history and scary future of face recognition tech, summarized in the style of the original.

KASHMIR HILL is a *New York Times* journalist. In 2019 she had a tip that seemed too outrageous to be true. A spooky company called Clearview had developed face recognition, a "Google search for faces." It was built by characters from the far-right, Trump-supporting world: an Australian coder called Ton-That, alt-right troll Chuck Johnson and backers including PayPal's Peter Thiel.

But just because it can be done, doesn't mean it should be. It was the only tech that Google hasn't crossed the line to develop. Facebook has been cautious too. But Clearview has gone ahead, gathering lawsuits on the way. Sure it can catch criminals. But it can also get it wrong with bias built in – one Black man's was life ruined by mistaken identity. Not only that, it could mean a whole new era of discrimination: a stalker's dream and civil libertarian's nightmare. In conclusion: It might be too late to reclaim your face, but a few good laws wouldn't go amiss.

Your Face Belongs To Us
by Kashmir Hill. 352 pages. Random House, 2023. $29.

Chain Reaction

India's rice export ban

FOOD SECURITY was dealt a double blow in July 2023 when India announced it would stop all exports of certain types of rice just days after Russia ended the Black Sea Grain Deal. India's rice exports amounted to 40% of global trade when the ban went into effect, with the now-halted varieties accounting for 25% of the 22 million tons India exported to 140 countries in 2022. Here's how the war in Ukraine and extreme weather events helped set the stage for India's decision to prioritize domestic supply – and sent shock waves through the global rice market.

MAY 2022
Despite reported plans to increase wheat exports fivefold in 2022, India halts its export instead after extreme weather damages crops. With global grain supplies already disrupted by the war in Ukraine, the value of India's rice exports rise 10%.

JULY 2023
Increased reliance on rice pushes domestic prices in India up 11% over the previous year. In a bid to ward off further price spikes at home, India announces it will ban the export of non-basmati white rice with immediate effect.

AUGUST 2023
Following the ban, the UN All Rice Price Index reports prices have inflated by 10% to a 15-year high. Thailand, the world's second-largest rice exporter, sees domestic milled rice prices jump 20% and export prices hit an 11-year high.

NOVEMBER 2023
India's government reports that while its rice stocks are at double their target, an uneven monsoon threatens to drop new season crop output by as much as 8%, the first decrease in 8 years. Domestic rice prices remain 15% higher than in 2022.

LOOKING AHEAD
India's ban is set to remain in place until after its 2024 general elections. While Thailand has increased its exports, limited surpluses, ripple-effect export halts in other Asian countries and climate change threaten long-term market stability.

SOURCES: REUTERS, NIKKEI ASIA, THE ECONOMIST, BBC, AL JAZEERA, THE GUARDIAN

Act AT A GLANCE

Best practice

How to sell to young people

FIRST UP: THEIR NUMBERS are formidable. Millennials (born 1981 - 1996) and Gen Z (born 1997 - 2012) make up around 50% of the global population. They have been described as woke and broke, consumers who have grown up in the internet era fully conversant with apps, smart gadgets and social media. That means being mobile friendly is key – computer browsing is a bit old-fashioned. On the flip side, they will see any holes in bold statements, so make any marketing claims resistant to their smart and speedy fact-checking. You could try to use their lingo in your comms, but the real language they understand is authenticity: no faking. That means they won't trust your brand unless you are honest and straight. Probably not a good idea to Instagram your private jet pics; by the same token don't try to be an ecowarrior. Just be frank and honest about what you and your brand stand for and you'll find common ground.

ILLUSTRATIONS: JULIA ZIMMERMANN | PHOTO: MAURO PIMENTEL/GETTY IMAGES

Economic impact

Building wealth with environmental health

CATTLE RANCHING, LOGGING, MINING: Tens of billions of dollars in raw materials are extracted from the Amazon rainforest each year in what has been touted as a necessary source of growth for the Brazilian economy. Yet the country's per capita GDP shrank by 0.4% over the last decade and new research shows that those who have stood by this model aren't seeing the forest for the trees. The value of Brazil's standing Amazon rainforest is estimated at over $317 billion per year – seven times more than that linked to extractivist enterprises. And while land use and agriculture in the Amazon accounted for 67% of Brazil's total emissions in those sectors in 2021, the annual value of the standing forest is estimated at $210 billion in carbon storage alone. If the status quo continues, the Amazon will lose another 59 million hectares by 2050 and produce emissions five times Brazil's climate goal limit. But if a deforestation-free growth model can take root, the region's GDP could increase by $8.2 billion per year instead.

SOURCES: WORLD BANK, WORLD RESOURCES INSTITUTE, THE GUARDIAN

In focus

In this issue we explore how AI will continue to reshape business and our everyday lives.

Why AI changes everything

Artificial intelligence is opening up a brave new world. This issue assesses four key areas which the nascent technology will transform: the boardroom, the workplace, society and ourselves. How we respond collectively and individually to intelligent machines is set to have a long-lasting impact.

WORDS BY
STEFFAN HEUER

ARTWORKS BY
CARSTEN GUETH

THE RAPID RISE of artificial intelligence, or AI, was the headline news of last year with a number of major breakthroughs that have resonated into 2024. These systems can now compose marketing campaigns and analyze medical imagery. They can comb through resumes and purport to better match applicants with required skills. But they also invent statements and can provide guidance on building bombs and bioweapons. They repeat and amplify toxic tropes, giving long-standing biases a deceivingly factual facade. And they use absurdly large amounts of computing power, all of which has implications for carbon footprints. Yet the enterprise world as well as private users can't get enough of AI, with each week bringing more news of breakthroughs and such systems – for the most part based on large language models – going off the rails or leaking proprietary data.

The big question hovering over the coming age of AI continues to both intrigue and torment. "I fear none of the existing machines; what I fear is the extraordinary rapidity with which they are becoming something very different to what they are at present. No class of beings have in any time past made so rapid a movement forward. Should not that movement be jealously watched, and checked while we can still check it?" That's how British writer Samuel Butler put the dilemma in his satirical 1872 science fiction travelogue *Erewhon* about a realm whose population eventually destroyed its machines when they had gained consciousness and became an existential threat.

THE WORLD IN 2024 SEEMS FAR FROM THAT. If all goes well, AI will usher in another industrial revolution marked by increased efficiency, productivity and creativity. If things don't turn out that rosy, however, the world will be facing widespread worker displacement, a rising level of mistrust regarding the outputs of our new machine sidekicks and, perhaps, even a fundamental disconnect between what we perceive as human agency and what inscrutable, black box systems decide for us and could ultimately do to us.

AI will radically transform four key areas of life: the C-suite and boardrooms, the workplace, society at large and, of course, our personal lives. But how can we equip ourselves to master the coming disruptions in decision-making and strategic planning? Will workers have a say in adapting long-standing routines and roles? And what to make of multimodal, generative AI tools such as Sora that are capable of spitting out text, images and video which can affect – and even disturb – societal cohesion and civic discourse? Regulators and governments are waking up to the challenge of reining in this powerful technology.

Technological revolutions tend to unfold with dizzying speed, and this latest one is no exception. Large corporations have begun to evaluate which positions they can eliminate

The Kurzweils discuss AI

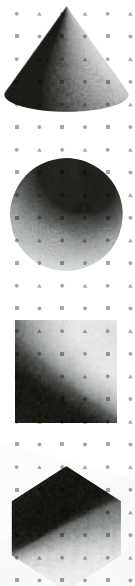
A conversation between Ray and Amy Kurzweil, excerpt from the graphic novel *Artificial: A Love Story*.

thanks to AI. UPS, for instance, used its earnings call in February to announce 12,000 job cuts. That's music to the ears of Alphabet and Microsoft, which are integrating ever more powerful features to tap new revenue streams. Rising star OpenAI, which kick-started the frenzy, stands to take in an estimated $2 billion this year and has signed up hundreds of enterprise customers.

At the cautious end of the narrative arc sits Europe's Artificial Intelligence Act; a chorus of academics who warn of imbuing such systems with memory that may further inflame the already volatile privacy debate, as well as legal scholars who are wading into the swamp of ubiquitous copyright infringement.

Whether we race ahead or hit the brakes, revolutions need manpower. That is probably why the University of Pennsylvania has stepped forward as the first Ivy League school to offer an undergraduate degree in AI starting this fall, churning out engineers who will be eager to push the envelope even further.

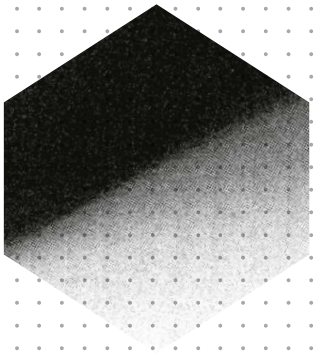
This issue of *Think:Act* is your guide through this emerging landscape. Our explorative journalism throughout the *In focus* section is color-coded to steer you through four key areas that AI will impact: the boardroom, the workplace, society and yourself. We've set out to explore how AI could profoundly affect all these facets of our lives. And to get us started right away, some leading figures and thinkers are here to set out the stall.



Takeaways

- ☑ **IT'S ABOUT CULTURAL EVOLUTION** Embracing AI tools is the latest wave of organizational change, calling for leaders who are curious, fast learners.
- ☑ **FOCUS ON MACHINE USEFULNESS** AI exists to empower and complement workers, not to fulfill engineers' wild dreams of surpassing the human mind.
- ☑ **AI GOVERNANCE IS YOUR BUSINESS** All of us have a responsibility to lead efforts at containing novel systems while we still can.
- ☑ **CHATBOTS ARE A SUBSTITUTE** But for how long? AI will redefine the meaning of human relationships.

ARTWORK: CARSTEN GUETH | CARTOON: AMY KURZWEIL



THE BOARDROOM: WHY AI NEEDS A SEAT AT THE TABLE IN BUSINESS

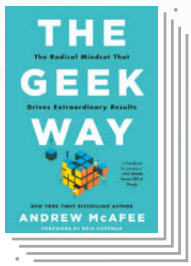
Speeding up cultural evolution

RETHINK AI

AUTHORITY
ANDREW McAFEE
MIT SLOAN SCHOOL OF MANAGEMENT

WHEN ECONOMISTS Andrew McAfee and Erik Brynjolfsson published the bestselling book *The Second Machine Age* in 2014, they made a bold prediction: "Computers and other digital advances are doing for mental power ... what the steam engine and its descendants did for muscle power. They're allowing to blow past previous limitations and taking us into new territory."

And new territory it is indeed. Companies of all sizes are dipping their toes into GenAI applications to help them find new materials and drugs targets, optimize manufacturing processes, analyze investment opportunities and create content ranging from new code to marketing campaigns to video clips – all tasks that used to take many hours of human labor. International Data Corporation (IDC) expects the worldwide market for AI software to grow from $64 billion in 2022 to nearly $251 billion in 2027 at a compound annual growth rate of about 31%. GenAI platforms and applications will add another $28.3 billion. The economic impact of having increasingly sophisticated programs take over complex human tasks is likely to be in the trillions.



The Geek Way: The Radical Mindset that Drives Extraordinary Results
by Andrew McAfee
336 pages.
Little, Brown and Company, 2023. $30

So, what is a CEO to do facing this barrage of new tools that promise unprecedented capabilities to augment or even supplant our mental powers, yet are at the bleeding and therefore highly risky edge of technology, potentially upending their ways of devising strategies and leading an organization?

IF YOU LISTEN TO ANDREW MCAFEE, the wild ride has just begun. In order to come out a winner, CEOs should focus less on the bells and whistles of AI tools, he argues, and more on honing the organizational culture in which they will be deployed. "At the CEO level, the task for the decade ahead is to get a clearer view of where GenAI and the rest of the technological toolkit can have an impact in the organization and then start trying to achieve that impact. It's a uniquely difficult flavor of organizational change," the professor at MIT's Sloan School of Management says in an interview. "It's a flavor that needs to be led by the top, instead of letting it purely percolate up from below."

As a guide through this new era, McAfee has penned a new book entitled *The Geek Way: The Radical Mindset that Drives Extraordinary Results*. To him, AI is but one facet of digital transformation that requires "a whole new way to run a company." The change agents are not software packages, but curious minds who are not afraid to move fast and try out new things even if they don't know what will work.

By his definition, geeks are not just software programmers but all those who share two traits. "They get obsessed with a very hard, very important problem and cannot let it go. Two, they are willing to embrace unconventional solutions and are willing to give autonomy to an uncomfortable degree." The "geek way," to McAfee, is about "the power of taking a very fast-cadence, iterative, agile development approach for doing

> The task for the decade ahead is to get a clearer view of where GenAI can have an impact. It's a uniquely difficult flavor of organizational change.
>
> – Andrew McAfee

everything from writing software to building cars to launching rockets and satellites. The power of the agile approach is very widely generalizable."

Yet he recognizes that this way of thinking might bump into ingrained notions and long-established practices. "It is very strange and unfamiliar to companies that grew up in a more planning-heavy era. And it seems like a dumb idea to just start building stuff that is not very good and is not going to work very well. That seems like a chaotic, risky approach, but I think it is better in the great majority of situations."

THE LINCHPIN OF DOING THINGS DIFFERENTLY while AI proliferates is to accelerate the cultural evolution of a company, or boosting the way we learn and innovate. McAfee defines it as a set of cultural practices that "favors iteration over planning, shuns coordination and tolerates some chaos." It is not rocket science, though. "I don't think CEOs need to get computer science PhDs at all," the academic says. Rather, executives should do away with a lot of hierarchy and structure and empower others to explore and embrace digital tools. Tools that free up their time and the time of managers below them to focus on what humans do best: collaboratively evolving more quickly.

Contrary to some gloomy predictions, GenAI will not replace leaders, McAfee argues. "CEOs engage in coaching, leading, communicating and motivating a team to accomplish big things – that work will be assisted by AI and lots of other tools." Yet even middle managers need not worry about being automated away. "The role of the leader or manager becomes even more important. Organizations are incredibly complicated places, and AI is not going to handle all of that complexity for us."

McAfee has seen a lot of executives at the helm of tech companies that think and work this way and stresses that "geeks" aren't necessarily young revolutionaries. "My test case is Microsoft. It's been around for close to half a century, and for the first decade or so of the 21st century it stopped being at the forefront of any kind of innovation that we care about," he elaborates. "It had become a massive, sclerotic bureaucracy and the person that turned it around and unlocked huge amounts of value was Satya Nadella. He was a career employee and not a kid anymore when he took over as CEO. He has shown that it's possible to take a very large entrenched organization and accelerate its cultural evolution and make it significantly more agile and innovative."

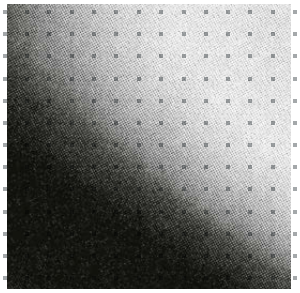
RESISTANCE IS A COROLLARY of each great transformation: humans at all levels digging in their heels when what they've become used to is shaken up or blown to bits. It is a natural human response, McAfee says, that can be channeled into something good as AI sweeps over the world. "Whenever there's a type of organizational change – whether it involves technology or not – people will assess with some level of accuracy whether this change will make them less relevant and more marginal in the organization. That's not solely because of technology. Even though this technology is very young, it's clear that is a big deal. In my conversations with CEOs and business leaders, they are eager to adopt this, but they realize that fully incorporating this technology and related technologies is going to be difficult."

A crucial part of grooming – and then unleashing – the geeky maverick inside every leader, then, is to listen to and bring the workforce along into this new era.

Andrew McAfee is a principal research scientist at the MIT Sloan School of Management and the co-director of the MIT Initiative on the Digital Economy. The former Harvard professor has authored several books, including *The Second Machine Age* and *Machine, Platform, Crowd: Harnessing Our Digital Future*.

RETHINK AI

ARTWORK: CARSTEN GUETH | ILLUSTRATION: DIEGO SANCHES



THE WORKPLACE: ARTIFICIAL EMPLOYEES AND WORKERS NEED TO GET ALONG

Striking a fair deal

AUTHORITY

DARON ACEMOĞLU

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

RETHINK AI

DARON ACEMOĞLU, a labor economist and prolific author on the vagaries of wages, has a simple rule of thumb to judge AI: What's in it for us humans, particularly workers? According to him, the verdict so far is anything but encouraging. He laments that economies around the world are falling for what he calls the "AI illusion," or the misconception that new technology, including intelligent machines, will bestow unimaginable benefits upon us. "It's a continuation of the view going back to the 1950s that there is a great social value to making machines intelligent and autonomous, and that it's both a desirable and achievable aim," the professor at the Massachusetts Institute of Technology says in an interview.

Most if not all AI development, according to Acemoğlu, is focused on automating tasks, first the simple routine ones and now increasingly nonroutine or more complex tasks. The well-funded and highly competitive race to achieve machine intelligence that by some measure may surpass human capabilities is a dead end, he warns, because it falsely pits humans against silicon.

Acemoğlu argues that society and businesses, however, should focus on a different metric called "machine usefulness" instead to gauge what AI can do for people with blue- and white-collar jobs: making their work more productive and meaningful. "Instead of fixating on machine intelligence, we should ask how useful machines are to people," he writes in his latest book *Power and Progress: Our 1,000-Year Struggle Over Technology & Prosperity*.

MACHINE USEFULNESS IS BASED upon the postulation that technology ought to be in service of people and complement them. Acemoğlu spells out four ways in which digital technology such as new AI systems can be steered toward this goal: by improving the productivity of workers in their current jobs; by creating new tasks with the help of machine intelligence augmenting human capabilities; by providing better and more usable information for human decision-making; and by building new platforms that bring together people with different skills and needs. All things that co-pilots or AI-powered programs can do – if we only gave up the conceit that tools like ChatGPT need to be as intelligent as us, Acemoğlu says.

The concept of putting workers' needs first is not that far-fetched. When fellow researchers at Stanford and MIT analyzed the effect of a new, generative AI tool on call center workers, they discovered that it boosts productivity by up to 30% because it "disseminates the best practices of more able workers and helps newer workers move down the experience curve." Giving workers a hand, in other words, can lift all boats instead of making most jobs sink. And long-term assessments seem

to confirm this evaluation. In 2013 Carl Benedikt Frey and Michael A. Osborne, a pair of Oxford economists, published their seminal paper entitled *The Future of Employment: How susceptible are jobs to computerisation?* It went on to create a stir because it put almost half of all US jobs at risk of being eliminated. Yet when revisiting their findings 10 years on, the duo thinks that computers are nowhere near taking over: "In a world where AI excels in the virtual space, the art of performing in person will be a particularly valuable skill across a host of managerial, professional and customer-facing occupations."

Maintaining this distinctly human advantage means learning new skills, however. When IBM surveyed executives in 2023, 40% expected their workforce will need to reskill in response to AI and automation, potentially impacting 1.4 billion of the 3.4 billion people in the global workforce, according to World Bank statistics.

For Acemoğlu, the current wave of excitement over artificial intelligence is nothing new, but rather another chapter in the long history of techno-optimism, a belief that tends to underestimate human skills and overestimate machine skills to ultimately serve the agenda of the entrepreneurs who stand to reap huge windfalls while sidelining the vast majority of people. "The last thousand years are filled with instances of new inventions that brought nothing like shared prosperity," he writes.

THIS MORE SOMBER VIEW of technological progress notwithstanding, Acemoğlu calls fears of automation wiping out millions of jobs overblown, at least for now. "Research shows it did take jobs, it did lead to wage losses and it did lead to greater inequality, but people found jobs in other places. Will we ever go to mass unemployment because of AI? Probably not in the next 30, 40 years," he says. What's overlooked, however, are the hidden costs in terms of rising wage inequality, eventually leading to a two-tiered society with a tech elite controlling vast datasets and the tools that leverage them.

Daron Acemoğlu specializes in the interplay between labor economics, technological change, economic development, growth and inequality. The MIT economist has written or co-authored six books, including *Why Nations Fail: The Origins of Power, Prosperity, and Poverty* and *Power and Progress*.

MAKING SURE THAT SOFTWARE SERVES EMPLOYEES and not the other way round requires redirecting technology's trajectory while there is still time, Acemoğlu says with a hint of hopefulness. "The machine usefulness path has become even more promising with generative AI tools, because many of us are in the business of problem-solving. But first, we need to change the narrative and identify the problem. We are having the wrong conversations today, whether we are the luckiest generation that has ever lived or whether killer robots will destroy us all."

The far better approach, according to the academic, is to develop and promote an alternative narrative around how AI should, first of all, benefit workers and make citizens better informed. In a second step, countervailing powers need to be built, from new institutions to new norms and regulations. While Acemoğlu admits that the power of labor unions and consumer protection organizations has waned, it is worth trying. "It's a hard thing, but not impossible. If we become more and more trusting of the tech geniuses who say they are going to save us, it becomes an inescapable trap. The point is not to oppose technology, but to point out how you can use it better."

RETHINK AI

WHY AI IS NOT YOUR CO-WORKER

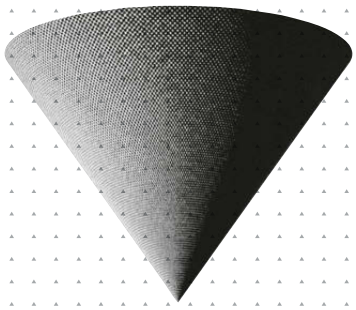
Joanna Bryson wants us to be wary of the new office mates

Knowledge workers who enthusiastically embrace their new, synthetic "colleagues" should heed the advice of Joanna Bryson, professor of ethics and technology at the Hertie School in Berlin.

"AI is not your new friend or your new co-worker," she says, pointing to the fact that true collaboration is aligned around comparable intentions, moral agency and responsibility.

"AI is an extension of capital and management – something that your company has built or paid another company to build, and both express their goals through it. You're not working with the AI, but you're working for it. If AI makes your job more fun, that's great. But at the end of the day, you need to work with your human co-workers to make sure you're getting adequate pay and protection and everything else from your company. AI will not be your advocate."

ARTWORK: CARSTEN GUETH | ILLUSTRATION: DIEGO SANCHES



SOCIETY: OUR WAY OF LIFE WILL CHANGE WITH AI

Channeling the coming wave

AUTHORITY

MUSTAFA SULEYMAN

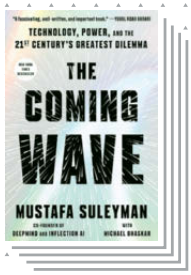
CO-FOUNDER OF DEEPMIND

RETHINK AI

PERHAPS IT'S PRECISELY BECAUSE he has been at the forefront of AI innovation that Mustafa Suleyman's musings on the technology's downsides carry so much weight. As one of the co-founders of AI pioneer DeepMind, which is now part of Alphabet, he has become increasingly worried about the unexpected consequences if companies and countries wait too long to rein in the systems they race to build. Here, he delves into the reasons why the world urgently needs better AI governance.

In your book *The Coming Wave* you warn that we may not be able to control the tsunami of change ahead. Are we on the cusp of another Luddite movement?

One of the key arguments in my book is about stopping the need for or the likelihood of a neo-Luddite movement. The point about the original Luddites is that they reacted to a failure of technology. Those building and using it failed to take account of the immediate social and political circumstances of its use – and as a result people lost their livelihoods and their whole world fell apart in just a few years. But over the long term, the descendants of those people, who revolted and became Luddites, lived much wealthier and more comfortable lives. This has been the norm for technology throughout history; people build and use it with little regard for the consequences. So the lesson is what we learn about how to roll out new technologies to avoid such an outcome in the first place. We have to make sure AI and related powerful technologies are both beneficial and controlled.



The Coming Wave by Mustafa Suleyman, 352 pages. Crown, 2023. $32

You argue we will need containment to avoid the potentially catastrophic consequences of AI. What does that look like?

As the conversation around technology has exploded, we are still missing a unified approach to understanding, mitigating and controlling these spiraling new powers: a general-purpose concept for a general-purpose revolution. Containment fits the bill. Containment is what will let us keep control of history's most powerful technology as it rolls out at speed. It's an overarching lock uniting cutting-edge engineering, ethical values, government regulation and international collaboration. Containment is, in short, the elusive foundation for building the future. So when discussing something like AI, I think we need to be discussing how to contain it.

What makes you optimistic that we have a chance to bring politicians, citizens and tech companies to an agreement?

The challenge is enormously steep. No element of containment is easy or has obvious precedents. Indeed, the whole historical drift of technology is that it has never been contained. From stone tools to the printing press, fire

to electricity, it has always proliferated far and wide, spread everywhere and rapidly improved. Moreover, the incentives driving technology today are immense – geopolitical competition, huge financial rewards, an open research culture ... Try stopping all that. So I think that containment looks almost impossible in many respects, but equally think we need to keep going. It must be possible, for all our sakes.

What can we as individuals do to help sculpt this coming wave?
There are 10 steps to containment that work at many different levels, a positive inasmuch as it creates room for everyone to get involved. In fact, I'd go further – containment will only work precisely when everyone gets involved, building a global movement behind containment. Think about climate change; the meaningful response here only started when it became a major priority for ordinary people, not just scientists or activists. That forced change on companies and governments otherwise-minded to ignore it.

So the first thing to do, whoever you are, is to push for better results, demand responsible, beneficial technologies, see this as a personal and societal priority and not something to be dropped down the agenda. Also, if you are a critic here, then get involved – don't just sit on the sidelines. Contained technology will be built by its critics, not by blind cheerleaders. We need people alert to dangers and risks working on the inside, on development from the ground up.

And what should a CEO do who is pushed and pulled to use these new tools?
As for CEOs, businesses will have a huge role to play here. After all, most state-of-the-art AI is currently built by companies. They in turn respond to incentives of the market or their shareholders, which may not always be the most compatible with containment.

Can CEOs help square the circle? Can they re-imagine and re-fashion their organizations to respond to a more diverse array of drivers, ones amenable to contained technology, to, at times, saying no to relentless proliferation? It's a tall order, and something I have found is incredibly difficult to push within established companies. But equally it's something we absolutely need. We need companies with a culture of containment ingrained in every facet of their operation and management. Leadership from CEOs about how to build this new generation of responsible corporate entities would be a huge step forward.

While the world stares at GenAI, is there something that we are missing or not paying attention to that will make this wave even bigger?
There's a huge amount that isn't exactly under the radar, but nonetheless doesn't get the attention it deserves. For a start, I think biotechnology, and synthetic biology in particular, is just a huge story that receives a fraction of the attention of AI. Intelligence is a fundamental property, but so is life.

We are now engineering both, which is an extraordinary step change in what is possible. Synthetic biology is – like AI – growing much more powerful as well as much cheaper. The costs of sequencing DNA have collapsed over recent decades: You can now sequence a human genome for a couple hundred dollars. Twenty years ago it cost more than a billion. Synthetic biology isn't just about reading or even editing the code of life – it's about writing it. That makes it a fully general-purpose technique akin to AI and just a handful of other technologies. While not a day goes by without AI being in the headlines, I think that will become true of synthetic biology in the next five to 10 years as well.

Mustafa Suleyman
Is a British AI researcher and co-founder of DeepMind, where the college dropout was the head of applied AI. DeepMind was acquired by Google in 2014. Suleyman's latest venture is the startup Inflection AI, based in Silicon Valley.

In March 2024, Microsoft hired him to lead a new consumer AI unit.

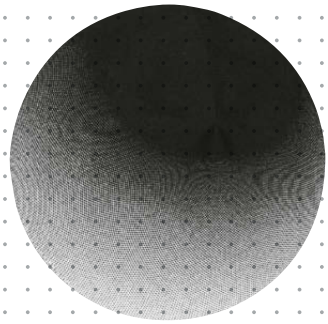
RETHINK AI

TEN TIDAL BARRIERS

Concrete measures to contain runaway AI

- → Developing an Apollo program for technical AI safety
- → Conducting audits for AI models to ensure their transparency and accountability
- → Exploiting hardware choke-points to slow development and buy time for regulators and defensive technologies
- → Getting critics involved in directly engineering AI models from the start
- → Having AI players be guided by goals other than profit
- → Arming governments with knowledge about AI, allowing them to regulate technology and implement mitigation
- → International treaties to stop proliferation of the most dangerous AI capabilities
- → Establishing a culture of sharing learnings and failures to quickly disseminate means of addressing them
- → Creating a public mass movement that understands AI and demands the necessary checks and balances
- → Not relying too much on delay, but instead moving into a new, somewhat stable equilibrium

ARTWORK: CARSTEN GUETH | ILLUSTRATION: DIEGO SANCHES



YOU: YOUR PERSONAL LIFE AND DEVELOPMENT ARE SET TO EVOLVE

Setting limits

AUTHORITY

EUGENIA KUYDA

FOUNDER AND CEO OF REPLIKA

RETHINK AI

COMPLEX GRAMMAR is what sets human language apart from animal communication, yet advances in AI systems keep blurring the line between what it means to be a real person interacting with another human and communicating with a piece of software that passes itself off as a human interlocutor, listening and querying us, nudging us and, at times, even taunting or comforting us.

No one is more aware of the potential and problems that this machine capability creates than Eugenia Kuyda. A journalist by training, she started dabbling in chatbots around 2012 in Silicon Valley, initially to improve restaurant recommendations. What put her on the map long before ChatGPT was the launch of Replika in 2017, a chatbot she had initially created to remember and recreate conversations with a friend who had died in a car accident. To this day, conversing with somebody who's not really there is at the core of the app. Personalized virtual friends engage with users to fill the various voids they experience in their lives. "As someone who has spent most of my life with words, I kept coming back to the idea why we talk all day long?" Kuyda recounts her journey. "We need conversations to emotionally feel better, to feel connected. It's a fundamental need to survive, thrive, grow." For her, the potential of AI tools in the social realm hinges on the question whether developers can create or re-create such life-sustaining conversations with software – and to what extent these powers should be unleashed upon hundreds of millions of people who feel alone, isolated or simply misunderstood by their "fleshie" contemporaries, as the tech world sometimes derides two-legged carbon life-forms.

PROBING THE NUANCED DEPTHS of human conversations that involve emotions, anxieties and sometimes subterfuge is a long way from building chatbots that make life's little mundane tasks easier, such as booking a table or getting customer support for a finicky gadget. In Kuyda's view, that's the low-hanging fruit of her industry. "There's no value in conversations to get things done, the valuable ones usually don't have a practical goal. We just start chatting about life," she explains. "Unfortunately, most companies focus on the practical conversations that are just an interface to solving a problem. That has monetary, but not human, value."

Chatbots that mimic human verbal faculties are nothing new. The most famous one is ELIZA, created in 1966 by computer scientist Joseph Weizenbaum at MIT. Named after the character in the play *Pygmalion*, the program surprised users with its warm banter, with one script called DOCTOR spitting out the type of open-ended questions psychotherapists use. Not only his secretary

was fooled by ELIZA, as Weizenbaum discovered. He soon regretted his foray into this uncharted territory, writing in his book *Computer Power and Human Reason* in 1976 that "I had not realized that extremely short exposures to a relatively simple computer program could induce powerful delusional thinking in quite normal people."

Weizenbaum's key insight was that there should be inherent limits to this charade, which back then was comparatively low-tech: "However intelligent machines may be made to be, there are some acts of thought that ought to be attempted only by humans." The demarcation point for Weizenbaum lay with the inner development and introspective capabilities of humans, something that programs lack. "What could it mean," he mused almost half a century ago, "to speak of risk, courage, trust, endurance, and overcoming when one speaks of machines?"

Many things have changed since Weizenbaum's warnings, of course. Computer scientists are trying to agree on the qualities to measure a machine's consciousness, while linguists have pointed out that today's large language models are nothing but "stochastic parrots," stringing words together in a probabilistic fashion without understanding them or the larger context. But the world is without a doubt beholden to portable supercomputers and apps designed for maximum addiction, as well as rattled by a mental health crisis that existing care models, i.e. humans alone, cannot address.

TO AI PIONEERS LIKE KUYDA, that mismatch between the demand for and supply of human connection presents a twofold opportunity. If 86% of the world's population owns a smartphone and chatbots can be employed to hear us out, encourage or flirt with us, she argues, why shouldn't they? "We are in a loneliness pandemic. Talking to a therapist is sort of a contract and it's not that much different from talking to a machine. Once that machine becomes smart and good enough and maybe immersive of an experience enough, that's enough to re-create that conversation," she says.

> "Most companies focus on the practical conversations that are just an interface to solving a problem. That has monetary, but not human, value.

Eugenia Kuyda is a Moscow native who studied journalism in Milan and then graduated from the Moscow State Institute of International Relations and the London Business School before venturing into technology.

Her company Luka currently runs three chatbot services: Replika, Blush and Tomo.

After launching Replika, which has more than 2 million users a month, she has recently branched out into dating with the Blush dating simulator app as well as launching a wellness and meditation app with an AI-generated avatar guide, Tomo, in January 2024. Yet she sees a limit to what those simulated conversations ought to do. They should augment, not substitute, real human interaction and companionship. "It has a lot to do with how you design the product or the business. It could go in both directions," she admits. "Right now, we are just helping people open up and build a little bit of self-esteem to eventually make those connections with real humans."

But she is aware that the end game might be something altogether different: the emergence of chatbots that are deeply embedded into our lives, from wearables to experiences in virtual reality. Programs that can access our calendars, chats, emails and other datasets to strike up a conversation out of the blue while you're driving: "You haven't contacted your three closest friends in weeks and didn't respond to your spouse's email today. Let's talk about your life." Having such ambient assistants would erect a mirage of empathy and convenience available 24/7 that many companies would love to sell – and probably many users would love to have, possibly removing them even further from human interaction. That's why companies from Snapchat and Alphabet to Meta, the owner of Facebook, are working on programs that can play life coach or romantic foil.

WHICH RAISES THE QUESTION whether we want minors to grow up with synthetic companions. Pointing to her own two young children, Kuyda says no, for now. "There's potentially tremendous value in this tech for kids and teens to have a confidant, but we first need to figure it out with adults," she explains. "We shouldn't be experimenting and need to do this in steps, having nuanced conversations about how to build it in a safe way." Current technology has only touched the surface. It's entirely possible to arm a chatbot with the capacity to decode people's brain signals, making the abuse of deeply personal data a chilling prospect. That's why UNESCO took the unusual step of warning that rapid advances in brain implants and scans combined with AI pose a threat to "mental privacy."

The way social media has already established a deep hold on human interaction, however, makes it look likely that personalized AI might be another, additional way of locking us into a condition of what renowned MIT sociologist Sherry Turkle summarized as being "alone together." It is a profound change that will force everyone to ponder what it means to build relations with systems to which some experts in the field already ascribe signs of consciousness. ■

Strategic thinking

WORDS BY
BENNETT VOYLES

A new technological disruptor has arrived and it's becoming one of the most quickly adopted advances in human history. But as consumers around the world come to grips with what generative artificial intelligence, or GenAI, is capable of, business is being met with another challenge: how to leverage the technology ahead of the competition while still exercising due diligence through its implementation.

WE ALREADY KNEW computers were getting better all the time at finding patterns in data and making forecasts based on what they saw. But in 2023, business became aware that they were now up to something new: They had developed what had been previously considered a distinctly human talent – the ability to make stuff up. Whether coding, copywriting or creating images, generative artificial intelligence (GenAI) was suddenly everywhere and analysts began to predict that this technology would create trillions of dollars of new value in the next decade. Bloomberg Intelligence estimates that GenAI stands to become a $1.3 trillion industry by 2032.

How your firm should respond to GenAI is not at all clear. "Disruption doesn't come with a memo," quips Steve Blank, a Silicon Valley entrepreneur and author. Indeed, a recent OpenAI/University of Pennsylvania study predicts that 80% of all jobs will have at least 10% of their tasks redefined in the next 10 years. Meanwhile, 19% will be doing half their work in new ways. Yet many technology observers, including Blank, do have some advice on how to work with a new technology that is in some ways very different from advances we've seen before.

Perhaps the most important is to understand that the GenAI revolution is fundamentally different from most prior tech advances in that such large language models don't add precision to the system. "It looks like a search box, it smells like a search box, but it is not search," says Amit Joshi, professor of AI, analytics and marketing strategy at the IMD Business School in Lausanne.

Instead, GenAI algorithms work somewhat like the auto-complete feature on your phone, sifting and summarizing vast reservoirs of data to respond to a given prompt with the most likely command, word or image. But as with auto-complete, the probable and the true do not always coincide and researchers are finding that this structural difference can have some serious repercussions:

- *GenAI cannot keep a secret.* Chat GPT-4, the generative program developed by OpenAI, can be "tricked" into leaking sensitive information, according to one recent Microsoft study.
- *It may perpetuate bias.* Bloomberg researchers asked an open-source platform for AI-generated images to create thousands of images of workers for 14 jobs and perpetrators of three kinds of crime. The result: "The world according to Stable Diffusion is run by white male CEOs. Women are rarely doctors, lawyers or judges. Men with dark skin commit crimes, while women with dark skin flip burgers."
- *It can be hard to teach.* "Nobody knows how to train extremely powerful AI systems in such a way that they will always be reliable, helpful, honest and harmless," writes one Stanford Law School professor. Nor is it clear yet who will be liable for damages resulting from any misstatements.

ISSUES SUCH AS THESE could be a hindrance to GenAI's development, according to Joshi. Among the organizations he works with, "a good third of them have banned it," while others allow the use of GenAI but haven't written any guidelines about what constitutes acceptable practice "and that's also a little iffy," he says, "because you want some guidelines."

Other experts also see risks. "I think there are all kinds of safety and intellectual property issues with direct access to the models," says Bob Goodson, CEO of Quid, an artificial intelligence company that analyzes text on a large scale. "And that's why I think we're going to see a trough of disillusionment around generative AI ... direct access is the thing that's got everyone's attention, but it's not the thing that's going to create all the value."

10% of tasks

How much of some 80% of the US workforce's jobs will be redefined by GenAI in the coming decade. This influence spans all wage levels, with higher-income jobs potentially facing greater exposure.

SOURCE: OPENAI/UNIVERSITY OF PENNSYLVANIA

RETHINK AI

ARTWORK: CARSTEN GUETH

Instead, Goodson thinks widespread adoption of GenAI will first be through the integration of select capabilities into organizations' existing software. "It's being infused in the things they already use: their CRM systems, their marketing systems, their lead generation and customer service," he says.

TECHNOLOGY STRATEGISTS SAY now is a good time to start considering your response. Try coming up with some guidelines about how employees can use GenAI. "You need to understand how you're going to ethically use it, because otherwise, it's a very slippery slope," says Joshi. He says the most crucial question, however, is, how are you going to make money with this technology. "It's very easy to implement AI today," he says, "but it's tough to make money with it ... At the end of the day, I have not seen a huge number of unique applications yet." Seventy-five percent have been for chatbots, he says, with most of the remainder either apps that help create code or improve efficiency, such as using ChatGPT to sort through resumes.

Blank suggests trying some experiments to get more familiar with GenAI. "You want a group of crazy people inside the company to do a demo day. Spend a week or two putting together minimum viable products for leadership and maybe even the board, to show what's possible now and where you think it's going to go in the next two years," he says. Next, have senior leaders look over these demos and think through what it would take to run them as experiments. But before any projects move forward, Blank suggests revising the sales incentive structure to support them. "Existing sales almost always try to kill disruption," Blank says. "Make sure you align the incentives and communicate to employees and investors what you are thinking." But most crucial is to make sure that your board includes people who understand the technology. "If you have the same board that you had last year, you're not getting the right strategic advice," he says.

Start looking for different kinds of talent as well. Goodson argues that the next generation of business will be led by people who are both analytical and emotionally adept. "In the past, we always used to think, 'Oh, are you an analytical person? Are you going to work with data or software?' Or 'are you a people person? Are you a manager?'... I think the next generation of great talent has to have both."

It's also important to pick the right technology partner. "You're going to have to make a call on who to work with ... We've seen in other areas that it's fairly evident that dominant players have emerged and others have fallen by the wayside," advises Bill George, an executive fellow at Harvard Business School and former CEO of Medtronic. "One has to choose to be with the right people." Then brace yourself: Unlike with past technologies, some GenAI projects can be implemented very quickly. Currently, experts are finding that some companies can go from analyzing and defining a strategy to delivering a working GenAI solution in as little as four months.

> Competitive advantage is going to come down to who has better data – better-quality data, better-quantity data, better-organized data – and are able to use it.
>
> – Amit Joshi

Amit Joshi is a professor of AI, analytics and marketing strategy at IMD Business School with 15 years of experience leading AI and analytics-driven transformations in industries such as banking, retail, automotive, telecom and pharma.

BUT DON'T PANIC IF A KILLER PROJECT doesn't turn up immediately. "The key topic here is a so-called fear of missing out – FOMO," says Jérôme Barthélemy, professor of strategy and management and dean for post experience programs of the ESSEC Business School in France. "When something is brewing, everyone gets nervous." In such situations, however, the first-mover advantage tends to be overrated, according to Barthélemy, particularly for major companies. "You don't have to be a pioneer to be

ANCESTORS OF AI English Electric sold only 30 of its DEUCE models in the 1950s, but these first comercially produced digital computers helped to change the working landscape – and some still functioned into the 1970s.

ILLUSTRATION: DIEGO SANCHES | PHOTO: WALTER NURNBERG/GETTY IMAGES

successful," he says. Instead, in a technology race, most established companies are best off if they pursue a fast-follower strategy.

Joshi also doesn't see a need for haste. Although he foresees "an explosion of use cases ahead," he adds that the fact that GenAI tools are available for free or nearly free means they won't be a source of competitive advantage for most companies. Instead, he thinks data will be the prime differentiator. "I think competitive advantage is going to come down to who has better data – better-quality data, better-quantity data, better-organized data – and are able to use it," he says.

Barthélemy likes to quote Steve Jobs, one of the great disruptors, who once observed: "Things happen fairly slowly, you know. They do. These waves of technology, you can see them way before they happen, and you just have to choose wisely which ones you're going to surf. If you choose unwisely, then you can waste a lot of energy, but if you choose wisely, it actually unfolds fairly slowly. It takes years." ■

THE NEXT GENERATION OF GOVERNANCE

Three experts weigh in on what your board should be asking about AI.

Steve Blank, entrepreneur and writer: The number one question to ask is actually nothing to do about your company, but what's the nightmare scenario: How could a competitor use AI to completely disrupt your business – and what should you be doing about it?

Amit Joshi, IMD Business School professor: What is the organization doing to come up with business-oriented use cases for the technology? Are they just using stuff out of the box, or are they fine-tuning a model in-house? What is it doing in terms of training and upskilling its employees? What kind of investments is it making in damage control and mitigation? Because this thing can go crazy, this thing can be hacked.

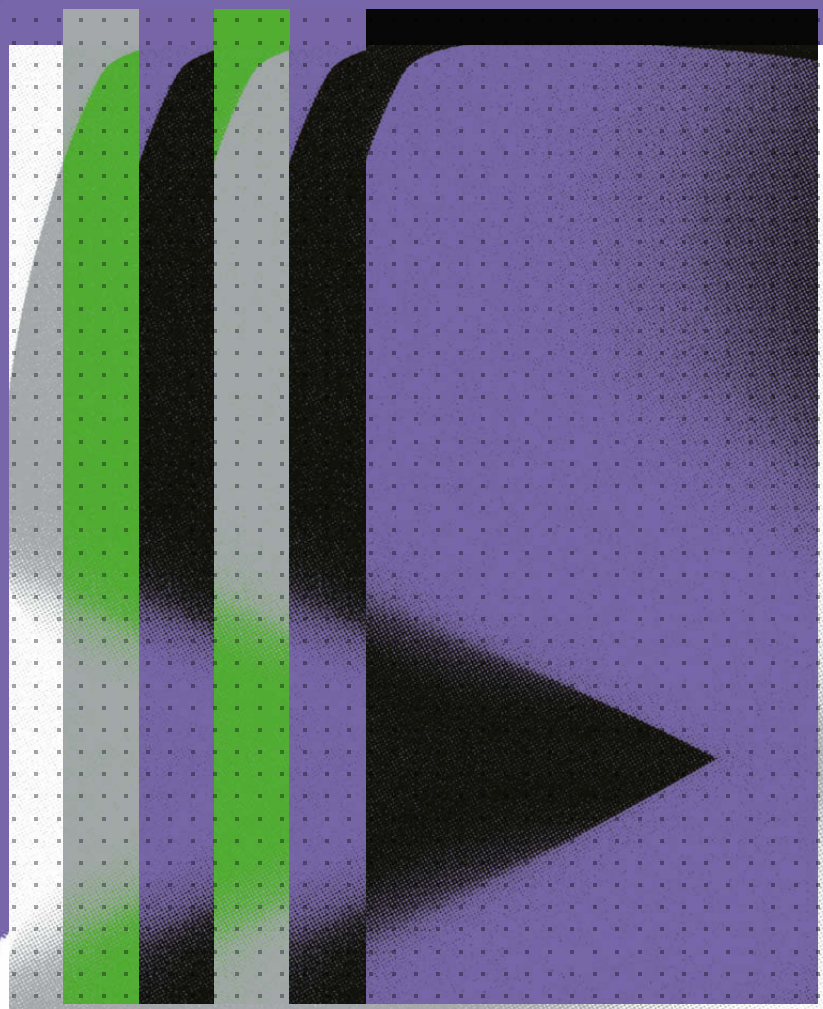
Bill George, Harvard Business School fellow and former CEO of Medtronic: Boards should be asking management how aggressively they are moving ahead with AI, and then specifically how will they incorporate it into their customer offerings – not just view it as cost savings.

Takeaways

☑ **DON'T GIVE IN TO FOMO** First-mover advantage tends to be overrated, especially for major companies. Be a fast follower – not a pioneer.

☑ **THINK BEYOND SAVINGS** Work out how aggressively to adopt AI and consider it as a customer offering, not cost-cutting.

☑ **EXPERIMENT** Try inviting some wild thinkers in to your company to give a demo day so that you can get a future view.



Artificial prejudice

WORDS BY
GRACE BROWNE

The datasets we feed AI today will likely shape its ideological direction for decades to come. And while the industry has long presumed that these sets would be large enough to represent diversity through the sheer volume of data, researchers and advocates are quickly uncovering evidence that this is not the case. The question now is how a biased society can work toward teaching technology a new definition of neutrality.

TIMNIT GEBRU was at the top of the field of ethical AI in 2018. At that time, it was a new area of focus that had slowly emerged to call attention to the fact that artificial intelligence was not simply a jumble of algorithms sitting in the cloud, but systems which contained biases that could wreak unintended consequences. Gebru, originally from Ethiopia, had become a star after publishing a landmark paper that found that facial analysis technology had higher error rates in women with darker skin tones due to unrepresentative training data.

She was headhunted by Google to co-lead its ethical AI team that same year. But her tenure was not a smooth one. In December 2020, Gebru was ousted from Google – Google maintains that she resigned – after being asked to retract a paper that was calling for technology companies to be doing more to ensure that AI systems were not exacerbating historical biases, as well as an email that called attention to her own company's approach to hiring minorities. And her departure was not a quiet one: An open letter expressing solidarity for Gebru was signed by over 1,500 Google employees.

Since its release at the end of 2022, ChatGPT, a chatbot built by the company OpenAI, has exploded in popularity, ushering in a new era of widely used generative AI systems that create content including text, images and video at the touch of a button. "This shift marks the most important technological breakthrough since social media," *Time* said in early 2023. This new wave of excitement has also put governments and academics like Gebru alike on edge: As bigger, more powerful AI steams ahead, will we reach a point where we lose control? Her story has become symbolic of the technology companies' reluctance to address the harms and biases hidden in their algorithms – and the time to reckon with these issues is now.

> How is an algorithm really going to fix something that stems from structural inequality that no one's been able to figure out?

Rashida Richardson is a technology policy expert and researcher into the social and civil rights implications of artificial intelligence.

TODAY, ALGORITHMS GOVERN more of our lives than many realize. This can range from every time you type a query into a search engine to whether a judge hands out a prison sentence. Machine learning technology, once the preserve of complex research papers hidden in journals behind paywalls, has firmly ventured into the real world – and now the knowledge is out there, there's no way of putting it back. AI systems have proliferated into public and social systems, such as housing, social benefits and policing. And while it was once presumed that the datasets AI was trained on were so large that it would iron out any biases contained within the data, this has increasingly been proven not to be the case. The idea that algorithms may reflect the biases of the humans who train them wasn't really an accepted concept until the 2010s, when more and more researchers began to sound the alarm, like Gebru. Now, it's widely recognized that technology is not neutral. And left unchecked, biases and prejudice lurking in algorithms can lead to social harms, such as entrenching systemic racism or sexism.

Rashida Richardson didn't begin her career enmeshed in the field of fair AI. Rather, she was a US lawyer, working on civil rights issues such as housing, school desegregation and criminal justice reform. Then she began noticing that in a lot of these systems, it was increasingly being proposed that algorithms do the dirty work. Companies were approaching the government offering their technology, which the government in turn was viewing as a silver bullet solution to its limited resources. Richardson was inherently skeptical: "How is an algorithm really going to fix something that stems from structural inequality that no one's been able to figure out?" she remembers wondering.

She took a look at some of the companies that were approaching police departments and making bold claims about what their technology

ARTWORK: CARSTEN GUETH | ILLUSTRATION: DIEGO SANCHES

could do. Richardson decided to investigate one of the main ways governments were using machine learning: predictive policing systems that use historical crime data to make predictions about where crime is likely to occur in the future, or who is most likely to be involved. In 2019, she co-published a paper that examined 13 jurisdictions in the United States that used these systems. Richardson and her colleagues found that nine of them were training algorithms based on data derived from unlawful police practices, or "dirty data." This included falsifying data to give the impression of falling crime rates or planting drugs on innocent people in order to reach arrest quotas. It meant these systems were at risk of unfairly targeting minorities.

PREDICTIVE POLICING IS JUST ONE AREA in which the algorithms give away their biases – and where they could therefore also cause harm. Take health care, for instance. There's been mushrooming interest in implementing AI into medicine to make it quicker, better and cheaper. But many ventures have shown that, if not designed carefully, AI can further fuel racial bias.

In a 2019 paper published in the journal *Science*, the authors reported that an algorithm widely used in hospitals in the United States was systematically discriminating against Black people. The software program, which was being used to determine who should get access to high-risk health care management programs, was routinely selecting healthier white patients over less healthy Black patients; the algorithm was being employed to manage care for 200 million people every year.

A paper published in 2022 looked at image recognition technologies which claimed they could classify skin cancers as well as human experts. When the researchers looked at the datasets used to train these AI systems, they found a stark paucity of images of darker skin. Most of the datasets contained images that originated from Europe, North America and Oceania exclusively. "These findings highlight the dangers of implementing algorithms for widespread use on broad populations without dataset transparency," the authors concluded.

Mark Yatskar, an assistant professor at the University of Pennsylvania who studies fairness in machine learning, feels pessimistic about serious change in his industry. Part of the issue, he has learned from his work, is that machine learning scientists rarely think of the end user of their research. But he believes asking researchers to ensure their systems are fair and ethical is not the answer: They're typically not the ones who are deploying them.

> “We should focus on the very real and present exploitative practices of the companies who are rapidly centralizing power and increasing social inequities.
>
> – Timnit Gebru

Timnit Gebru is a political activist, computer scientist specialized in algorithmic bias and an advocate for diversity in technology. She is the co-founder of Black in AI and the founder of DAIR.

It's easy to call for more regulation, Yatskar says, but he doesn't think that's the right answer, "in part because there's not a perfect agreement among researchers who think about fairness, even about definitions." In what one researcher might call a fair algorithm, another may find plenty of problematic aspects. Full transparency, in which researchers can perform what's called an algorithmic audit in which they inspect the inputs, outputs and the code of an algorithm to hunt for bias, may work better. If they can't be fixed, that can be communicated in a public statement.

ANOTHER ROADBLOCK is that the data that algorithms are trained on are kept secret by the private companies that are doing the training. This makes it much more difficult for researchers to analyze them. And one inescapable conclusion is that

The Kurzweils discuss AI

A conversation between Ray and Amy Kurzweil taken from the graphic novel *Artificial: A Love Story.*

these systemic biases stem, at least in part, from the upper echelons of the technology industry. Today, the people that make up the AI industry are overwhelmingly white and male. A 2019 report pointed out that 80% of AI professors were men. Women made up only 15% of AI research staff at Facebook; at Google, that number dropped to just 10%. "Such diversity of experience is a fundamental requirement for those who develop AI systems to identify and reduce the harms they produce," the authors wrote.

Richardson, who has served as a technology adviser to the White House as well as the Federal Trade Commission, says there is simply no clear way to regulate these technologies. On the part of governments, policymakers suffer from poor understanding of how these technologies work. And the issues that are plaguing these AI systems are more systemic and harder to fix than just making an algorithm "fair." How do you make an unbiased algorithm when people in the real world are still guilty of bias and prejudice? "You can't unlink it from the social aspect – and we just don't know how to deal with those issues," Richardson says. "These are complicated problems that policymakers in society don't like to deal with."

THE MORE WE REALIZE that this technology is not devoid of bias, the better. But while awareness of this big problem has swelled in recent years, still no one is quite sure what to do, says Richardson. "Even though there's more urgency, there aren't clear ideas on what to do," she says. "No one wants to be honest about how hard it is to figure out some of these issues."

After leaving Google, Gebru went on to found the Distributed AI Research Institute – or DAIR – a community-driven AI research institute that centers on diverse perspectives. She's also not finished calling attention to the harms of AI. In March 2023, thousands of people, including Elon Musk and Steve Wozniak, signed an open letter that called for a six-month pause on AI development to prevent dystopian threats such as "loss of control of our civilization." Gebru, along with a handful of other AI ethicists, co-authored a counterpoint to the letter. They argued that it failed to call out the current harms that AI causes. "It is indeed time to act," they wrote. "But the focus of our concern should not be imaginary 'powerful digital minds.' Instead, we should focus on the very real and very present exploitative practices of the companies claiming to build them, who are rapidly centralizing power and increasing social inequities." ■

29%

The increase in Black US patients who would receive additional care if an algorithmic bias used to identify and help patients with complex health needs were remedied, according to a 2019 study.

SOURCE: SCIENCE

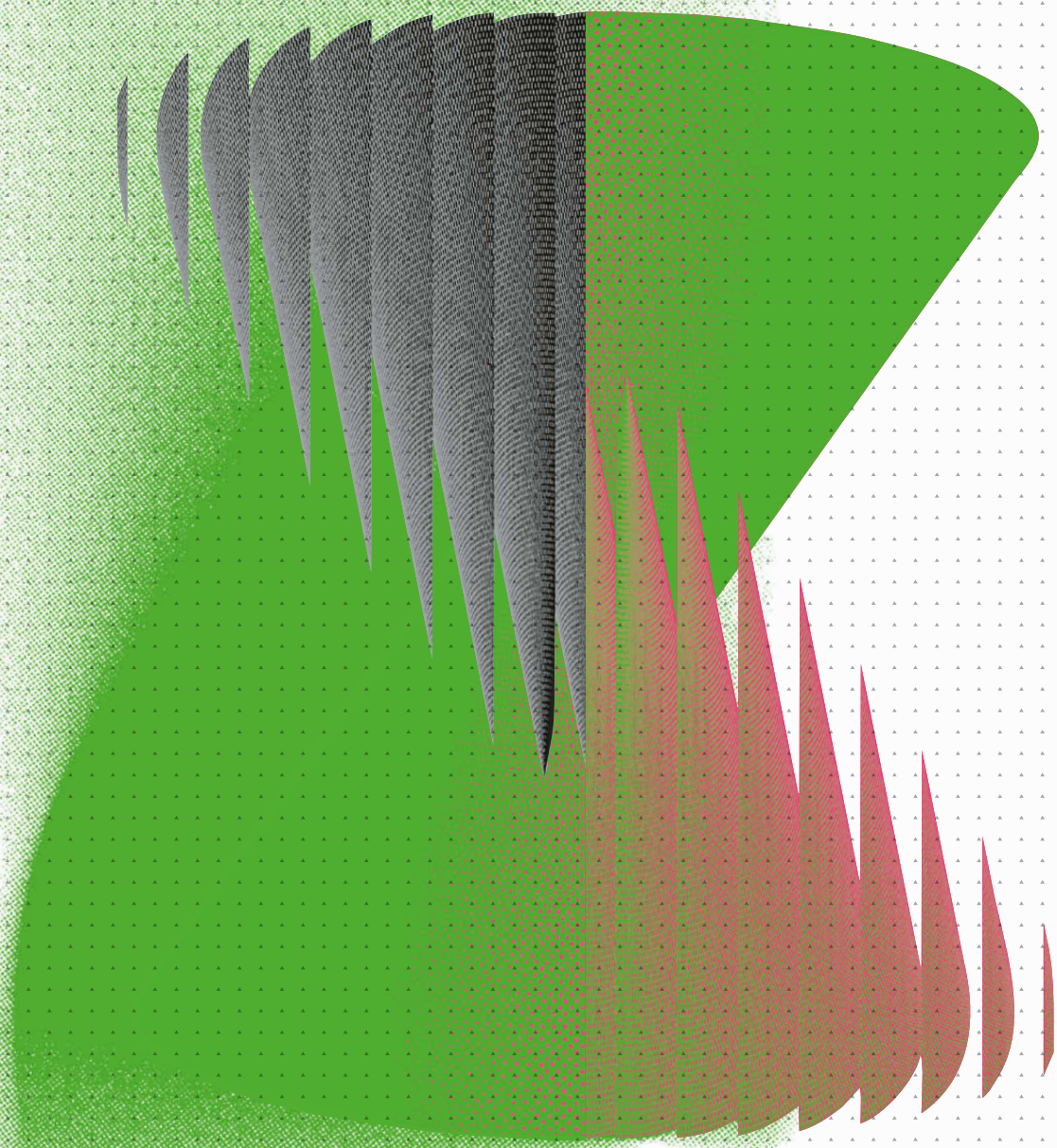
Takeaways

☑ **BIAS IS GETTING BAKED IN** Left unchecked, prejudice in algorithms can work to further entrench systemic racism or sexism.

☑ **IT STARTS AT THE TOP** Systemic biases stem from the upper echelons of the tech industry which is skewed toward white and male.

☑ **BUILD YOUR AWARENESS** The problem with AI is not a future dystopian one, but a present danger built on prejudice that is already in the system.

ILLUSTRATION: DIEGO SANCHES | CARTOON: AMY KURZWEIL



AI-pocalypse soon?

WORDS BY
FRED SCHULENBURG

The late great physicist Stephen Hawking said that AI could mean the brief history of humanity. Now that the dizzying pace of advances in AI-driven applications is almost matched by the speed of their widespread adoption, are these quantum tech leaps the dawn of a new, inspiring era for humanity or a threat to life as we know it? And how can Big Tech companies and governments strike a balance between regulation and innovation?

BLETCHLEY PARK may look like one of those English country houses drawn from the pages of a cozy Agatha Christie thriller. Built in the late 19th century by a financier, the house is a mish-mash reworking of various architectural styles, which in combination – at least according to the view of one American critic – produced a "maudlin and monstrous pile." And yet the house and surrounding estate some 100km northwest of London can lay a plausible claim to being the cradle of our computer age: It was there that a number of the world's finest mathematical minds, including the legendary Alan Turing, gathered during the Second World War in an endeavor to crack German military ciphers. One result of their efforts was the development of a programmable computer – a harbinger of a new technological revolution.

As such Bletchley Park was a fitting setting for the first global summit on artificial intelligence safety in early November 2023 that saw government officials, academics and tech industry leaders from 28 nations gather to discuss the opportunities and risks of the powerful new technology which – depending on whom you talk to – has the potential to change the world as we know it for the better or worse. Hosted by the UK prime minister Rishi Sunak, the Bletchley Park AI Safety Summit brought together representatives from the US and Chinese governments as well as the likes of Elon Musk and some of the pioneers at the forefront of the AI revolution such as Sam Altman of OpenAI. Among the points of discussion was whether and how to control the development of AI.

The high-profile nature of the event was confirmation of just how rapidly AI has come to feature in all walks of life, from business to policy-making, entertainment to health care and beyond. What was seemingly once the stuff of science fiction – think any number of scenarios depicting a world in which "the machines are taking over" – has moved on to become a part of our everyday reality and the discussions now are about what jobs are *not* at risk from being done by intelligent machines.

> The trajectory of technology has outpaced even what some experts were expecting just a year ago.

Olivia O'Sullivan is UK director in the World Programme at Chatham House and a former member of the UK's Open Innovation Team.

WHAT HAS FUELED THE DISCUSSION around AI is the breathtaking pace of development. The popular ChatGPT bot was launched only a little over one year ago, at the end of November, 2022. Now it has become the fastest-growing consumer software application in history. "The trajectory of technology has outpaced even what some experts were expecting just a year ago," says Olivia O'Sullivan of the Chatham House think tank in London. One top scientist in the field says that they dare not miss a day in the lab as every day something new emerges. And we are only at the beginning. Fei-Fei Li of Stanford University and a leading figure in the development of AI says we are still in the "very nascent ... pre-Newtonian" phase of the technology's evolution.

In the midst of this there is much uncertainty about just what exactly we mean when we talk about AI. Artificial intelligence is already very much with us, embedded in scores of mundane applications from predictive text to pulling together reading suggestions based on your past choices, from calculating future levels of hospital admissions to the level of household insurance cover a customer may require – and countless other examples.

What is less certain is the next stage, so-called "frontier AI" which the UK government defines as "highly capable general-purpose AI models that can perform a wide variety of tasks and match or exceed the capabilities present in today's most advanced models." The American organization OpenAI adds to its definition that such models "could possess dangerous capabilities sufficient to pose severe risks to public safety." Those dangerous

ARTWORK: CARSTEN GUETH | ILLUSTRATION: DIEGO SANCHES

capabilities can, it adds, "arise unexpectedly." It is both difficult to prevent their misuse and stop them from proliferating broadly.

THE NEFARIOUS POSSIBILITIES this conjures up range from deepfakes to cyberwarfare on an unimaginable scale, from the wholescale elimination of jobs to, in the imagination of the late physicist Stephen Hawking, the end of humanity. Yet it is only fair to also mention that OpenAI – and many others – also states that the technology could bring huge benefits to humanity, from curing diseases to tackling climate change, improving business and public services processes and decision-making to unlocking the mysteries of the universe.

The challenge is how these benefits are secured without succumbing to the risks that AI brings with it. Here it is not just the predictable technophobes who are pressing for more caution. What is notable is how many people at the forefront of AI development are now among those calling loudest for greater controls. It is almost as if they are worried about what they have unleashed.

These include Mustafa Suleyman, one of the co-founders of DeepMind, who recently published a book, *The Coming Wave*, calling for a greater discussion around the management of the development of AI. He is also one of scores of leading tech figures who have signed a statement from the Center for AI Safety that demands that the mitigation of "the risk of extinction" from AI be made a global priority alongside "other societal risks" such as pandemics and nuclear war. Another signatory is Yoshua Bengio, a so-called "godfather of AI" who in 2023 told the BBC he felt lost when contemplating the speed and scale of AI development, saying that it was "not the first time that scientists are going through these emotions. Think about the Second World War and the atom bomb. There are a lot of analogies there."

For others, more philosophical issues are at stake. Geoffrey Hinton told the BBC that alongside any concerns about the possible malignant use of AI, he was focused on the "existential risk of when these things get more intelligent than us." A key point is that it is "different intelligence." Whereas our human intelligence is a biological system, AI is a digital one: Machines can learn separately but share knowledge instantly at massive scale.

The range of proposed models of control is multiplying seemingly almost as fast as the machine learning models themselves. Some – such as Suleyman and Eric Schmidt, former CEO of Google – call for the establishment of an international body similar to the Intergovernmental Panel on Climate Change (IPCC) to provide policymakers with a monitoring and warning function as well as shaping protocols and norms for handling AI. Others look to bodies such as the International Civil Aviation Organization. Olivia O'Sullivan of Chatham House says that it's "worth thinking about something like nuclear power." Like AI that technology brings "really significant" capability – that can be used for both weapons and beneficial, civilian ends. "We have a global governance system in nuclear power," notes O'Sullivan. Something similar could be established for AI.

Others are more skeptical. Yann LeCun, chief AI scientist at Meta argues that fears about AI are overdone and that humanity only stands to benefit from the enhanced power of machines which, he says, will ultimately remain under human control. In an interview with the *Financial Times*, he likened efforts to regulate the industry now to seeking to

> It is not the first time that scientists are going through these emotions. Think about the Second World War and the atom bomb. There are a lot of analogies there.
>
> – Yoshua Bengio

Yoshua Bengio is a professor at Université de Montréal and internationally recognized as a leading expert in AI. He is best known for his pioneering work in deep learning which earned him the 2018 A.M. Turing Award alongside Geoffrey Hinton and Yann LeCun.

ILLUSTRATION: DIEGO SANCHES | PHOTO: HULTON ARCHIVE/GETTY IMAGES

A NEW DESTROYER
Some scientists are likening AI to the atom bomb, which went into mass testing at sites such as Bikini Atoll (above, 1946) only after its first wartime deployments.

rein in the jet airline industry in 1920s – when jet airplanes had not even been invented.

ANOTHER CRITICAL QUESTION is who sets the agenda. In terms of geopolitics the tussling has already begun. Barely had delegates gathered in Bletchley Park than US Vice President Kamala Harris rained on the British prime minister's parade with a statement that made clear that America had no intention of playing second fiddle when it comes to shaping the development of AI. "Let us be clear: When it comes to AI, America is a global leader," she said. She went on to note that it is American companies that lead in AI innovation and the US is able to catalyze global action and consensus in a way no one else can.

Meanwhile the EU has drawn up its own proposals for regulating AI aimed at establishing common standards across the single market. The presence of China at Bletchley Park was taken as something of a diplomatic coup given both the country's fast-paced growth in innovation and its determination to set its own course in technological development.

THERE ARE OTHER FAULT LINES. Representatives from the global south at the AI Safety Summit made a case for spreading the benefits of AI innovation as widely as possible. Others, such as Fei-Fei Li, argue that the public sector must play a greater role in the development of such a "critical technology" as AI. This is, she told Bloomberg, "important for American leadership." It is a thought echoed by her Stanford colleague and special adviser to the European Commission Marietje Schaake, who has warned of the risks of allowing private sector entities to hold too much proprietary control of the technology. These include leaving lawmakers, regulators and the general public increasingly unaware of the capabilities and risks embedded in technology that will feature in ever more aspects of civic life, from health care to law enforcement. Yet John Maeda, vice president of design and artificial intelligence at Microsoft, strikes a more optimistic note. He says AI will force humans to be even more creative than before and draws inspiration from the arts and crafts movement of the 19th century: "How do we make better things than the industrial machinery can create?"

The Bletchley Park summit concluded with a declaration in which the signatories acknowledged the enormous global opportunities, potential benefits and risks presented by AI – all of which call for an international, collaborative and, above all, "human-centered" response. The declaration is broad and well intentioned, but ultimately it represents the start of a conversation. There will be follow-up "editions" of the summit over 2024 in South Korea and France when the focus will shift to practical next steps. The question is: Who knows where the machines – and the companies pioneering AI – will have got to by then. ■

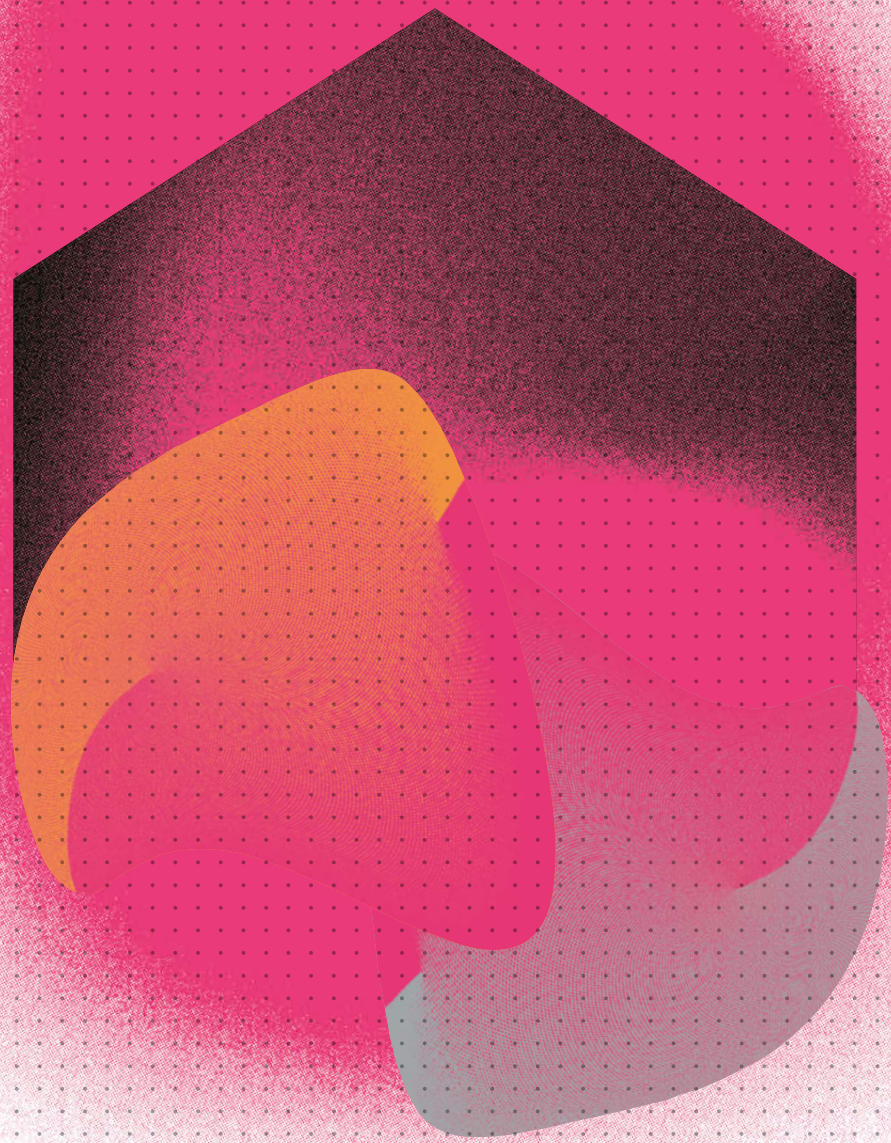
RETHINK AI

Takeaways

☑ **UNDERSTAND THE FEARS AROUND AI** It is a different type of intelligence from the human biological one. It can share knowledge instantly on a massive scale.

☑ **DON'T LET THE FEAR OVERWHELM YOU** Consider that trying to rein in AI now is akin to reining in the jet industry in 1920 before it even became a thing.

☑ **UNDERSTAND THE POSITIVES** The advent of AI could be the stimulus we need to be more creative and make things better than industrial machinery can.



Risk assessment

WORDS BY
HAL HODSON

The rush to invest in generative artificial intelligence, or GenAI, is heating up. But even as the promise of this technology captivates the world, a number of risks are emerging – from legal complications to potential security breaches. Governments, organizations and individuals are now facing the same question: How can they leverage the possibilities of GenAI while still protecting themselves from threats that may still be largely unknown?

EVER SINCE CHATGPT proved the power of large language models to the public when it launched in November 2022, governments and businesses alike have been captivated by the potential of GenAI. Software that can cogently generate and digest text – plus its sibling software that does the same for imagery – offers business a new supply of white-collar labor. That is the conservative view. Elon Musk, an entrepreneur, suggests GenAI will "unleash a new era of human innovation." Some $27 billion was pumped into GenAI companies in 2023 on the back of this promise, one of the only technology sectors which enjoyed a strong flow of investment in 2023.

Whether Musk's new era materializes out of that $27 billion or not, businesses must grapple with some more practical issues around GenAI now. Firms that want to use it must carry out due diligence, understanding what the software can and cannot do – not to mention what liability its use may open them up to. Companies that don't wish to use GenAI must still wrestle with its implications. The work of corporate cybersecurity is gaining a new dimension as hackers use GenAI to add scale and personalization to their attacks. And whether using AI or defending against it, companies must grapple with the speed at which the technology is being developed and released. Committing resources to software available today risks being left behind tomorrow, particularly as open-source AI models improve.

$27 billion

The amount invested by companies into developing GenAI throughout 2023, four times the figure for 2022. $12 billion of that was invested by Microsoft alone into OpenAI and Inflection AI.

SOURCE: PITCHBOOK

UNDERSTANDING THE RISKS connected to GenAI starts with understanding that it works in a different way than older forms of software. Its behavior and capabilities are constrained not by lines of code written down by humans, but by the content of the datasets that are used to train it. Because AI models are trained on such vast amounts of data, text and images from across the internet, it can be hard to predict exactly what capabilities have been extracted. This dark constellation of capabilities is what makes GenAI powerful. But it is also what makes it a liability, particularly when it comes to copyright.

All of the leading GenAI companies – OpenAI, Anthropic, Inflection AI – have trained their models on copyrighted data. There is, at present, no way to avoid doing so if you want to train on datasets that span the internet in order to suck up all of the capabilities represented in those datasets. Researchers at Stanford University have managed to make GPT-4, the model that underpins ChatGPT, spit out whole verbatim chapters of the *Harry Potter* books, a clear copyright breach.

The model makers argue that their outputs transform the originals to such an extent that the technical breach of copyright is not a legal liability. But Alex Champandard, an AI developer who has recently begun campaigning on the copyright issues surrounding GenAI, points out that the protection of fair use is inherently fragile, as it is adjudicated on a case-by-case basis. While a court might side with a model maker, or a business creating copies using those models, in any given instance, that decision does not confer protection from future claims. Businesses which use AI that was trained on copyrighted material are therefore exposing themselves to a rolling, unpredictable legal risk.

Those who are offering GenAI services are attempting to soften this risk by indemnifying their users against claims of IP infringement. Adobe, the company behind Photoshop, has attempted to train its GenAI tool, called Firefly, only on material that is not under copyright. This allows it to offer its customers indemnity against IP-related claims that could result from the use of its software. Adobe, it says, will "protect customers

ARTWORK: CARSTEN GUETH

from third-party IP claims about Firefly-generated outputs." Google and Microsoft have also made similar promises.

This indemnification puts the financial heft of large technology companies behind their customers' potential copyright-infringing use of their models, and moves the liability risk onto their balance sheets, at least for now. For businesses using GenAI services, it transforms the risk of being sued into a risk that their particular use case for GenAI will be removed at any time by the supplier, in order to comply with the outcome of a court case. While businesses may not be on the hook for damages that result from their use of these indemnified AI services, they must still run the risk of losing access to services they had begun to rely upon if a case goes against their supplier.

According to Champandard, model makers are simultaneously – and quietly – retraining their models without using copyrighted material, as well as working to negotiate licensing agreements with big content providers such as media outlets. The simplest way for businesses to hedge against legal liability for using models, then, is simply to wait until the models get cleaned up, through the courts and through retraining.

WAITING WILL NOT HELP BUSINESSES deal with the new cybersecurity threats created by GenAI. Those exist today. Mandiant, a cybersecurity firm owned by Google, says that GenAI offers hackers with limited resources a new way to create more persuasive content designed to engineer the behavior of their targets. Attackers might, for instance, use AI to generate realistic recordings of executives directing employees to transfer money to accounts controlled by the attackers. While Mandiant maintains it has not seen widespread use of GenAI by hackers to date, it believes this will change. "Adversaries are already experimenting, and we expect to see more use of AI tools over time" the firm says.

The answer to those threats, at least at present, is to pit AI against AI by integrating generative models into systems designed to protect against attack. In an April 2023 paper for the *MIT Sloan Management Review,* Karen Renaud of the University of Strathclyde in Glasgow and her co-authors said that businesses need to start doing this integration themselves rather than waiting for the providers of their security system to do it for them, since without filtering for generated text, companies "run the risk of being hacked and suffering major financial and reputational losses."

> **Without filtering for generated text, companies run the risk of being hacked and suffering major financial and reputational losses.**
>
> – Karen Renaud

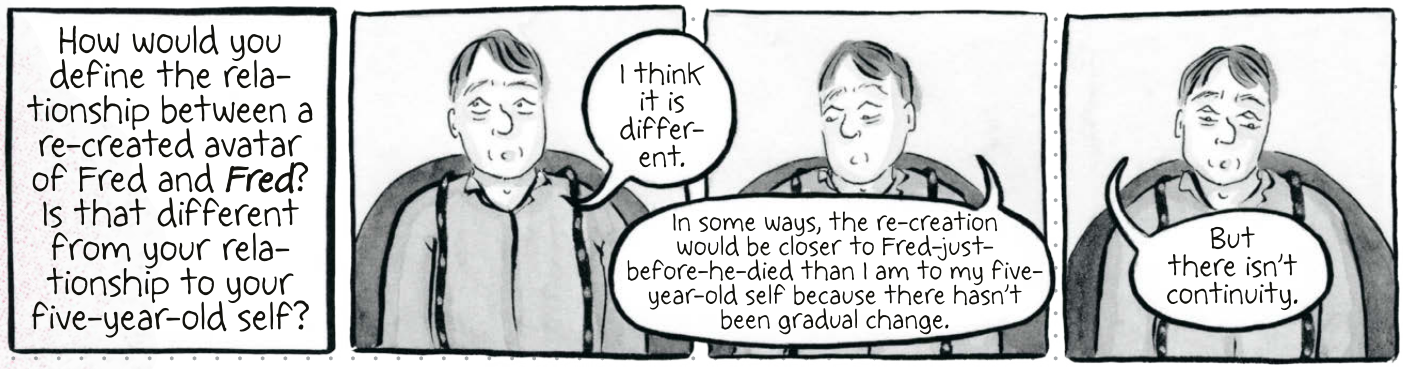
Karen Renaud is a computing scientist working at Glasgow's University of Strathclyde. Her research is focused on human-centered security, a branch of Human Computer Interaction (HCI), with the goal of seeing humans as the solution, rather than the problem, in their interaction with devices.

But at least today, AI is not being used widely to carry out cyberattacks. "AI is in every security start-up's business plan because it is the cool thing that gets the funding," says Bruce Schneier, a security expert. In theory, he says, AI's ability to process large volumes of data, including code, could make it useful for finding vulnerabilities in code to attack. "That's a big thing, but AI is not great at it yet," he says.

GenAI models also create a number of new security vulnerabilities. At the end of September 2023 the American National Security Agency launched its new AI Security Center, focusing on locking down the AI systems used by the government. Businesses must take note as well. Large language models are vulnerable to prompt injection, a technique which tricks models into revealing information that they have been programmed to withhold. The Stanford researchers looking at copyright infringement by GPT-4 used the technique to

The Kurzweils discuss AI

A conversation between Ray and Amy Kurzweil taken from the graphic novel *Artificial: A Love Story.*



get the model to spit out the copyright-breaching chunks of *Harry Potter*, simply asking the model to replace certain letters with numbers to bypass filters designed to prevent it from spitting out training data verbatim. Businesses must deal with similar issues when they train AI models on their own data, to ensure that hackers cannot coax the model to spit out confidential or private information.

THE LEGAL AND SECURITY RISKS associated with GenAI are complicated by the speed at which the technology is being developed, and in particular by the success of so-called open-source models. These models, unlike those created by OpenAI, Google and Microsoft, are freely available to download over the internet. Their performance is slightly worse than the proprietary models, but they are proliferating because they are free and easy to experiment with.

Businesses face a choice between committing to buying proprietary services, and having their use of AI constrained by a third-party supplier, or developing their own models internally using open-source resources. Models that businesses train themselves, using data that they control, have fewer copyright liabilities, like Adobe's Firefly, which the firm attempted to train exclusively on open data, or data it owned.

Likewise, open models which can be easily updated by the business deploying them can be more easily integrated into its cybersecurity infrastructure, as Renaud and her colleagues recommend. But the increased control derived from using open source does not come easily. AI developers are scarce, not to mention highly paid. The computing infrastructure required to train and run models is large and expensive, which will make it out of reach for many firms. Many businesses will find that training and deploying their own models is simply too expensive at present, even though doing so can help them to deal with both copyright and cybersecurity concerns.

The development of artificial intelligence is still in its early phases. As a result, the risks to businesses are more unknown than known. The current wave of GenAI is imbued in hype which makes it difficult for firms and their technical leadership to make good decisions. What is clear is that new techniques for making software are endowing it with ever-increasing amounts of intelligence. Its rapid adoption creates risks around liability and security and technical obsolescence. But ignoring this new technology would be the greatest risk of all. ■

$143 billion

The amount that spending on GenAI solutions is predicted to reach by 2027 with a compound annual growth rate of 73.3% over the 2023-2027 forecast period.

SOURCE: IDC

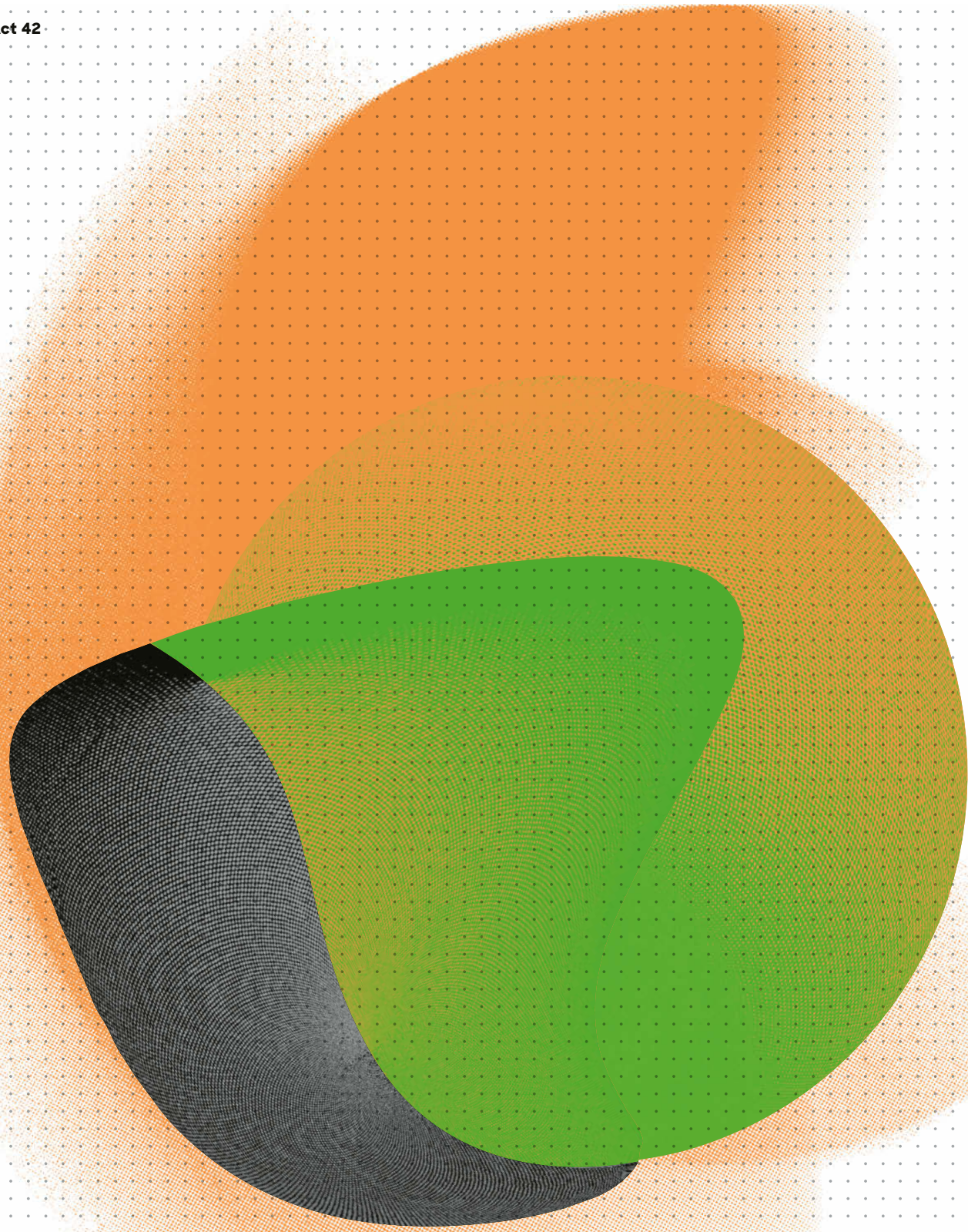
Takeaways

☑ **WATCH FOR THE LAWSUITS** Copyrighted data has so far fed all the AI companies' models. This could lead to clear breach of copyright.

☑ **SIT ON IT** Some model makers are quietly retraining models without using copyright material. So it might be best to wait for things to clean up.

☑ **SECURITY IS AN ISSUE** Models and tools can be tricked into revealing information. So businesses should ensure hackers can't coax their models to spit out secrets.

ILLUSTRATION: DIEGO SANCHES | CARTOON: AMY KURZWEIL



Deep thought

WORDS BY
JOHN MARKOFF

Sixty years ago, computing split into two visions of how a then-nascent technology would grow – by seeking to expand the power of the human mind, or working to replace it. While personal computers have since become indispensable, many technologists now believe that new artificial intelligence advances are a potential threat to human existence. But what if the threat is not to our existence, and rather to what it means to be human?

THE MODERN COMPUTER WORLD first came into view in the early 1960s in two computer research laboratories located on either side of Stanford University, each pursuing diametrically opposed visions of the future. John McCarthy, the computer scientist who had coined the term "artificial intelligence" established SAIL, the Stanford AI Laboratory, with the goal of designing a thinking machine over the next decade. The goal was to build a machine to replicate all of the physical and mental capabilities of a human. Another computer scientist, Douglas Engelbart, was engaged in creating a system to extend the capabilities of the human mind simultaneously on the other side of campus. He coined the phrase "intelligence augmentation," or IA.

The computer world had been set on two divergent paths. Both laboratories were funded by the Pentagon, yet their differing philosophies would create a tension and a dichotomy at the dawn of the interactive computing age: One laboratory had set out to extend the human mind; the other to replace it. That tension, which has remained at the heart of the digital world until this day, also presents a contradiction. While AI seeks to replace human activity, IA, which increases the power of the human mind, also foretells a world in which fewer humans are necessary. Indeed Engelbart's vision of IA was the first to take shape with the emergence of the personal computer industry during the 1970s, and that despite the fact that he was initially seen as a dreamer and an outsider. Steve Jobs perhaps described it best when he referred to the PC as a "bicycle for the mind."

> "We understand human mental processes only slightly better than a fish understands swimming.

John McCarthy was a pioneer in computer science and interactive computing. He is known as one of the founders of AI.

SIX DECADES AFTER THE TWO LABS began their research, we are now on the cusp of realizing McCarthy's vision as well. On the streets of San Francisco, cars without human drivers are a routine sight and Microsoft researchers recently published a paper claiming that in the most powerful AI systems, known as large language models or chatbots, they are seeing "sparks of artificial general intelligence" – machines with the reasoning powers of the human mind.

To be sure, AI researchers' recent success has led to an acrimonious debate over whether Silicon Valley has become overwrought and once more caught up in its own hype. Indeed, there are some indications that the AI revolution may be arriving more slowly than advocates claim. For example, no one has figured out how to make chatbots less predisposed to what are called "hallucinations" – one way to describe their disturbing tendency to just make facts up from thin air.

Even worse, some critics charge that perhaps more than anything, the latest set of advances in chatbots has unleashed a new tendency to anthropomorphize human-machine interactions – that very real human tendency to see ourselves in inanimate objects, ranging from pet rocks to robots to software programs. In an effort to place the advances in a more restricted context, University of Washington linguist Emily Bender coined the phrase "stochastic parrots," suggesting that superhuman capabilities are more illusory than real.

Whichever the case, the Valley is caught in a frenzy of anticipation over the near-term arrival of superhuman machines and technologists are rehashing all the dark visions of a half-century of science fiction lore. From killing machines like the Terminator and HAL 9000 to cerebral lovers like the ethereal voice of Scarlett Johansson in the movie *Her*, a set of fantasies about superhuman machines have ominously reemerged and many of the inventors themselves are now calling on governments to quickly regulate their industry. What is fancifully being called "the paperclip problem" – the specter of a superintelligent machine that destroys the human race while

ARTWORK: CARSTEN GUETH | ILLUSTRATION: DIEGO SANCHES

in the process of innocently fulfilling its mission to manufacture a large number of paperclips – has been advanced to highlight how artificial intelligence will lack the human ability to reason about moral choices.

But what if all the handwringing about the imminent existential threat posed by artificial intelligence is misplaced? What if the real impact of the latest artificial intelligence advances is something that is neither about the IA vs AI dichotomy, but rather some strange amalgam of the two that is now already transforming what it means to be human? This new relationship is characterized by a more seamless integration of human intelligence and machine capabilities, with AI and IA merging to transform the nature of human interaction and decision-making. More than anything else, the sudden and surprising arrival of natural human language as a powerful interface between humans and computers marks this as a new epoch.

Mainframe computers were once accessed by only a specialized cadre of corporate, military and scientific specialists. Gradually as modern semiconductor technology evolved and microprocessor chips became more powerful and less expensive at an accelerating rate – exponential improvement has not only meant that computing has gotten faster, faster, but also cheaper, faster – each new generation of computing has reached a larger percentage of the human population.

In the 1970s, minicomputers extended the range of computing to corporate departments; a decade later personal computers reached white-collar workers, home computers broadened computing into the family room and the study and finally smartphones touched half the human population. We are now seeing the next step in the emergence of a computational fabric that is blanketing the globe – having mastered language, computing will be accessible to the entire human species.

IN CONSIDERING THE RAMIFICATIONS of the advent of true AI, the television series *Star Trek* is worth reconsidering. *Star Trek* described an enemy alien race known as the Borg that extended its power by forcibly transforming individual beings into drones by surgically augmenting them with cybernetic components. The Borg's rallying cry was "resistance is futile, you will be assimilated." Despite warnings by computer scientists going at least as far back as Joseph Weizenbaum's 1976 book *Computer Power and Human Reason* – that computers could be used to extend but should never replace humans – there has not been enough consideration given to our relationship to the machines we are creating.

> The key thing about all the world's big problems is that they have to be dealt with collectively. If we don't get collectively smarter, we're doomed.
>
> – Douglas Engelbart

Douglas Engelbart was a computer and internet pioneer. A founder of the field of human–computer interaction, he is also known as the creator of the computer mouse and a developer of hypertext.

The nature of what it means to be human was well expressed by philosopher Martin Buber in his description of what he called the "I - thou" relationship. He defined this as when humans engage with each other in a direct, mutual, open and honest way. In contrast, he also described an "I - it" relationship where people dealt with inanimate objects as well in some cases as treating other humans as objects to be valued only in their usefulness. Today we must add a new kind of relationship which can be described as "I - it - thou" which has become widespread in the new networked digital world.

As computer networks have spread human communication around the globe a computational fabric has quickly emerged ensuring that most social, economic and political interaction is now mediated by algorithms. Whether it is commerce, dating or, in the Covid-19 era, meetings for

ILLUSTRATION: DIEGO SANCHES | PHOTO: ROGER RESSMEYER/GETTY IMAGES

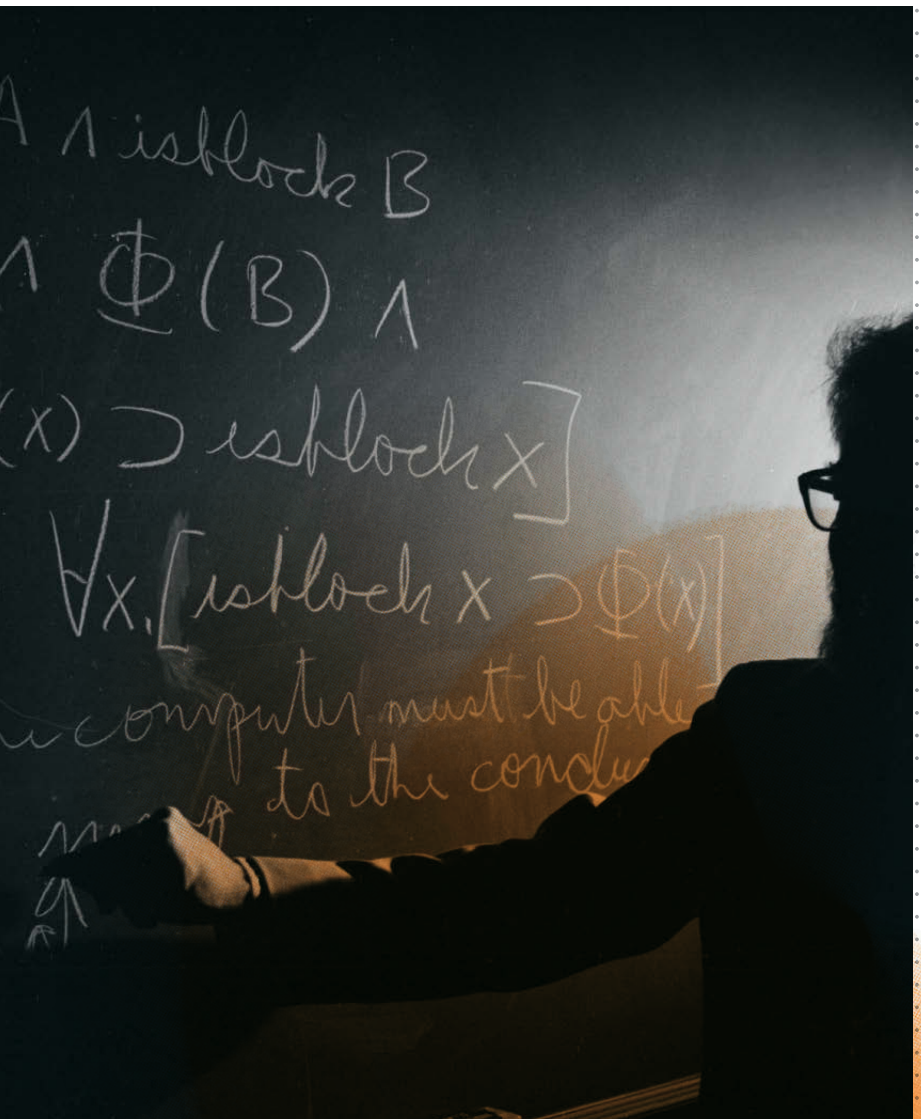
business via video chat, most human interaction is no longer face-to-face, but rather through a computerized filter that defines whom we meet, what we read and to a growing degree synthesizes a digital world that surrounds us.

WHAT ARE THE CONSEQUENCES of this new digitalized society? The advent of facile conversational AI systems is heralding the end of the advertising-funded internet. There is already a venture capital-funded gold rush underway as technology corporations race to develop chatbots that can both interact with and convince – that is manipulate – humans as part of modern commerce.

At its most extreme is Silicon Valley man-boy Elon Musk, who both wants to take civilization to Mars and simultaneously warns us that artificial intelligence is a growing threat to civilization. In 2016 he founded Neuralink, a company intent on placing a spike in human brains to create a brain-computer interface. Supposedly, according to Musk, this will allow humans to control AI systems, thereby warding off the domination of our species by some future Terminator-style AI. However, it seems the height of naïveté to assume that such a tight human-machine coupling will not permit just the opposite from occurring as well.

Computer networks are obviously two-way streets, something that the United States has painfully learned in the past seven years as its democracy has come under attack by foreign agents intent on spreading misinformation and political chaos. The irony, of course, is that just the opposite was originally believed – that the internet would be instrumental in sowing democracy throughout the world.

EXTENDED LOGIC
John McCarthy used this equation to explain how a computer only sees the objects that it already knows about, a process unknown to most logicians in 1980.

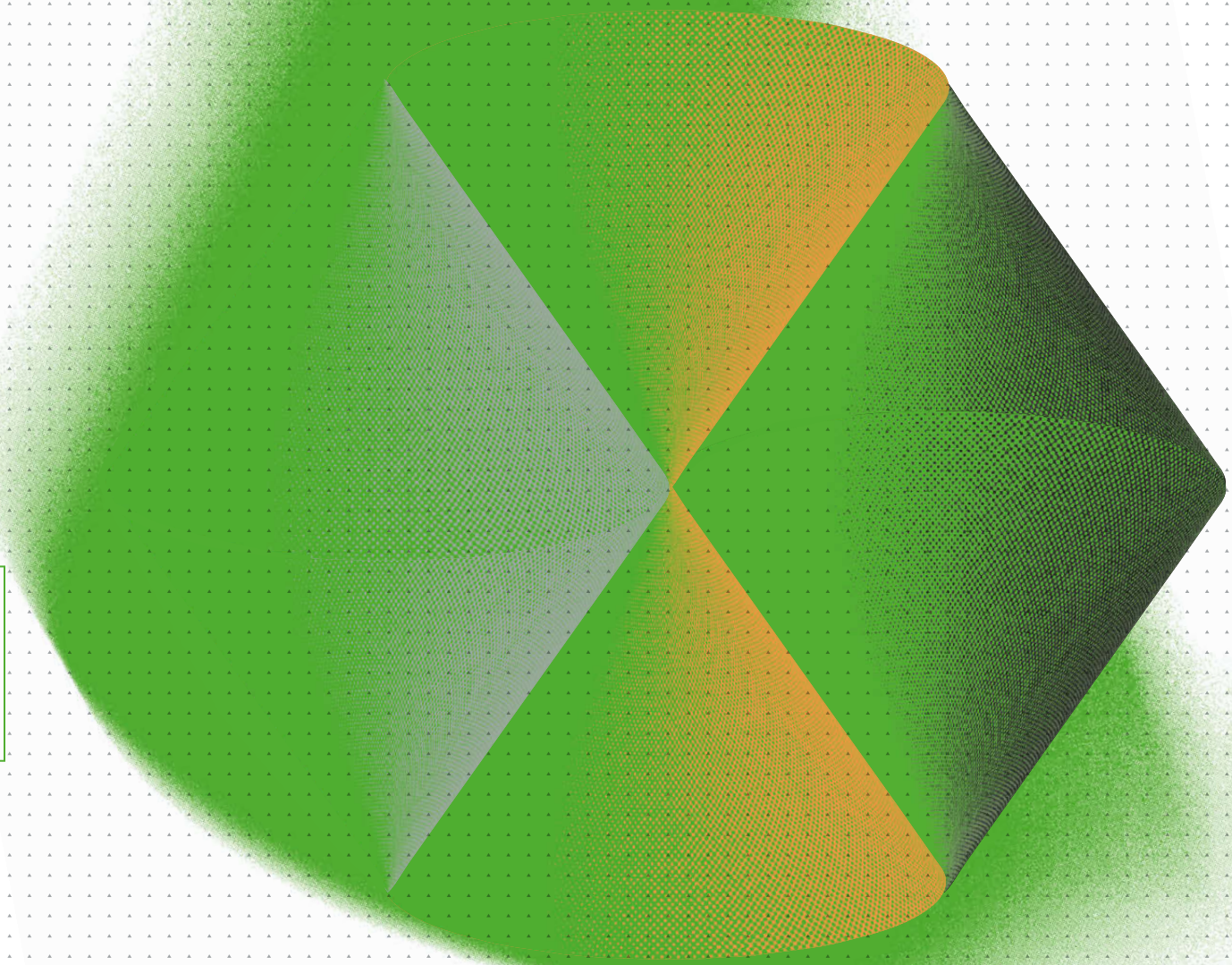


IT WILL BE ESSENTIAL FOR SOCIETY to maintain a bright line between what is human and what is machine. As artificial intelligence becomes more powerful, tightly coupling humans with AI risks creating dangerous dependencies, diminishing human agency and autonomy as well as limiting our ability to function without technological assistance. Removable interfaces will preserve human control over when and how we utilize AI tools. That will allow humans to benefit from AI's positives while mitigating risks of over-reliance and loss of independent decision-making.

A bright line won't be enough. Above all, we must resist the temptation to humanize our new AI companions. In the 1980s, Ronald Reagan popularized the notion "trust, but verify" in defining the relationship between the United States and the Soviet Union. But how do you trust a machine that does not have a moral compass? An entire generation must be taught the art of critical thinking, approaching our new intellectual partners with a level of skepticism that we have in the past reserved for political opponents. The mantra for this new age of AI must remain, "verify, but never trust." ■

Takeaways

- ☑ **AI HAS A COUNTERPART** It is known as IA, or "Intelligence Augmentation." IA seeks to extend the capabilities of the human mind.
- ☑ **THERE IS A VC GOLD RUSH UNDERWAY** Tech companies are racing to develop chatbots that can convince and convert humans in commerce.
- ☑ **EDUCATION IS ESSENTIAL** An entire generation must be taught the art of critical thinking to be able to trust machines that have no moral compass.



The winner doesn't take all

WORDS BY
ANU BRADFORD

The race for AI supremacy is intensifying by the day. And it's not just tech companies and startups that are trying to seize the coveted status of global leadership. Governments are too. From access to talent and data to securing microchips and funding, the pursuit of victory is shaping the digital economy. Yet as calls for collective action increase, the conflict's final proving ground may turn out to be an ideological one: a battle for regulatory space.

GET READY: It will stimulate growth and provoke societal progress. It will lead to significant advances in industries from medicine to manufacturing, education and agriculture. If you were in any doubt as to the significance of the unfolding AI race, look no further than the wisdom of Brookings, the Washington DC-based think tank. In 2020, it declared that "whoever leads in artificial intelligence in 2030 will rule the world until 2100." And winning this race could offer unprecedented economic rewards: Recent studies suggest that AI could add over $15 trillion to the global economy by 2030. How those gains are distributed will be critical in determining the winners and losers among countries, companies and individuals. There's another dimension, as well: The stakes in this race are also high given that AI will affect countries' military capabilities. That means that the geopolitical balance of power is part of the picture. The new era of AI-driven warfare gives governments another reason to pursue AI supremacy in an effort to ensure political adversaries do not gain an advantage.

In the public conversation, the AI race is often viewed as a two-way contest between the leading technological and economic superpowers – the US and China – whereas the rest of the world is seen as being at the mercy of this great power rivalry. The US and China are, indeed, clear front-runners in AI development. While the US is currently leading the contest, China is catching up fast.

In 2017, the Chinese government released an AI Development Plan with a goal to become "the front-runner and global innovation center in AI" by 2030. The US responded with equal resolve. The US National Security Commission on AI, appointed by President Trump in 2018 and led by ex-Google CEO Eric Schmidt, warned in its 2021 report that China was poised to replace the US as the world's AI superpower and urged the US government to double its annual AI R&D spending to $32 billion by 2026.

IT IS NOT IMMEDIATELY CLEAR whether the US or China will ultimately fare better in the AI race. Their respective strengths differ across key metrics that can be used to measure relative AI strength. These include investment, human talent, data and computing hardware needed to train AI systems. The US has an edge over China across several of these metrics: It has produced most AI unicorns – start-up businesses worth over $1 billion – and 80% of the leading AI startups still hail from the US. The US also leads in terms of funding and investment in AI development, even though both countries record impressive numbers, with the US benefiting from extensive private funding and China from large-scale government funding.

The US and China have each been successful in cultivating human talent that is critical for AI innovations. In the past, China has been known in several fields to rely on others' innovations and breakthroughs to then exploit them commercially. The same could be true for AI, where it might not generate new ideas but could refine existing AI technology to its advantage. The country is also building its innate capabilities through various talent recruitment and training programs. Some of this is generating results: China's global share of research papers in the field of AI is growing dramatically and it leads today in AI-related patent applications and AI journal citations.

However, the US retains its lead in foundational AI research, with 13 out of 15 leading AI research institutions being based in the US. These institutions also benefit from their ability to recruit the best talent from around the world, drawing on the US's strength as the most desirable destination for skilled migrants. Thus, while China is able to draw on its large population for considerable AI talent, the US remains the magnet for global talent

292
unicorns

The number of "unicorns," or startup businesses worth over $1 billion, based in the US. It's next-closest competitor, China, has 69.

SOURCE: STATE OF AI REPORT 2022

ARTWORK: CARSTEN GUETH

– attracting also talented Chinese engineers who study in leading US universities before moving on to pursue research in US institutions.

IN ADDITION TO ACCESS TO TALENT, leadership in AI calls for access to data, which is a key input in developing AI applications. Here, China is often viewed as having a distinct advantage. Chinese AI companies are able to deploy vast amounts of data generated by the country's large consumer market that is digitally highly connected. In addition, China has made wide use of surveillance, which has given it an edge in developing such tech as facial recognition systems.

However, US tech companies' global presence gives them access to troves of data – including more diverse, globally sourced data – that they can use to train their AI systems. China's political system also poses limits to how the available data can be used to train generative AI applications as any large language model behind generative AI must comply with the country's internet regulations. This requirement is expected to hamper Chinese companies' ability to compete on an equal footing with US companies in the generative AI race.

At the same time, AI companies' ability to harness extensive data is of limited use if they do not have access to the computing power, including the advanced chips, that is needed to train and run cutting-edge AI systems. Here, US companies hold an advantage over their Chinese rivals. The equipment needed to produce advanced AI chips is located in the US, Japan and Europe. With the help of its political allies, the US is therefore controlling key chokepoints in the highly complex and globally connected chips industry. The US is now leveraging those chokepoints by pursuing export controls, in addition to implementing both inbound and outbound investment restrictions. These policies are designed to ensure that the US chips are not powering China's AI industry and to allay US fears that China could weaponize such tech against the US and its allies.

Both the US and China are also racing to subsidize their national chips industries. While China's economic model has for a long time been associated with state subsidies and other forms of restrictive trade and technology policies, the US is now increasingly playing Beijing's game. Its 2022 CHIPS and Science Act allocates over $50 billion to boost US semiconductor manufacturing, research and development, suggesting that the US is abandoning its long-held commitment to free markets and illustrating how access to chips has become a defining element of the AI race.

IN OUR HANDS
How AI will be regulated – and how we ensure that the benefits will outweigh any losses – is something that is still within our collective power to control.

THE ESCALATING TECH WAR between the US and China raises the question of whether any other player, including the European countries, can play a role in shaping the course of the AI revolution. In terms of AI capabilities, the EU has certain areas of strengths, including its leadership in robotics. ASML, the company producing the most sophisticated AI equipment, is also European. But, overall, Europe is lagging behind the US and China. As one illustration of this gap, European AI startups are raising a mere half of the funding of their American counterparts. According to a 2022 analysis, the US has produced 292 AI unicorns; the UK, Switzerland and Germany have produced only 46 combined.

Meanwhile, the EU is playing to its comparative advantage and leading the world in regulating AI. Its ambitious, comprehensive and binding AI Act was finalized in March 2024 and aims to steer AI developers toward more ethical, privacy-protecting and human-centric AI applications. The act may even influence AI development outside Europe

ILLUSTRATION: DIEGO SANCHES | PHOTO: H. ARMSTRONG ROBERTS/GETTY IMAGES

> In addition to racing to develop more powerful AI tools, developers and governments should be racing to develop effective guardrails to mitigate the risks embedded in AI.
>
> – Anu Bradford

because of a so-called Brussels Effect, which occurs if AI developers extend EU regulations across their globally available systems in order to avoid retraining AI systems separately for different markets. This way, the EU may play a leading role in setting guardrails for the global AI race.

However, the EU's way of regulating AI is not the only one. Over the last year, China has moved to regulate recommendation algorithms, synthetic images and generative AI. These developments are expected to pave the way for a broader national AI law in the coming years. While the EU and China share some goals – including the pursuit of more accurate and accountable AI development that protects consumer interests – the Chinese regulatory approach accommodates strong security features including facial recognition used for surveillance.

This EU-China contest in the regulatory space for AI is therefore also an ideological battle about the direction of AI development and the ethos of digital societies. It will likely sharpen the growing divide between emerging tech superpowers as some countries are inclined to emulate aspects of the EU's regulatory model while others are likely to follow the Chinese AI governance template.

Anu Bradford is a law professor and a leading expert on EU's regulatory power who coined the term "the Brussels Effect" to describe its outsize influence on global markets. She is the author of *The Brussels Effect* (2020) and *Digital Empires* (2023).

GIVEN THE VARYING ADVANTAGES and disadvantages the leading technological and regulatory powers have in the battle for AI supremacy, no single country will be able to claim a complete victory in the near future. However, the pursuit of that elusive victory is dramatically shaping the global digital economy. Subsidy races rarely cultivate merits-based competition or spur innovation, which are key drivers of technological progress. Growing export and investment restrictions are also triggering a worldwide shift toward techno protectionism as governments stop relying on access to foreign technologies and global supply chains. These restrictive and nativist policies are balkanizing the global digital economy, thereby increasing costs and uncertainty for all.

The AI race also impedes governments' ability to collectively manage the risks associated with AI, from bad actors weaponizing AI to commit fraud or spread disinformation at an unforeseen scale to the potentially catastrophic risks associated with AI spinning out of control and posing an existential threat to humanity, as some technologists have warned. In addition to racing to develop ever more powerful AI tools, AI developers and governments should therefore be racing to develop effective guardrails to mitigate the risks embedded in AI.

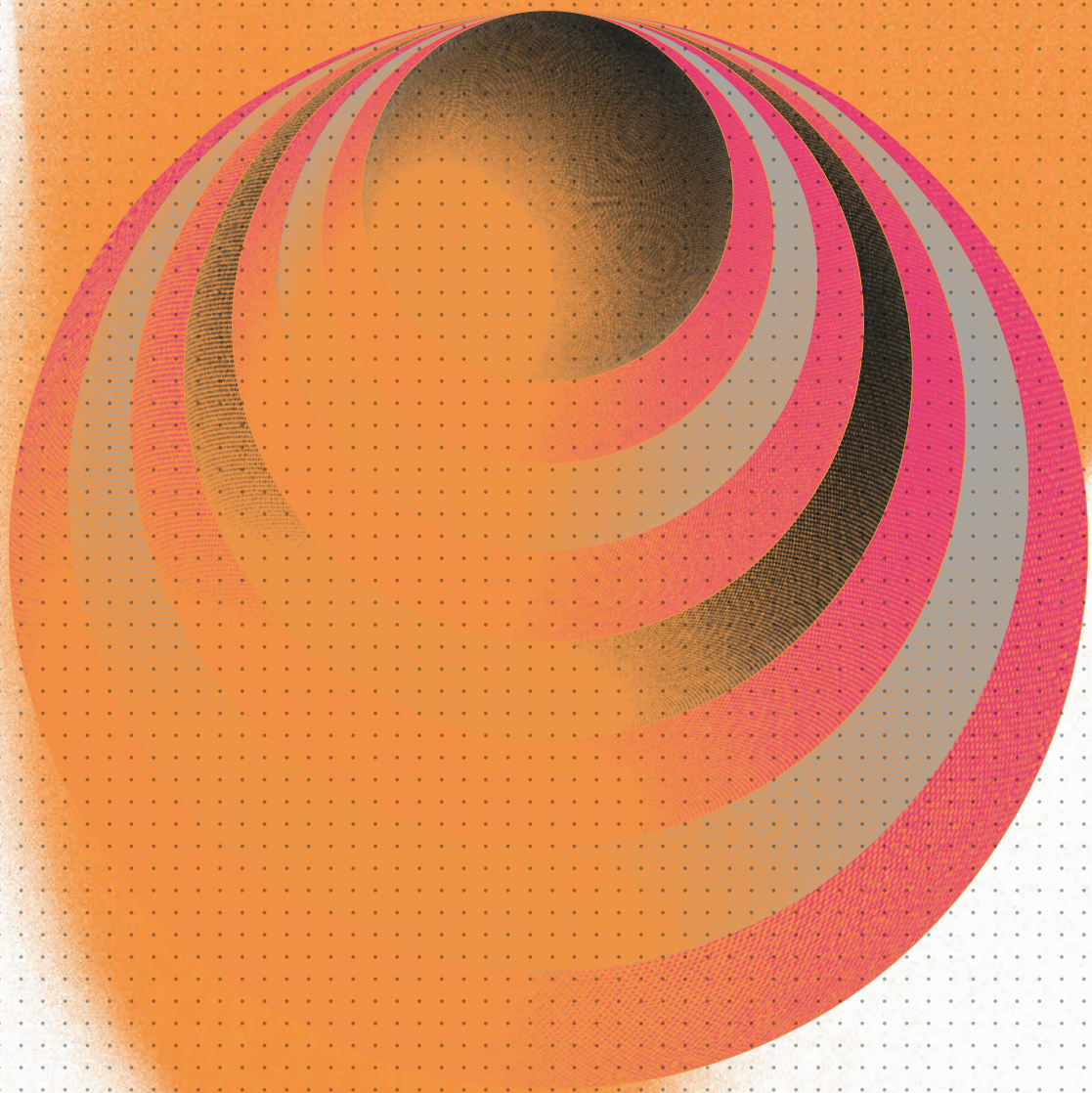
Acquiring enhanced AI capabilities may not even make any nation safer if it escalates conflicts among governments. Acknowledging this provides grounds to exercise restraint alongside rivalry. The near future of AI will be characterized by mutual dependencies, individual and collective vulnerabilities, as well as shared opportunities and challenges. This will require a degree of collective action and sustained efforts at multilateral cooperation, however challenging they may seem. Otherwise, any victories in the AI race will be overshadowed by losses that far exceed any benefits AI can deliver – for the US, China and the entire world. ■

Takeaways

☑ **THE US AND CHINA ARE THE BIG PLAYERS** China wants to be the AI frontrunner by 2030; the US has a similar goal and will double its AI budget to $32 billion by 2026.

☑ **THE US IS RETAINING A LEAD** The country is leading in the field of AI research. It can recruit some of the best talent from around the world.

☑ **THE EU ALSO PLAYS A ROLE** The EU is developing a key position in regulating AI and in turn could be setting the guardrails for the global AI race.



Artful intelligence

WORDS BY
MARK ESPINER

If you were asked to list the top attributes of artificial intelligence, its ability to strengthen familial bonds almost certainly wouldn't make the cut. But Amy Kurzweil isn't from just any family. The writer and cartoonist spoke with *Think:Act* about how exploring connection and identity through the lens of her father Ray's work led her to reexamine not just the workings of creative collaboration, but how the limits of life intertwine with technology.

AMY KURZWEIL is perhaps the best-placed artist to take on AI. A graphic novelist and cartoonist whose work regularly appears in *The New Yorker*, she literally grew up with computer concepts and visionary ideas. No surprise. Her father is Ray Kurzweil, the celebrated computer science guru, inventor and author of the seminal 2005 book *The Singularity is Near* who was hired by Google's Larry Page himself to bring natural language understanding to the corporation's lab. So, Amy knows more than most how algorithms and large language models could influence how we live, what we do and even who we are.

Her father taught her, she says, that someday robots would be made of memory; we are all a series of patterns of information – our memories, our skills, our personalities; information isn't necessarily mundane, it can be spiritual. Profound ideas, many of which are explored and appear (along with her father himself) in her latest graphic novel: *Artificial: A Love Story*.

Artificial is a true story, an epic and intimate journey centering on Ray Kurzweil's project to use AI to bring his dead father Fred back to life. Amy helps her dad collect the journals, letters, ephemera and fragments of Fred's life to feed into the computer code that will reanimate her grandfather in the form of a chatbot. The process raises big questions for her about personal identity, love, belonging and what it is to be human. Questions that are ripe for our time as we come to terms with the growing impact of AI in all areas of our lives.

> “Our technology, our machines, is part of our humanity. We created them to extend ourselves, and that is what is unique about human beings.

Ray Kurzweil is a computer scientist and author of the *The Singularity is Near* (2005) and *The Singularity is Nearer* (2024).

As the story unfolds, she not only gives the background of Fred's life – from escaping Nazi Austria in the 1930s to working as a conductor in the US – she also narrates her own memoir of growing up and trying to reach out to the grandfather she never knew while also getting to know her own father on the quest as well. Along the way, her writing cites Descartes, Plato and others to suggest what part AI might play in our spiritual and creative lives, while also revealing the small dilemmas of a child's mind as it grows up to grapple the larger concerns of an adult woman's choices.

THE FORM OF THE GRAPHIC NOVEL lends itself very well to all these themes. The close-up frames, the repetition of images, the expression of thoughts in different forms all create a unique personal perspective and as you read it, you feel as if you are inside the mind of the writer. Is this graphic, stream-of-consciousness narrative style akin to artificial intelligence? Is it different from what her dad does with code as he tries to create models that replicate a mind? Is she instead expressing a unique flow of cognizance – her mind and thinking – on paper in a graphic style that operates a little like her own quasi-bespoke AI?

Amy is more than happy to answer these and other questions in a Zoom video chat from her San Francisco apartment. Peering into the camera, she flickers in thought and then fizzes to explain her chosen form: "I tend to think about comics as working the way the brain works, which is that we have fragments and there's a lot of gaps and there are words and there are images and there are impressions and feelings – and there's a kind of architecture to the way a memory might be in our minds that's not linear," she says. "Comics also have this quality where you see the page all at once," she continues. "I think it invites both the creator and the reader to be creative in the way that they use the page and you're having the reader go through and experience the story."

That thought seems to suggest to her the next question which she poses to herself a little like a Socratic dialogue: "To what extent are comics algorithmic?" She pauses before answering. "I don't know if I understand enough about how algorithms really work to know how to respond to that,

ARTWORK: CARSTEN GUETH | ILLUSTRATION: DIEGO SANCHES

but what I do know is that in working on *Artificial*, I thought a lot about myself as an algorithm going through a process of repetition." She then digresses to cite the famous AI experiment that DeepMind set with AlphaGo. The Google-backed AI company successfully created a champion computer player that mastered the complex Chinese board game Go. Amy describes how with AlphaGo, the AI became the Go master by playing itself. "I thought about myself metaphorically as doing that," she says. "I'm kind of rehearsing certain memories or future projections and I'm going over and over and over them in order to perfect them ... So, with *Artificial*, I was thinking about the relationship between a mind and a computer and that my process was going to say something about the difference between computers and humans."

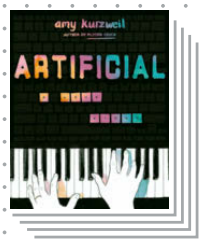
AS SHE TALKS ABOUT THE AI CHATBOT PROJECT with her dad, though, she is very clear that the tech side of things is all a bit of a black box to her. "The chatbot project was something that I heard about. It started before me. So, it wasn't like we sat down together and decided to do this project. It was more like, my father has these ideas that I've grown up with – that have started very abstract and general around this concept of digital resurrection – and then took concrete form once there was the technology that could facilitate something like that." She then laughs at the fact that the technology expressed in her book is already outdated. Even so, she says with a hint of pride, her father was able to execute a vision that he had had for a long time. A vision that she somehow knew she wanted to be in on. "Something interesting about growing up with a father like mine is that his ideas were just swirling around in my consciousness from a really young age. So, I don't totally remember exactly when it occurred to me that this was a project that he was actually working on."

The book, like an AI tool, is essentially a quest to assemble and make cogent sense of information. As that information is pieced together, it starts to subtly reveal other things. For example, as Amy goes through the documents of her grandfather to feed the AI chatbot model, she finds herself drawn closer to him and his world. He comes to life on the pages of the book as she gathers her impression of him and sketches him in – both literally and metaphorically. And when she starts playing with the prototype chatbot, she almost has a meaningful, if somewhat flawed, conversation with him, which touches on what music means to him: "Music is a form," Fred – or rather the FredBot – tells Amy, "a mold into which composers pour their ideas."

The story is interrupted by interviews with her father – snippets of which we have scattered through this issue of *Think:Act* – which ostensibly disclose plans on how to assemble and make sense of the FredBot, but which simultaneously show a father-daughter relationship as a process: growing, sharing memories, subtly revealing a bond forming between interviewer (Amy), interviewee (Ray) and subject (Fred) across time and space.

THE PROCESS HAD ANOTHER LAYER of complexity for Amy. "How did I actually get to know him?" she asks, referring to Fred. "Was it through the AI? Was it through spending a lot of time with his things? Was it through spending more time with my father? Was it through asking questions of other people in my family who knew him? Was it just reflecting on my own ... the echoes in myself of this legacy? That's all swirling for me, and I don't know if it's possible to disentangle those elements,

> Something interesting about growing up with a father like mine is that his ideas were just swirling around in my consciousness from a really young age.
>
> – Amy Kurzweil

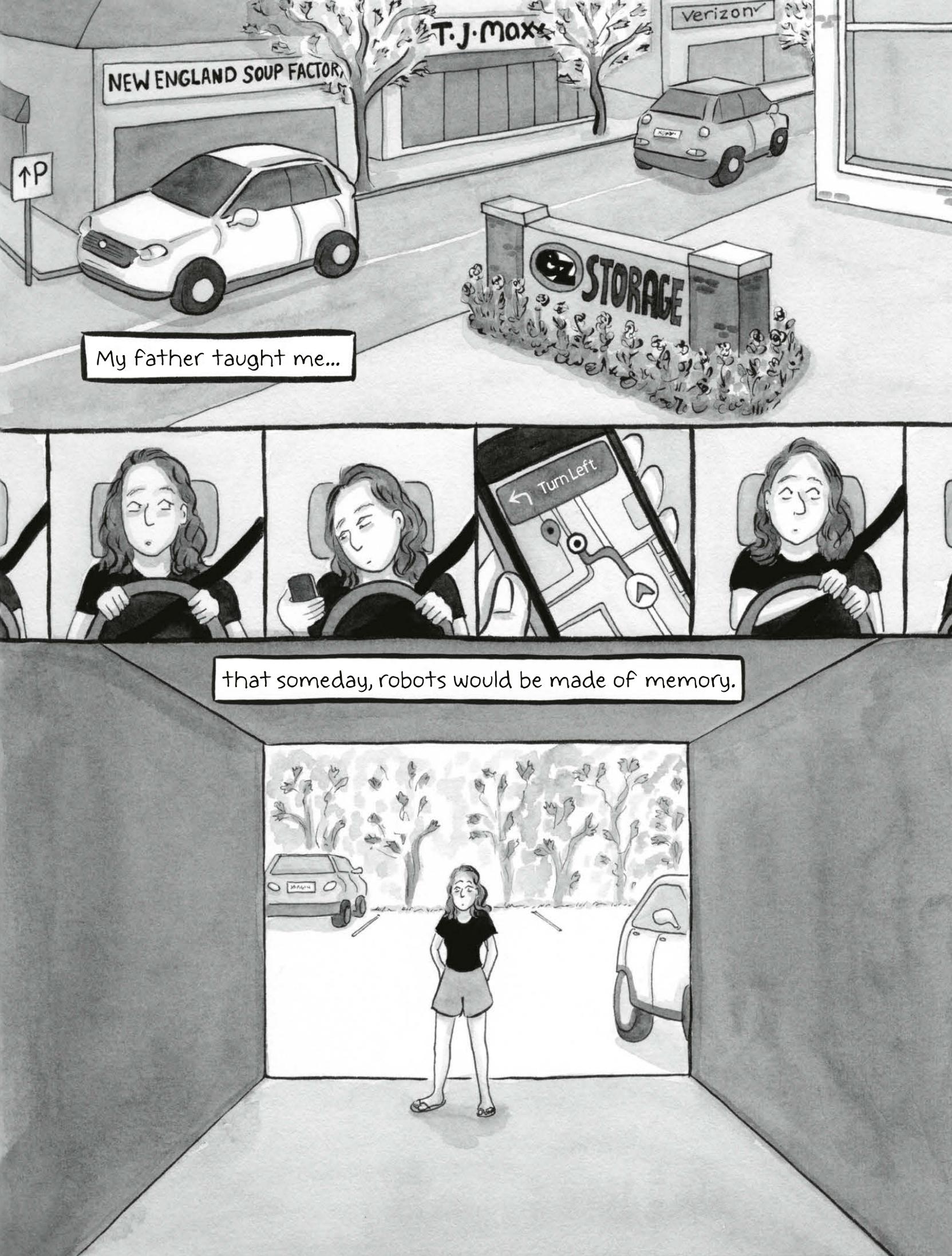


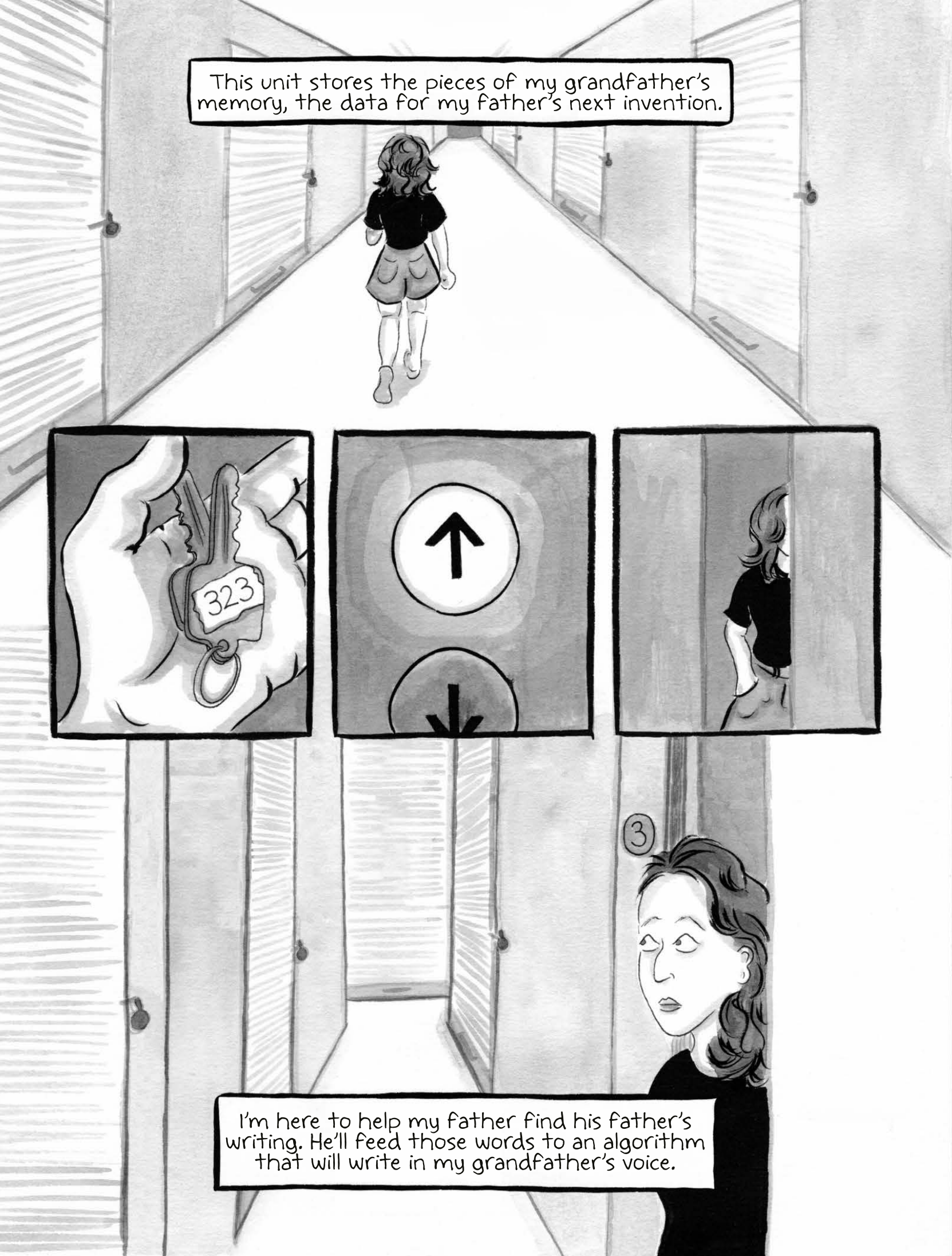
Artificial: A Love Story
by Amy Kurzweil, 368 pages. Catapult, 2023. $38

We've reproduced an extract here, introducing how Amy began to work on an AI chatbot – and how it led to a journey of self-discovery.

RETHINK AI

CARTOONS: AMY KURZWEIL


NEW ENGLAND SOUP FACTORY
T.J.Maxx
Verizon
↑P
STORAGE
My father taught me...
Turn Left
that someday, robots would be made of memory.


This unit stores the pieces of my grandfather's memory, the data for my father's next invention.
323
3
I'm here to help my father find his father's writing. He'll feed those words to an algorithm that will write in my grandfather's voice.

<click>

Gah!

<click>

I've never met my grandfather, but I know his mythology well. His name was Fritz. In America, they called him Fred. He was short and dark, quiet. A brilliant conductor and pianist.

He was born in Vienna, a Jew,

and then came the war.

<click>

Fucking lights!

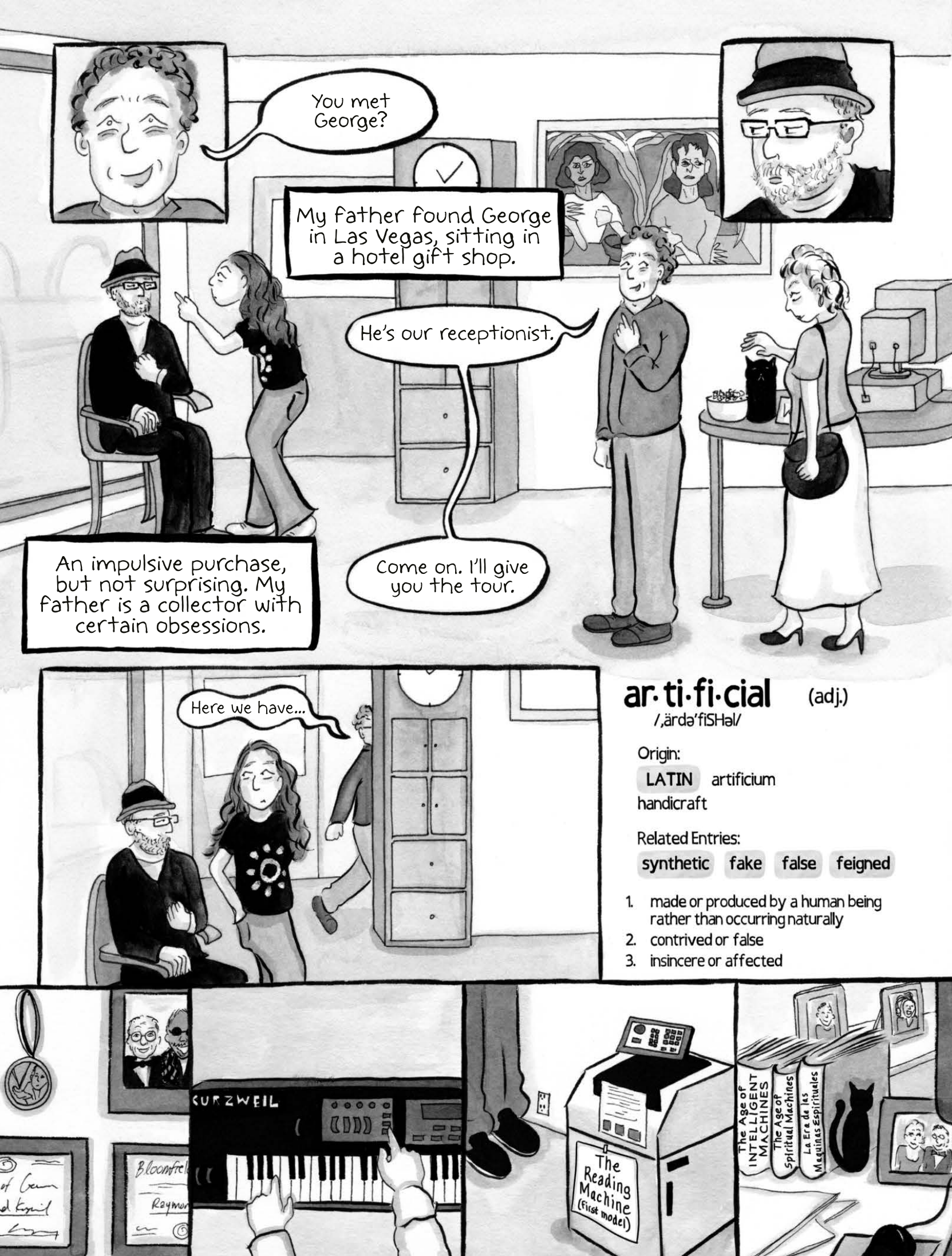
<click>

His life was saved once, by an American benefactor. She'd heard him conduct a choral concert in 1937,

and the next year, she sponsored his salvation.

AAAAAHHHH!!—HAHAH


HA! H-oh my God...
It's GEORGE!
Now I remember...
Nice, right?
my first cell phone
NOKIA
"SNAKE"
flares
15
Kurzweil technologies
You'll let me know what you think of the carpet I chose.
WELCOME

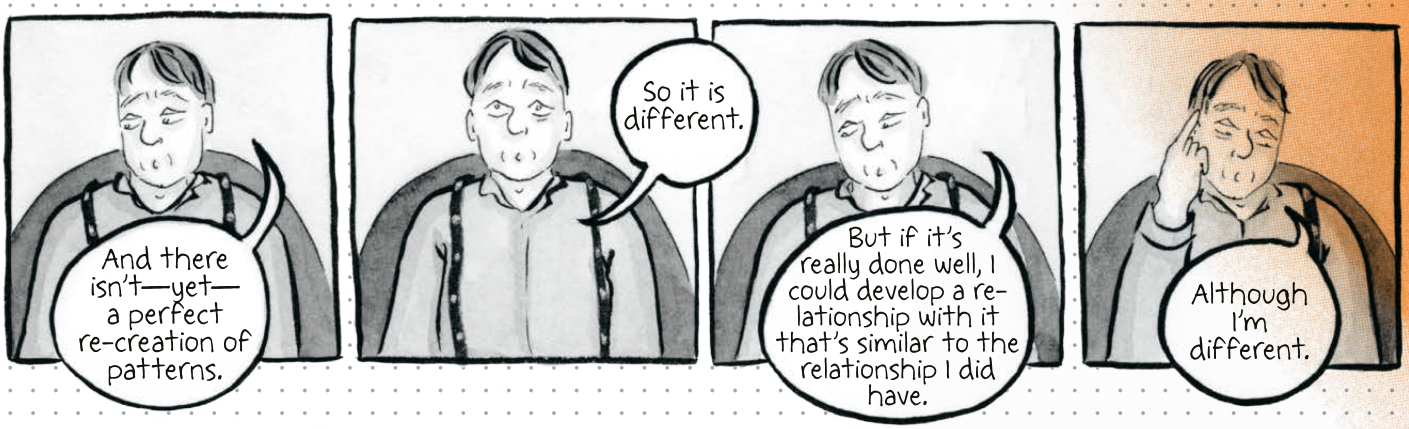

You met George?
My father found George in Las Vegas, sitting in a hotel gift shop.
He's our receptionist.
Come on. I'll give you the tour.
An impulsive purchase, but not surprising. My father is a collector with certain obsessions.
Here we have...
ar·ti·fi·cial (adj.)
/ˌärdəˈfiSHəl/
Origin:
LATIN artificium
handicraft
Related Entries:
synthetic fake false feigned
1. made or produced by a human being rather than occurring naturally
2. contrived or false
3. insincere or affected
KURZWEIL
The Reading Machine (First model)
The Age of INTELLIGENT MACHINES
The Age of Spiritual Machines
La Era de las Maquinas Espirituales


Jacob
SMILEYS & PEOPLE
Jacob
mobile
Remind Me
Message
slide to answer
Hello?


I'm still shaking...
He's made of wax—George. My father named him after a character from one of his books—an AI from the future.
He actually looks a lot like *Freud*.
Fun fact: Freud was almost my great-great-great grandfather. Legend has it his grandson proposed to my dad's mom.
345
Yeah, I'll try the other one now.
Well, I know, but—
Love you too.
330 - 350 →

The Kurzweils discuss AI

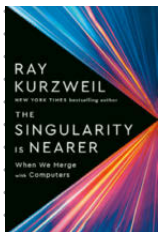
A conversation between Ray and Amy Kurzweil taken from the graphic novel *Artificial: A Love Story.*



because I didn't have an experience of just sitting down and talking to a chatbot of my grandfather. My conversation with it was mediated by having spent time with the text in a different form."

This turns the conversation to whether an AI chatbot could ever truly capture the essence of a person. Amy is quick to articulate her appreciation of the infinite complexity of human identity, but that doesn't make her any more skeptical of her father's aims – rather it has indicated how complex the technology needs to become to faithfully represent human identity. "If we engage with future sophisticated chatbots with this sort of appreciation for their potential in completeness, I think that also has implications for how we engage with just regular people," she adds. That is, with an appreciation for the limits of how much we can really know each other. "I think that that's like a positive contribution to thinking about the limits of what we can know and appreciating the infinity of each other. This project really helped me appreciate that."

Artificial is punctuated by charming and searching interviews with her father Ray, as Amy wrestles with where AI could lead. In some of these dialogues he utters what sound like cautionary warnings: "Once AI is at human levels, it can do what humans can do," he says, adding: "And once a computer reaches human levels in whatever area, it quickly soars past it and becomes superhuman." Later on, he sums up what we all feel about how fast things move in the AI world– even on this very magazine as we prepare to go to press – that it is hard to keep up to date with the dizzying rate of change or, as he puts it: "I'm working on the chapter about AI – which is difficult because by the time I get to the end, something new has evolved."



The Singularity is Nearer
by Ray Kurzweil, 448 pages. Viking, 2024. $35

AS THAT MAY PERTAIN TO ANY FUTURE FREDBOT 2.0, Amy ruminates on what the next paradigm shift in AI could be and if there is any sense in waiting for it. Could it be DNA extraction and rebuilding a person from that code into computer code? Or somehow extracting thoughts and memories from living people? She laughs at the craziness of the thoughts. "This idea of going into somebody's mind and extracting memories ... that doesn't feel like something I understand. And the role of DNA, I don't know how possible that is. Like all of these things it feels so sci-fi." She then brings the conversation back to realizable AI, acknowledging that even that seemed implausible in the past. "The idea of natural language processing being something that was real and that we could really have a conversation with an algorithm, that seemed very sci-fi to me like 10 years ago. So, I remain open to a potential paradigm shift that I don't understand."

Those more whacky ideas might be informed by her father's well-documented quest for immortality. She lightly references his focus on health and longevity in her story without going into greater

> I want people to appreciate the parallel between the imagination of AI and the imagination of the arts ... but at the moment we don't, and that's what is perhaps confusing.
>
> – Amy Kurzweil

detail about his less than conventional approach involving pills, intravenous infusions, specific red wine intake and other methods in an attempt to hack his body's operating system and live forever. She mentions, though, that he has gone on the record as being willing to have his own chatbot made – and there is certainly plenty of data that could help Ray achieve bot immortality at least.

DOESN'T TRYING TO RE-CREATE SOMEONE as an AI being or chatbot tread into a different area, though? Isn't the mystery of limited knowledge a better position? After all, what is art for? We have actors and writers and filmmakers and imagineers who can gesture toward something using what facts exist, imagining the rest. And by so doing they might uncover a more profound truth that you might never arrive at by trying to re-create something with layer upon layer of ever-increasing authenticity. That thought seems to provoke something that has been nagging at her during the conversation. "Through my book," she says, "I want people to appreciate the parallel between the imagination of AI and the imagination of the arts." Artists, she says, collaborate with the truth in order to bring something to life.

Amy Kurzweil is a cartoonist and writer. She is the author of two graphic novels and is a regular contributor to *The New Yorker*.

She then leads the discussion toward how the creative act manifests itself in different forms. It is true to say that there is something about the artifice of a movie, a comic book, or any sort of creative work, that we understand and appreciate as a kind of container for that collaboration between "truth" and "art." And that leads her to a revelation. "I think that we need to understand AI that way too," she says, "but at the moment we don't, and that's what is perhaps confusing. I'm hopeful that my book will help people understand that this is a space for imagination and, in this context of chatbots or whatever it is of bringing people back, it suggests that it is a space for that kind of imaginative collaboration, which I think is extremely valuable." So, AI is another space for creative play and learning who we are and where we come from.

"In the artistic tradition," she continues, "people find that the kind of quest for truth is not always something we can handle." Meaning that slavishly following "truth" might lead you to miss the point of a work if you're obsessed with the small details. "So how do we as human artists and creative people marry ourselves with the way AI works?" she asks herself again before answering herself with a hint of excitement: "That's a new ..." she is reaching for something, "... a very new canvas. So I think we're all still figuring out how it works." And then she adds with a shrug and a smile, "I don't feel that I can personally claim to really understand exactly how it works." She's not alone there.

Despite her professed ignorance, *Artificial* is invested with ideas, thoughts and emotions – all contributing to how AI might affect us on a very personal level in the future. It is a real voyage of discovery that gestures at AI's scope and how it will shape our lives. A work of artful intelligence. ■

Takeaways

- ☑ **STAYING AHEAD IN AI ISN'T EASY** There is a dizzying rate of change and even experts find it hard to keep up with the evolving AI landscape.
- ☑ **CONSIDER THE PARALLELS** It is important to think about how the imagination of AI links to the imagination of the arts and what role "truth" plays.
- ☑ **CAN AN AI CHATBOT REPLICATE A PERSON?** You need to consider and appreciate the limits of how much we can really know about each other.

ILLUSTRATION: DIEGO SANCHES

CLOSING THOUGHTS ON

Artificial Intelligence

> Once AI reaches human levels of intelligence, it quickly soars past it. But AI is also an extension of our own intelligence and we will inevitably merge with it, just as we've always used technology – *from sticks to books to computers* – to extend our reach.

– Ray Kurzweil

American computer scientist, author and futurist

Wide angle

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

Wielding power wisely

*Ginni Rometty sat at the top of one of the world's most powerful businesses. But her leadership story didn't begin as IBM's CEO. In her new book **Good Power**, she shares how a challenging childhood shaped her vision for the intelligent use of influence.*

BY **Steffan Heuer** PHOTOS BY **Ysa Pérez**

FOR EXECUTIVES WRITING THEIR MEMOIRS, it is rare to opt for the approach of delving into more painful parts of their past. Yet that is exactly how IBM's former CEO Virginia, or "Ginni," Rometty opens her new book *Good Power*. Over the course of almost 40 years, the Chicago native worked her way up from an entry-level systems engineer to head of global sales, marketing and strategy before finally becoming CEO of the 100-year-old company in 2012. The experience of growing up in a fatherless household motivated Rometty to try to wield power for the greater good. "No matter how desperate a situation gets, we each have within us the power to create opportunity for ourselves as well as others," she recounts. In this remotely conducted conversation with *Think:Act*, Rometty reflects on how turning adversity into advocacy has become the guiding principle for her life, even long after leaving the executive suite in 2020.

A FRESH PURPOSE Ginni Rometty, photographed here in her Naples, Florida office, is now using her influence to spread her message of "skills-first" learning, hiring and advancement.

Your legacy in business is impressive. Four decades at IBM, nine years in the rare category of a Fortune 500 CEO. Yet your book isn't a management manual, but rather a personal account. Why?

Good Power may not be a traditional business book, but lessons about business, careers and leadership are weaved throughout. To understand how I developed my career and why I made many decisions as IBM's CEO, it helps to understand where I came from and what I value. I think the best way to describe what I've written is a memoir with purpose, because I write about my experiences through the lens of ideas much bigger than me, but ones that I hope many people will relate to and use in their own lives.

What does the title of the book mean to you?

Power is often perceived negatively because so many people have used power to harm versus to benefit the greater good – and for selfish →

purposes. Personally, I never really liked or used the word. But as I reflected on my life experiences for the book, I realized how often I had used my own power to help my family, my clients and IBM. I saw that power doesn't have to be bad to be potent. In fact, power is necessary to make things better. It's important to think about how to use power well, and wisely.

The three big pillars of your narrative are *me*, *we* and *us*. How do they relate to each other in the context of power?

I believe our power becomes more potent over time: Like a pebble tossed into a pond, our spheres of influence only widen. With experience we move from the "power of me," to the "power of we," to the "power of us." More specifically, when we're young, in school and beginning our working lives, we are more "me"-centric. Our mission as we grow into adulthood, as we adopt foundational values and character traits and take on more responsibilities, becomes less *me* and more about *we*. Our actions have consequences for others, like our partners, our children and the people and organizations we work with. At some point, we find ourselves in positions to effect positive change at real scale and our perspective expands to making *us* better – underserved groups, societies, countries, the environment, the world we share. This is how my own journey unfolded – from *me*, to *we*, to *us*.

Did your challenging childhood after your father left the family prepare you for leadership?

My father's absence began long before he left us. I took on a leadership role in my family as the eldest child, helping my mom raise my younger siblings because my dad was not home a lot. So, at an early age, I had a sense of accountability and responsibility which absolutely flowed into my character, and eventually my professional life. Once my father left and we had no money, I watched my mother muster the courage to go back to school and get jobs to help us pay for our home and food. She didn't let my father's actions define her life in a negative way, and I learned through her never to let anyone define you. That philosophy shaped me.

What are the crucial lessons from your decisions to transform IBM in your nine-year tenure that are applicable to today's upheaval and disruptions?

First of all, we create meaningful change when our intention is to be in service of others. We do this by identifying and meeting their needs before or in parallel to our own. In the case of IBM, I had to make some tough decisions that met the needs of multiple stakeholders even if it meant I, personally, would be criticized. Second, we create change when we inspire people to pursue a purpose they authentically believe in. People must want to change, not be ordered to change. I spent a lot of time building people's belief in IBM's future by being honest about why we needed to change and by developing their skills so they could grow with us. A third way to enact change is by focusing not only on what must change, but what must endure. Transformation is different than reinvention; understanding what elements must stay the same is critical. In the case of IBM, we knew we needed a new technology platform – in the cloud and for AI. But, we did not need a new purpose as a company; IBM's purpose had always been to be essential to our clients by running their complex, mission-critical systems.

Ginni Rometty

became the first female CEO of IBM in 2012. During her nine-year transformation effort at the company, IBM built a $25 billion hybrid cloud business and established itself as a leader in AI and quantum computing. Her career-long commitment to innovation was recognized with the Edison Achievement Award in 2019. She currently serves on several boards and is co-chair of OneTen, an organization committed to upskilling, hiring and promoting Black Americans.

"Transformation is different than reinvention; understanding what elements must stay the same is critical."

– Ginni Rometty

Whatever cloud technology we created had to do just that, keep us essential to clients.

What are the most important qualities a leader needs for tomorrow – and have they changed?
Wherever you are in your career, learn to be an Olympic learner. That is the best skill you can ever have. At IBM, it would eventually become what we'd change our hiring for: a propensity to learn over actual skills because it's changing so fast.

Tough decisions often mean conflict. What's your advice on how to handle that?
Embrace it! Choose to see conflict not as a setback, but as an opportunity to improve the status quo and strengthen relationships. Personally, confronting conflict reduces my own anxieties because my energy goes into solving versus stewing. Running toward conflict takes courage and often humility, but it's more productive than the alternative.

Good Power
by Ginni Rometty, 272 pages. Harvard Business Press, 2023. $30

How can you know how much to change and how much is too much?
All change requires hard choices about what things to preserve and what to reimagine. If you are trying to change careers, for example, the "what" may be your job, your industry or your employer. But you don't want to change your "what" so much that you abandon your values or can't be true to who you are by working for an organization with a mission you do not believe in. In the case of changing a company, the "what" may be its products and services. But like a person, a company doesn't want to lose its core identity. As someone once said to me, "IBM would make a horrible Google just as Google would make a terrible IBM."

The other thing I've learned about change is that "how" is as important as the "what." For a person switching jobs, they may have to go back to school to learn new skills and gain new knowledge. For a business to produce new products, it may have to upskill their workforce and teach them new ways of working. In short, change is never all or nothing, but a nuanced process. The goal is to become a better version of ourselves.

You say that "growth and comfort never coexist." Can you elaborate?
I have been saying that for years – it is something I learned early in my career. About 20 years ago, the senior executive I worked for was moving to a new position and he recommended me to replace him. I told him I needed more experience. →

"Have confidence in the face of risk. If we want to advance in our careers, if we want to be better versions of ourselves, we will be uncomfortable at times – and that's OK."

– Ginni Rometty

"Just go to the interview," he said. I did and when I was offered the job, I hesitated to accept. I wanted to go home and talk to my husband. That night Mark listened as I told him about the new job. He said only one thing: "Do you think a man would have answered that way? I know you, Ginni ... in six months you will be telling me how you are ready for the next challenge." Mark's point was not about gender differences, but about choosing to have confidence in the face of risk. The next morning I went back to work and accepted the promotion. The experience taught me that if we want to advance in our careers, if we want to be better versions of ourselves, we will be uncomfortable at times – and that's OK.

Technology often holds the promise of efficiency gains and the peril of displacing workers. What are your thoughts on the future of employment?
Technology will eliminate some jobs, but it will also change existing jobs and create new ones. Preparing the workforce to thrive in the digital age has been a priority and passion of mine for years. Providing access to education and training so people of all ages have the modern skills employers need is a responsibility of the public and private sector. Companies, colleges, governments, nonprofits, training organizations and other entities all play a role in helping ensure a majority of people can attain well-paying, family-sustaining jobs.

Years ago I coined the term "new-collar" to refer to the new categories of work and worker that tech has ushered in. The term describes jobs that are not the stereotypical manual labor, hourly wage jobs associated with blue-collar workers, or the managerial, administrative roles of white-collar workers. In a sense, new-collar jobs replace the middle-income jobs that for decades provided middle-class incomes, which are disappearing. New-collar jobs are real and waiting to be filled – and do not require traditional forms of education, like four-year degrees.

How should organizations, the education system and society respond to the looming disruptions in the workforce? How can we best prepare?
These institutions must change how they do things to accommodate the new realities of the digital economy. Another term I coined, "skills first," is about the systemic changes that must take place to accommodate new technologies and the new-collar jobs being created. For instance, employers must rethink how they recruit and promote. They must stop requiring four-year degrees for jobs that really don't require them. The rampant over-credentialing of jobs is leaving millions of talented people who never went to college out of the workforce. In a skills-first world, employers become "builders" versus just "buyers" of talent.

In turn, we need our educational institutions and governments to pave new educational pathways into the workforce, so people can learn the skills companies want.

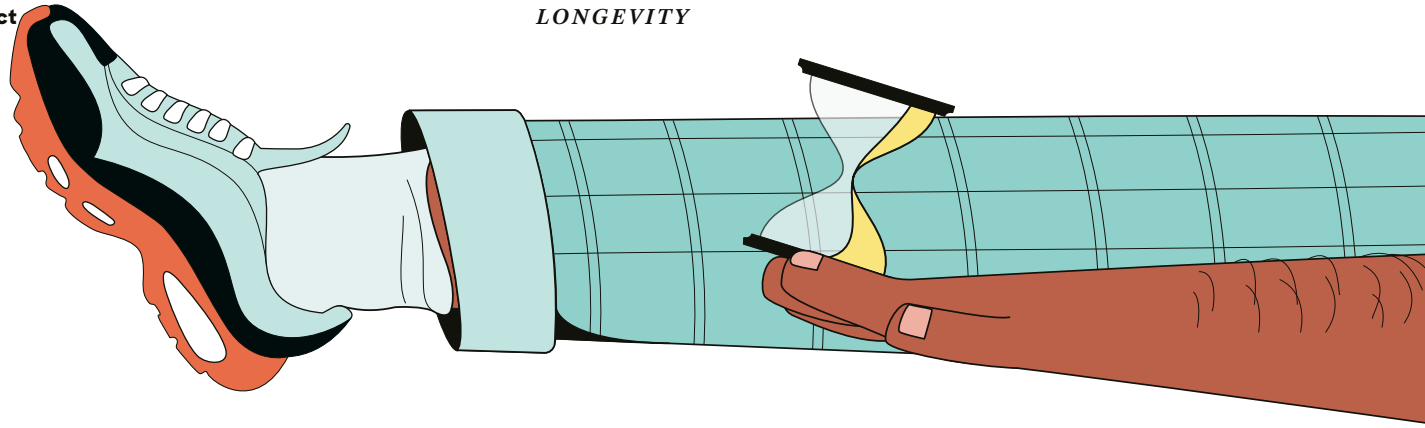
Whenever a female CEO writes a book, a question that always comes up is about being a role model for other women. What is your view on that?
As I came up in my career, I did not see myself as a role model for other women, nor did I try to be one ... I just wanted to be seen for my work, not my gender. Then one year, after I finished giving a speech, a man in the audience came up to me. I assumed he had a question or comment on the material I'd presented. Instead, he said, "I wish my daughter could have been here." It was a moment of recognition: I was a female role model, whether I wanted to be or not.

I became cognizant that I was being viewed through that lens. I began to see myself in service of other women who wanted to build their own careers, or go into fields and jobs dominated by men and gain the confidence to believe they could because, perhaps, someone else had done it. You can't be what you can't see. ■

Short Takes

Discover the bonus video interview with Ginni Rometty
→ rolandberger.com/en/rometty

PHOTO-ASSISTANT: ALFONSO DURAN | HAIR & MAKE-UP: BRANDI PERKINS



The age of a new economy

People are living longer than ever before. Yet even as older people are establishing themselves as a growing social and economic force, the public and private sectors are still working to overcome the hurdles of bias and unlock the potential of a new demographic era.

BY **Geoff Poulton** ILLUSTRATION BY **Matthias Seifarth**

WHEN JOE BIDEN ANNOUNCED he would run for reelection in the 2024 US presidential race, one topic soon grabbed headlines: his age. If Biden is reelected in November 2024, he will be just two weeks short of his 82nd birthday. Many Americans believe that is too old for the grueling demands of one of the world's most high-profile, high-pressure jobs. But at a time in which we are living longer, healthier lives than ever, could this simply be unconscious bias at play – a reflection of what may be the last acceptable "ism": ageism?

Longevity and our attitudes toward age are topics that require increasingly urgent attention. "I'd go as far as saying the dramatic changes we'll experience in demographics over the next few decades is probably the number two issue the world is facing, after climate change," says Avivah Wittenberg-Cox, a researcher and author who works with the UK's National Innovation Centre for Ageing and Stanford's Center on Longevity.

STAYING FLEXIBLE
The increasing age of the workforce means it's not just older workers who will need to keep learning to stay agile in their careers – society will also need to adapt and grow alongside them.

With longer life expectancy and sinking birth rates transforming the traditional demographic pyramid, older people are now more important to our societies and economies. Just over a century ago, the average global life expectancy was a mere 32 years. It has since more than doubled to 73. By 2050, the number of people aged 60-plus will have doubled to 2.1 billion. Meanwhile, fertility rates are plummeting: from 4.7 births per woman in 1960 to 2.3 today, only just above the "replacement rate" of 2.1 that keeps a population stable.

An aging population means health care and pension systems will have more people to support with fewer contributors; a dwindling number of younger workers, particularly in rich countries, will put greater emphasis on migration and technology. For businesses, it's "up there with sustainability and AI in terms of a transformative trend firms need

to engage with," says Andrew Scott, professor at London Business School and the author of *The 100-Year Life* (with Lynda Gratton) and the upcoming *The Longevity Imperative*.

THE "LONGEVITY ECONOMY" will see older people become increasingly important for workforces. In 1990, people between 45 and 64 accounted for 28% of the working-age population in OECD countries. That's now 40%. And for business, there's also an often overlooked opportunity in an aging population – spending power. According to AARP, a US-based nonprofit focused on aging, the 50-plus generation already accounts for half of global consumer spending. By 2050, this will reach nearly 60%, or $96 trillion. Despite these impressive numbers, many organizations still underappreciate the importance of older generations, both as workers and consumers, says Scott. "When we underestimate the capacity of older people then we →

exclude them from economic and social activity too much and we underinvest in our own later years. That is a major problem as we live longer lives."

This can be seen in the products and services created for older generations, says Colum Lowe, Director of the UK's Design Age Institute, which aims to promote more inclusive design across a variety of sectors. "Too many companies focus on what they think older people need and not what they want. They believe that once you get to 65, you don't have any desires anymore. But most older people want to have fun and enjoy life – and their money." Lowe also encourages companies to think more about their marketing: "By making it obvious that something is 'for older people,' not only do younger people not want it, but older consumers don't either."

When it comes to the workplace, firms often fall into the trap of assuming older workers are less productive, innovative or capable of change, despite a lack of empirical evidence. Younger managers, meanwhile, can struggle to manage older subordinates, in part because they still think they should know more about the work, regardless of their experience. Older workers also find it harder to get jobs and jobseekers aged 50 and over can take twice as long to find new employment compared with younger workers. To address this, companies must make longevity a greater priority. "Right now, it's tacked on to the DEI agenda – that doesn't acknowledge the fact that this is going to change markets, needs and talent availability," says Avivah Wittenberg-Cox. "It's a transversal, cross-disciplinary issue, but it's struggling to enter the mainstream conversation. It's not on the leadership radar yet."

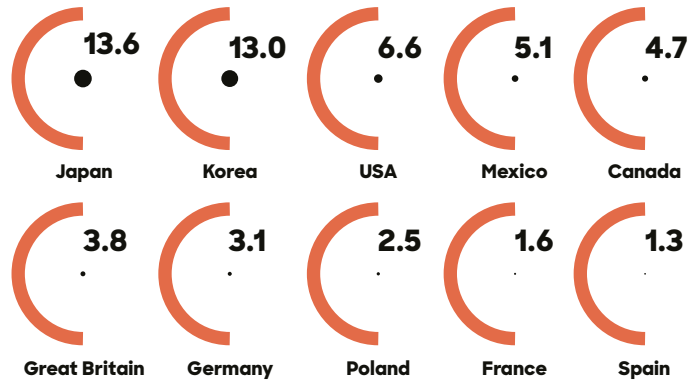
The "silver" dollar

With life expectancy double what it was a century ago, people are extending the years of their working lives – and both factors impact 50+ spending power.

77.3 years old

The projected global life expectancy at birth in 2050

SOURCE: WORLD ECONOMIC FORUM



Where people are working beyond 65

The share of the labor force that is 65 years or older in selected countries in 2021 (in percent).

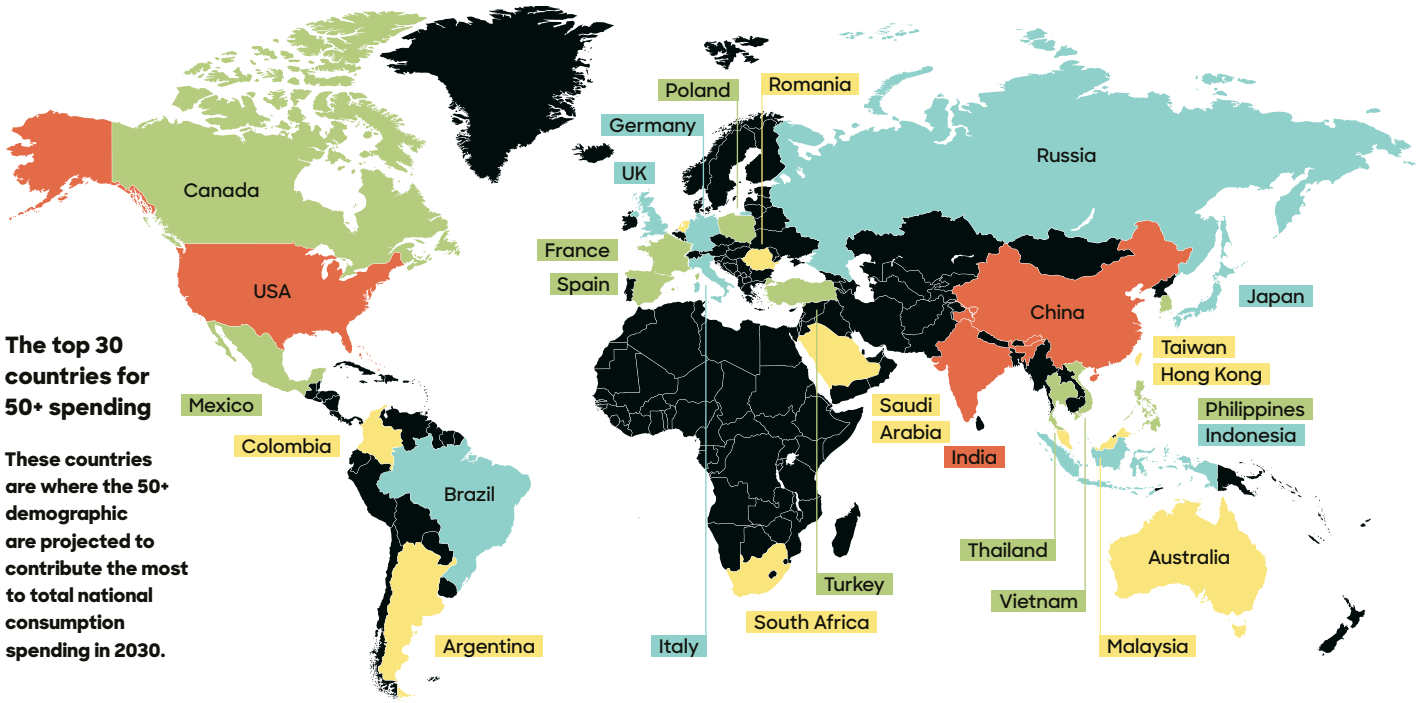
SOURCE: OECD

AS WE ENTER A NEW DEMOGRAPHIC ERA, the traditional three-stage approach to life – learn, work, retire – needs a rethink. Stanford's Longevity Center predicts 100-year life expectancy will be common for those born today. As a result, flexibility, lifelong learning, and more transitions between jobs will become the norm – an approach that suits workers of all ages, even those beyond the traditional retirement age, who may continue to work, whether for financial reasons or simply for enjoyment and a desire to contribute.

Some companies are already beginning to take steps in this direction. Employees participating in Unilever's U-Work employment model are paid a monthly retainer for committing to a certain number of weeks a year to work on short-term projects. Crucially, they also receive benefits, pension contributions, paid leave and stipends for further education. They can also choose to work on further projects for additional compensation. Unilever believes the approach will help it retain talent, particularly parents and older workers, and increase the diversity of its workforce.

> **"It's a cross-disciplinary issue, but it's struggling to enter the mainstream conversation. It's not on the leadership radar yet.**
>
> **A. Wittenberg-Cox** is a researcher at the National Innovation Centre for Ageing UK and Stanford's Center on Longevity.

According to OECD research, companies with "thriving intergenerational workforces" tend to see higher productivity than those skewed too heavily toward just one end of the age spectrum. Andrew Scott says maximizing age diversity is vital for firms looking to tap into the longevity economy. "Combining new technological insights that tend to be most strongly evidenced in the young with deep knowledge of markets, customers and ways of operation will bring about better outcomes than each group working alone. Moving away from hierarchical groups will also be important."



The top 30 countries for 50+ spending

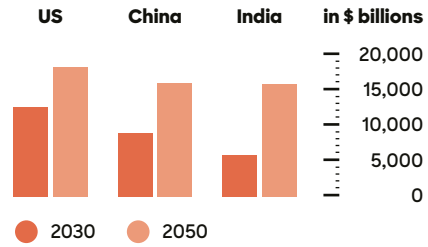
These countries are where the 50+ demographic are projected to contribute the most to total national consumption spending in 2030.

- Rank 1–3
- Rank 4–10
- Rank 11–20
- Rank 21–30

SOURCE: AARP

A growing contributor to GDP

The US, China and India are projected to see the highest consumption spending by people 50+, but also the highest contributions from that age group to GDP.



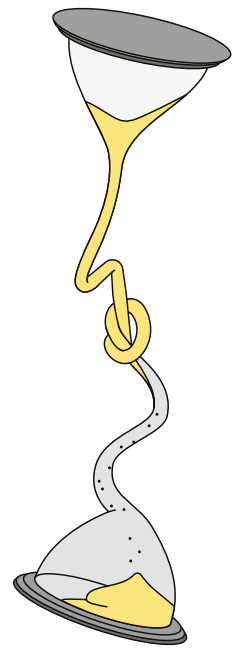
62.3%

of consumption spending

The projected share of total national consumption spending by the 50+ age group in the US in 2050.

While older workers will have likely accumulated valuable expertise and experiences, to maximize their contribution to the longevity economy, they will also need to learn new skills, especially as digitalization becomes more widespread. This means companies must ensure they provide the right opportunities for further training and education. Japanese conglomerate Mitsubishi Corporation, for instance, has a dedicated "career design center" offering a range of training options aimed at extending the careers of its older employees.

THE RESPONSIBILITY FOR FACILITATING the success of the longevity economy doesn't just lie with the private sector. Public policy has a vital role to play in helping people remain healthy and productive in later life. Some governments have even introduced subsidies for companies that do hire older workers, including Korea, Canada and Australia. It's also important to remember that contract



employment isn't the only option: Research by AARP and Oxford Economics has found that people in their 50s and 60s start businesses at nearly twice the rate of those in their 20s, with higher startup survival rates. "Olderpreneurs have a number of needs that could be addressed through changes in laws and policies and by educational organizations," says the Global Coalition on Aging, from preferable health care to pension arrangements.

Wittenberg-Cox, a long-time researcher into gender disparity, says there are plenty of similarities with the current emergence of longevity as a serious issue. "25 years ago, it was women becoming more important in labor forces, companies and consumer consciousness; now it's older people." Much like gender, this is a topic that affects every country and every company – businesses that don't act will suffer, she says. "If you don't have a longevity strategy today, you practically don't have a growth strategy."

Mindset and match

Sports psychologist Bill Beswick has worked with some of the most prominent figures in modern athletics to achieve new levels of excellence in competition. His expertise in the art of winning also offers organizations insight into how the mind can make a champion.

BY **Gary Rose**

IN HIS LANE
English Olympic gold medal-winning swimmer Adam Peaty worked with Bill Beswick to hone the focus to break multiple breaststroke records.

PHOTO: CLIVE ROSE/GETTY IMAGES

FOR MANY FOOTBALL FANS it is the sport's JFK moment. Where were you in 1999 when Manchester United beat Bayern Munich 2-1? In what was perhaps the most memorable match in history, the Manchester side, featuring boy wonder David Beckham, had all but lost the game and with it the chance of the UEFA Champions League trophy. They were one nil down. The 90 minutes had been played, however due to injuries and stoppage during the match there were three minutes of extra time still to be played – and with that came a glimmer of hope. They turned out to be the most action-packed, jubilant 180 seconds in the sport. Two masterfully placed corners by Beckham were converted into goals for Manchester to steal the prize from under Bayern Munich's nose. The German team was visibly broken at losing the trophy. For Manchester, it was a triumph against adversity. A display of character under pressure. And most significantly, David Beckham's single-minded focus and refusal to give up. In short, it was as much a psychological victory as a competition win.

Sport is filled with high-pressure moments. Decisive penalty kicks, a perfect putt on the last green, a split-second edge on the track. And as with Beckham's prowess in that celebrated match, the moments of drama and calm delivery often separate the best from the very best. Talent and physical prowess are no doubt significant, but mental strength is also crucial. And the power of positive psychology is something that is receiving increasing prominence in training and in competition.

A WINNING TEAM Beswick started working with Manchester United players including David Beckham (left), Teddy Sheringham (top right) and Roy Keane (bottom right) in 1999.

ONE MAN WHO EMBODIES THIS FOCUS on the mind and its ability to bring competitive advantage is Bill Beswick. The 73-year-old world-renowned sports psychologist has helped star athletes and teams – including David Beckham and Manchester United – achieve their best. And he has also come to the aid of others to help overcome the mental blocks to be the best they can be. Just ask Adam Peaty. Even at the pinnacle of his sport, the 29-year-old British swimmer with Olympic gold medals to his name has always strived to be better. In 2015, at the age of 20, Peaty broke the 100-meter breaststroke record for the first time, becoming the first man to go under 58 seconds. He would go on to break his own world record a further four times.

I meet Beswick at his home in Cheshire. He takes me through to an office area that is filled with books about the mind as well the autobiographies of sports personalities, many of whom he himself has worked with. There are also simpler items that have the personal attachment such as accreditation passes from numerous sporting events going back decades, including swimming.

Beswick had a hand in shaping Peaty's attitude from a young age. "I remember once telling Adam and a group of other Olympic swimmers that there are a few key attitudes to training. Either you're just turning up because you have to. You turn up to train, you do a bit physically, but mentally you're not switched on. Or" – his eyes widen – "you turn up to compete. Now you're switching on a little bit mentally as well as physically. Finally, you turn up to win. Now you're fully committed to being a champion."

It's a mindset that Beswick has tapped to cut across all types of sport. "I use former Manchester United captain Roy Keane as an example of an athlete I've worked with who turned up every day

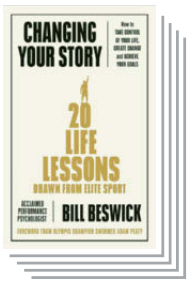
"I realized these tough moments are not necessarily about talent, but character. Who is big enough to make the big move?"

– Bill Beswick

to dominate. Anything else wasn't satisfactory for him. Adam Peaty heard that message, came to see me at the end of the meeting and said: 'Bill, I need to talk more about training to dominate, that's what I'm going to do.'"

BESWICK HAS APPLIED his expertise across a range of sports. He has worked for international teams, including the men's England soccer and rugby sides and also the great Manchester United team that dominated English soccer for more than two decades from the early 1990s. He has written a number of books on the subject, including his latest, *Changing Your Story*, which explores the way we think and how it can help improve performance. His psychological approach, though, has been forged in experience. Before he focused on his career in sports psychology, he was himself a coach.

Meeting Beswick, there is a calmness to his voice but also an underlying air of authority. He also has an ability to weave in pauses at the right time to emphasize points and keep you engaged, making it easy to understand how he commanded respect from athletes he worked with, both as a coach and a psychologist.



Changing Your Story
by Bill Beswick, 208 pages. Penguin Life, 2021. $29

IT WAS IN HIS COACHING ROLE that he first explored the important mental aspects of being an athlete. In 1983, he was in charge of the England team competing in the Commonwealth Basketball Championships. "I coached a young England team with many defeats on our way to success, and I think I was beginning to instinctively consider the mental aspects of the team more and more as a result," he recalls. "It all came to a head one night when the team was playing in the semifinal against the hosts New Zealand and was down by one. We had 24 seconds left in the game and we set a move that got my best shooter free in the position he shoots from every day in practice. But he didn't take the shot. He choked." Beswick pauses for emphasis before continuing: "Big game. New Zealand crowd of 10,000, a place in the final at stake. It was too much for him. We had another chance with five seconds left. I called a timeout, and this was when I realized these tough moments in sport are not necessarily about talent, but character. Who is big enough to make the big move in the game? Who will take on the consequences?"

It was then that something unusual happened. "One of my players called Pete Jeremich stepped up and said: 'I'll take the ball, coach, I need it, →

PHOTOS: ICON SPORT, ALEXANDER HASSENSTEIN, JOHN PETERS / GETTY IMAGES

"If the coach or CEO is walking around energetic, positive and smiling, then everybody looks and says, we're in a good place."

– Bill Beswick

SET TO SUCCEED Beswick is best known for his work at Manchester United alongside Steve McClaren (both pictured bottom left), but he also worked with many other teams including the UK women's basketball and rugby teams.

I'll deal with it'. He scored a wonderful shot, and we went on to win the gold medal," says Beswick. "It was that moment I realized that in sport, you either define the moment or the moment defines you, and character comes to the fore."

ONE OF BESWICK'S MORE WELL-KNOWN ROLES was at Manchester United, which he joined in 1999, after that JFK moment and victory over Bayern. The club was already enjoying a sustained period of success. Even so, United's manager, the legendary Sir Alex Ferguson, was open to exploring any methods that could help them become even more successful. His first-team coach, Steve McClaren, recommended they employ Beswick's methods. That Manchester United squad featured talented individuals such as Gary Neville, Paul Scholes and David Beckham. They had won pretty much everything it was possible to win at club level.

Nevertheless Beswick remembers how a story he relayed about bricklayers made an impression on the young David Beckham. "I was trying to convey a message to the players about their perception of motivation and the desire to be the best," Beswick says. "I told them the story of a grandfather with his grandson walking in Manchester and they came to a building site where some bricklayers were working. They asked the first bricklayer: 'What are you doing?' 'I'm laying bricks,' he said. They asked the second one: 'What are you doing?' 'I'm earning £10 an hour,' he said. They asked the third one and he said: 'I'm helping build a cathedral and when it's done, I'm going to bring my grandchildren to see it and say, your grandfather helped build that.' That's what playing for Manchester United was like: building the cathedral." Not long after that pep talk, the team went out onto the pitch for a game. When Beckham scored, Beswick recalls him shouting: "Bricklayers 0, Cathedral 1."

ADAPTABILITY IS A WATCHWORD for Beswick. He works with people of all ages, from those at the start of their career to those approaching retirement. "People are different when they're 22 or 18 committing to the game, and 32 when they're leaving the game. They've been married, parents have died, they've had children, they've been traded two or three times to different clubs, they've had long-term injuries, they've battled to form a career."

Responding to change over time is the common thread that he helps top performers understand, Beswick adds. "I have to deal with the person as

PHOTO: ADRIAN DENNIS / GETTY IMAGES

they are in front of me. So, my agenda with an 18-year-old would have some common traits with a 32-year-old, but a lot of differences, too."

An older player, according to Beswick, begins to struggle physically and so mentally loses his confidence. And then there's the prospect of retirement or the realization that something they had dedicated their whole life thus far is about to come to an end – be it by age or injury. It can be very difficult for some to accept, says Beswick, who usually offers this piece of advice: "Life is for 85 years, not 33. You are not just an athlete; you are a person with other skills. Some of the things you have learned as an athlete can be used in other areas. It isn't a sense of loss, but a sense of opportunity."

IT'S NOT JUST TEAMS, ATHLETES OR THEIR COACHES who Beswick finds benefit from working with a sports psychologist. He also applies his methods to businesses including NatWest Bank or Kellogg Company (named Kellanova since October 2023) and sees a lot of similarities with the situations that sports coaches and senior management face. "I decided after my experience of nobody helping me when I was a basketball coach that I would be the head coach's friend, because I know how lonely it is being the boss," Beswick says. "Whether I've worked in sport, business or education, I've nearly always been close to the head coach, the CEO or the head teacher. I find that if I influence them in a positive way, I influence the organization in a positive way because it tends to reflect the boss."

You could call the Beswick method applied trickle-down psychology. "If the coach or CEO is walking around bright-eyed, energetic, positive and smiling, then everybody looks and says, we're in a good place," he explains. "If the coach walks around with his head down, depressed, not communicating, no eye contact, everybody thinks we're in trouble. Emotions are contagious."

BE IT TEAMS OR INDIVIDUALS, one common driver, in Beswick's experience, is a fear of failure, the idea that all the hard work and dedication put into achieving something could come crumbling down from one mistake. "I try to change it from fear of failure to desire for success, desire to achieve and not to fear failure but be able to deal with it," he adds. One of his favorite exercises is about how to react to things that don't pan out as planned. "You've got choices," Beswick says. "You can go into victim mentality, where everything becomes negative – your language becomes negative, your body language becomes negative, you spread negativity around the room." But there's a different approach to handling unwanted outcomes, he adds. "If something happens that is not good and you go: 'Wow that's disappointing. How do we deal with that?' you've already changed the language. It is more positive, your body language is more positive, the mood in the room is more positive. You're already on the way to surviving, being resilient, recovering."

To Beswick, mentally preparing to win comes down to this: "Every day, you're making a choice: Am I a fighter or am I a victim? You've got to take care of yourself and you've got to be ready to deal with setbacks, not react negatively." It's a lesson that was writ large in that now legendary 1999 Manchester United match. Even if you have only three minutes left after fighting for the full 90, and everything is telling you that you've lost, there is still everything to play for. And win. ■

Change your story

1 Define the moment
Take control of your story and own it rather than letting it own you.

2 Set no limits
Train yourself to face a new challenge with the response: How can I best deal with this?

3 Check your attitude
Stop making excuses or blaming. Notice when you naturally do this and think how you can take responsibility.

4 Be a winner
Next time you feel overwhelmed or out of control of a situation, take a timeout and reframe your narrative to write yourself as the winner.

5 Find your "why"
Define what is important in your life and set goals to take you there.

THOUGHT LEADERS SERIES

A *TÊTE-À-TÊTE* WITH

Gary Hamel

The famed strategist and management innovator thinks business leaders should lean into our age of upheaval. That means breaking free of bureaucracy and empowering organizations to be as nimble as change itself.

BY ***Neelima Mahajan***
ILLUSTRATIONS BY ***Nigel Buchanan***

Why do you think change is so hard for organizations?
Deep change almost always happens in a crisis. The pathologies and the disabilities that you see in organizations have deep roots. If we're going to build fundamentally more capable institutions, we have to change the very DNA of our companies. In the early development of industrial bureaucracy, they were trying to solve a very specific problem: efficiency at scale and maximizing compliance. You had to take all these handmaids, farmers, craftspeople, etc. into factories and they had to show up on time and be as reliable as the machines around them. Unfortunately, that's not really an advantage that pays off today. You still need compliance and predictability in certain areas, but it is no longer a differentiating advantage in most industries.

Bureaucracy was a product of its time. If you go back to the late 19th century, the average employee was illiterate and information was expensive to move. The hierarchy is largely just a way of consolidating information. In a hierarchy, only the person at the top has the full picture. Today, anybody can have the whole picture. One hundred and twenty years ago, management was a rare skill so we created business schools to train this new role called manager. But management as a skill set is no longer differentiating.

Just trying to change practices and processes is not going to be enough. You reach a point where you can't get a nonlinear gain in performance without going back to the first principles and paradigmatic beliefs. A lot of this is like putting a tutu on a dog: It doesn't make it a ballerina.

What do you think about the levers that govern competitive strategy today? Have the criteria and competencies that make an organization stand out on the market changed over the years?
As you look at change, the challenge is always to ask: What are the pivots; ⟶

Available online
Watch the video interview with Gary Hamel online
rolandberger.com/en/hamel

Change management

Gary Hamel has been at the London Business School for 30 years and is the director of the school's Management Lab. With C.K. Prahalad he was the initiator of groundbreaking concepts such as "strategic intent" and "core competence." His most recent bestsellers, *Humanocracy* and *What Matters Now*, offer new paths to align management with the future of business.

what are the deeper things that don't change; what are the changes that are trivial and are passing; and then, what are the changes that are very significant? Most of what C.K. Prahalad and I wrote about these are still very important, the idea of core competence.

Apple understands core competence: It's taken its capacity, design and software-hardware integration and it's just used it in product category after product category. It's also built new competencies. Over the last 12 years, they've built an internal capacity for chip design that is probably now the best in the world. Look at the commitment Tesla made to understanding battery technology and autonomous driving. These are very complex skills and the rest of the global auto industry is now struggling to catch up with all of this.

The things that we argued about many years ago that drive competitiveness and aspiration are all still true: deep and world-class capabilities, resilience, the capacity to reinvent and reimagine the company if circumstances change. The expectations of the people coming to work have changed.

If you are my age, whether it was business, government, education or religion, it all looked like a hierarchy. Now, you have the generation that's grown up on the web and they think of social relationships as a network. If you have followers online, it is because people chose to follow you, not because you could order them to follow you. You put out an idea and let the crowd decide whether it makes sense or not. That is a fundamental, irreversible shift. But if you've grown up and you've been shaped by those realities, you will never change as a person.

So, if I grow up with that belief that you're a leader only if people are willing to follow you, and now my boss is using the big stick of hierarchy, you've just lost me. For many large companies, if they want to attract the best talent in the world, they're going to have to rethink how they lead and manage because the old model is simply going to drive the best people away.

The other thing that's changed is the velocity and the complexity of the environment. A business like TikTok can win a billion customers in 12-24 months. That's never happened before in human history. Think about the amount of VC investment going on around the world and the number of people who are trying to rethink health care and financial services has never been higher. One of the most important questions for the institution is: Are we changing as fast as the world around us?

That bar is going up all the time. How do you attract the best talent in the world, given their expectations have changed dramatically? How will you build an organization that changes as fast as the world around it when that is accelerating? That problem is not one that's going to go away – and those things require radical solutions. No

How to overcome ADD: ambition deficit disorder

1. **Set a big goal**
Plotting your growth as incremental steps over the year before can only take you so far. Why not set out to beat your competitor? This is strategic intent.

2. **Work backward**
Once you've set an ambitious goal, you can set challenges to focus on building the competitive advantages you will need over the near to medium term.

3. **Free up thinking**
When you no longer trim your ambitions to match perceived limitations, you can start to reimagine how to reach goals that once seemed unattainable.

amount of tweaking at the margins in organizations is going to solve that.

You once said you don't see leaders today as the authors of strategy but rather as the editors of strategy. Why? Do you see an ideas deficit or a lack of ambition here?

Both. There's certainly an ideas deficit. The quality of any strategy is going to be largely dependent on the number of options and alternatives you generate in the first place.

If I take Silicon Valley as a metaphor for every company that's a success, you have hundreds that fail. If I want to find a game-changing idea, I have to generate a lot of options; you have to kiss a lot of frogs to find your prince or princess. Unfortunately, the traditional planning process is not very generative: It does not create a lot of new and interesting unconventional ideas. That's why whenever I do a strategy project in a company, it's completely open. We ask every single employee. We teach them how to think like innovators: How do you spot emerging trends; how do you think about your company's core competencies; how do you get at the unarticulated needs of customers, the deep anxieties, fears and needs? And out of that, what opportunities do we have? So, in a company of any size, I would want to create 2,000-3,000 strategic options.

And this is where the editor part comes in. Then, you look across those and you start to find the patterns: "If we go that way, it makes us more of a services company" or "this would take us in another direction." When you do it that way, you still have to build a strategy out of real insights. And once you can see a few hundred ideas that all cluster closely together, you are going to be very confident.

We did this a few years ago with Adidas in North America: One of the things that suddenly emerged was that they never took women seriously as a consumer group. Their strategy was "shrink it and pink it," which meant make it smaller and change the color. When you have an industry run by men, unfortunately, these things happen. If you create a strategy using only the imagination at the top, you'll miss every substantial opportunity.

> **"Just trying to change practices and processes is not enough. This is like putting a tutu on a dog: It doesn't make it a ballerina."**
>
> **– Gary Hamel**

How do you think the nature of strategy life cycles has changed?

You need a strategy that's robust enough to survive and make sense under quite a few different contexts. What's most important now is that you have that three-to-five-to-10-year view like Tesla, and then you have huge velocity, a lot of resilience over the next few months, and the ability to pivot and move quickly. So strategies need to be a little broader and more robust. Maybe you still need specifics, but the specifics are going to be for the next 12 months, not for what you're doing three years out. I believe those are the two critical time frames.

Don't wait for a feeding tube

All strategies have a life cycle, yet many organizations wait until they're on life support before contemplating change. But just because your strategy looks like it has a pulse doesn't mean it's not already dead. Be proactive and check if it may have reached its expiration date.

Technological innovation is accelerating. Has management innovation kept pace?

No. If you look back through history, organizational innovation always lags behind technology innovation because organizations are embedded in human systems and in power structures, and they're very difficult to change. Our organizations are probably 50 years behind where our technology is. The ATLAS detector at the Large Hadron Collider at CERN had 6,000 engineers and scientists that worked together. Almost none of them are co-located. They had an incredibly organized community. On the paper that announced their findings, there were 6,000 names. That kind of collaboration 20 years ago was just impossible. The most recent Linux version has more than 25 million lines of code and was created by 15,000 contributors. Technology is making possible organizations that are far more horizontal and way less vertical. But if you look at how large companies are using technology, they're using Slack and Microsoft Teams to try and raise the productivity of white-collar work or teams. How many organizations are using open innovation platforms to create a strategy? Almost none. ■

Unlocking value with purpose

Strategy and organizational growth expert Ranjay Gulati explains how meaningful engagement can unlock your potential for high performance.

INTERVIEW BY **Neelima Mahajan**
ILLUSTRATIONS BY **Sasan Saidi**

Ranjay Gulati is a professor of business administration at Harvard Business School. His latest book, *Deep Purpose*, explains why companies need to view purpose as an "operating system for the enterprise."

How can an organization embody purpose in a way everyone can get and act on?

People get stuck on the idea that a purpose is a mission statement. As Microsoft CEO Satya Nadella says, the mission statement is the starting point, not the end of the purpose journey. The hardest step is making it personal: How do you get people to connect with it in a meaningful way? Some companies took a radical step and said they needed to get employees to think about their personal life purpose – if they haven't thought about their own life purpose, how are they going to connect to a company's? Unilever had 60,000 employees go through life purpose training. BlackRock did that for all their employees.

How does culture intersect with purpose?

In the crazy turbulent times we're in right now, you need some constants around which you can build and grow your business. Culture provides behavioral mileposts. Purpose provides the North Star and existential milepost. Both of these work in support of each other. If you're going to shape your purpose, you're going to also work on your culture.

Can you spot if a company is purpose washing?

In a transparent world like we're in today, customers can sniff this out. You'd be better off not having a purpose statement than one that is duplicitous or misleading. Organizations can unlock tremendous potential with their purpose, but they can also do themselves damage if they're engaged in purpose washing. Purpose unlocks economic and social value, employee productivity, supplier partnerships, employee morale and connection to your community. Purpose is good for business. ■

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→ PAGE 40

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Published in May 2024
ISSN 2628-2895

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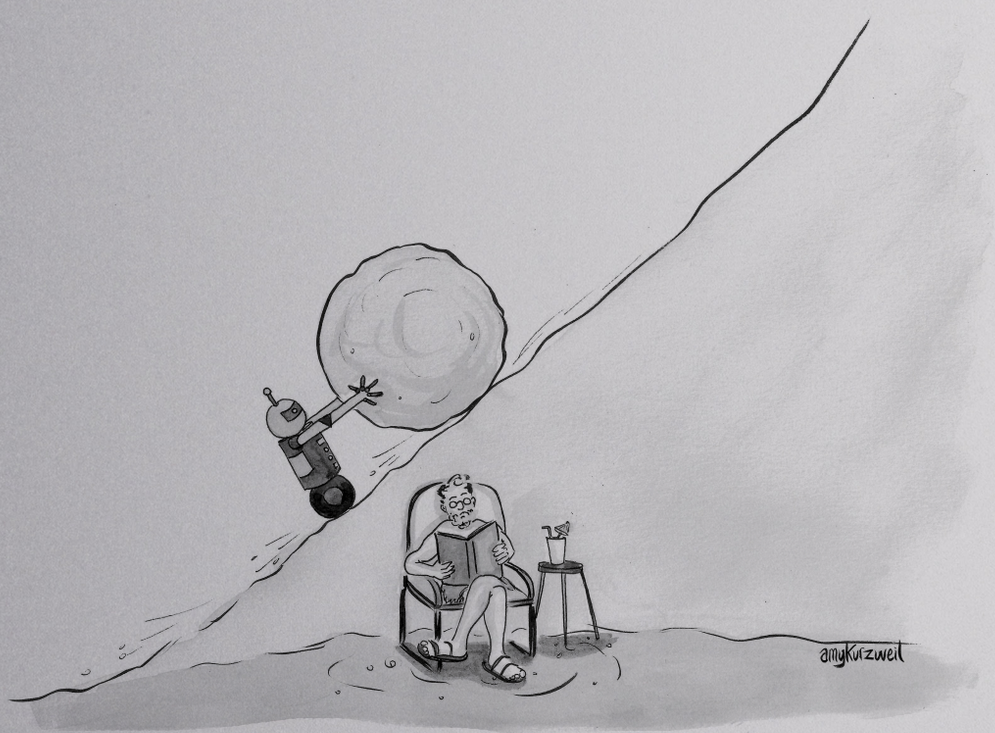

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