

Think:Act

navigating complexity



Think:Act #26 11|2018 ON BEING HUMAN

ON BEING HUMAN



Organized crime goes online How the mafia has embraced digitalization

Flex your mental muscles Is automation a threat for the human skill set?

Roland
Berger



"Robots cannot improve processes. Only people can do that, and that is why they are always at the center of our attention."

MITSURU KAWAI
Head of manufacturing
and executive vice
president of Toyota

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PHOTO: BEN WELLER



"We need the humility to recognize that we're at our best as people when we're being empathic and talking together."

SHERRY TURKLE
Pioneering researcher in the field
of human interaction with technology

→ PAGE 66

PHOTO: BOSTON GLOBE/GETTY IMAGES

"Organizations change if they are serious about it. And change doesn't actually take that long and it doesn't cost that much money."



JEFFREY PFEFFER
Organizational behavior expert and author of *Dying for a Paycheck*
→ PAGE 42

PHOTO: WINNI WINTERMEYER



"Ever since the first caveman sharpened a flint, humanity has defined itself by its capacity to equip itself with tools to manage its environment. The coming era will be no different."

CHARLES-EDOUARD BOUÉE
CEO of Roland Berger
→ PAGE 22

PHOTO: VINCENT BOISOT/RIVA PRESS/LAIF

Think:Act 26

In focus

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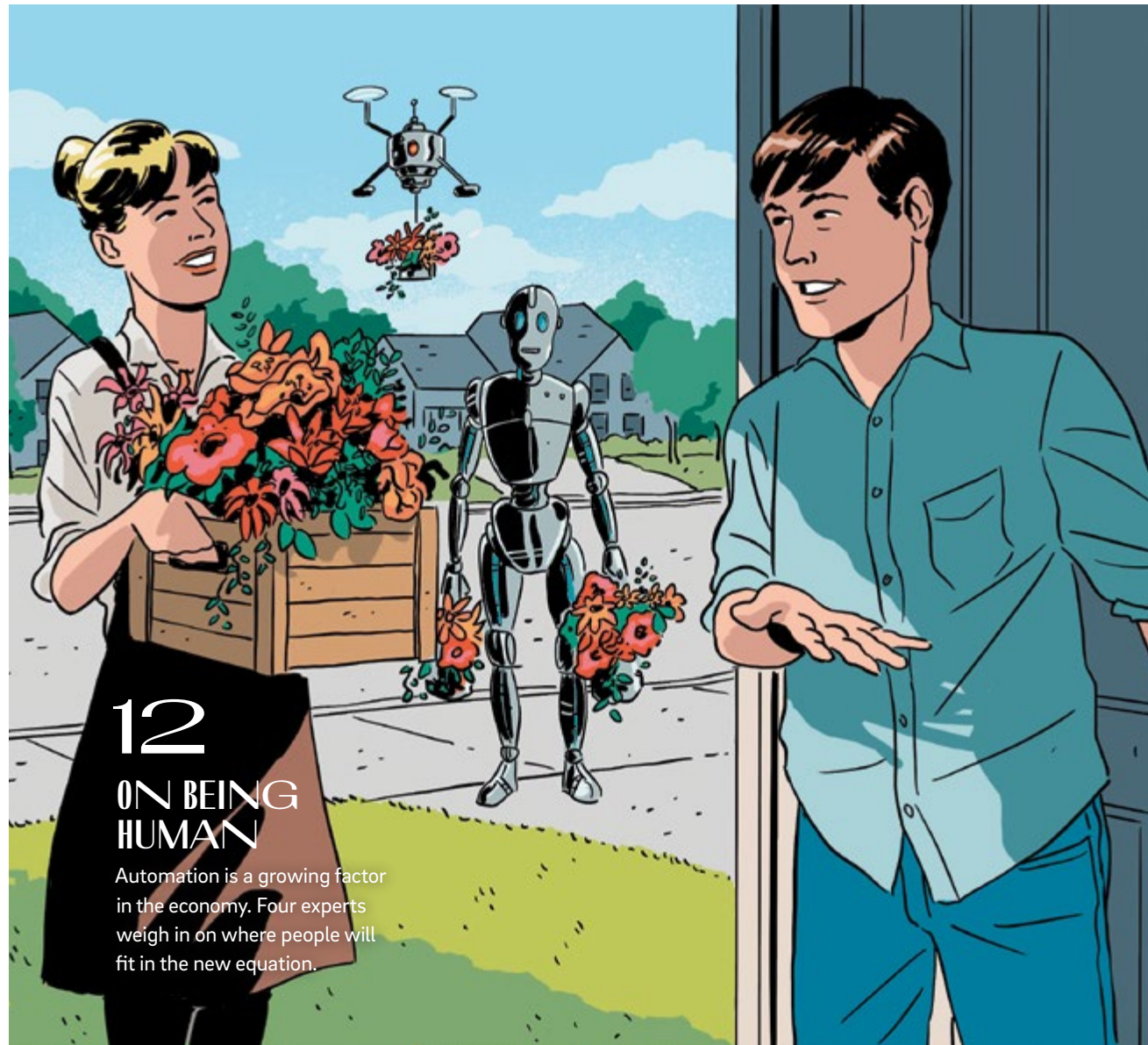
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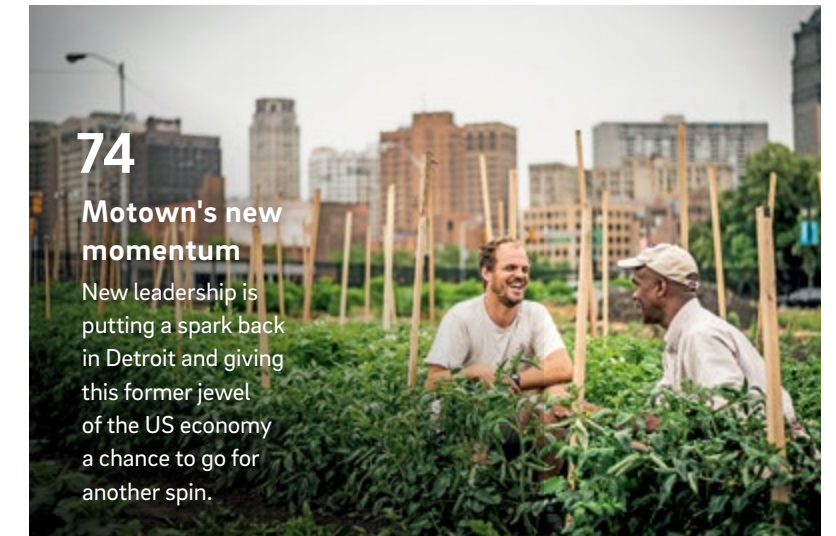
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COVER + BACK COVER ARTWORK: JACK RICHARDSON/DIE ILLUSTRATOREN | PHOTOS: HARVARD GRADUATE SCHOOL OF EDUCATION; RONALD PATRICK; BEN WELER; MALTE JÄGER/LAIF | ILLUSTRATION: JACK RICHARDSON/DIE ILLUSTRATOREN

Wide angle

Think, act and stay informed



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Think:Act online

To read uncut versions of our Sherry Turkle and Jeffrey Pfeffer interviews go to: www.rolandberger.com/tam



Think in numbers

PUTTING A FIGURE ON...

WOMEN BUSINESS LEADERS

23

THE NUMBER OF WOMEN serving as CEO on the Fortune 500. Roughly 5% of the Fortune 500 companies are now run by women. In fact, your company is more likely to be run by a man named James than it is to be run by a woman.

17.1%

OF BOARD SEATS are held by women worldwide. Less than one in five board seats of the 2,780 companies in the MSCI All Country World Index is held by a woman.

<5

THE AVERAGE PERCENT representation of women on boards in Asia. The three countries with the most women on their companies' boards are European countries where representation is now mandated - Norway has 46.7%, France is on 34.0%, and Sweden is close behind with 33.6%.

SOURCES: GLASS CEILING INDEX (THE NEW YORK TIMES, APRIL 24, 2018); WOMEN ON BOARDS AND THE HUMAN CAPITAL CONNECTION, MSCI, MARCH 2018; THE CS GENDER 3000: THE REWARD FOR CHANGE, CREDIT SUISSE, SEPTEMBER 2016

Food for thought

Should robots have human rights?

BY Joanna Bryson

IF WE DESIGN ROBOTS such that they need human rights, then we will be doing both the robots and our fellow humans and animals a disservice. Rights are the means by which we attempt to negotiate decent behavior between equals, and they are often violated.

Robots can never really be our equals since we construct them intentionally, designed from first principles (not just a vaguely intentional act as with copulation). Also, artifacts are products, so if we were to build them in such a way that they required even near-equal status, we would - in the unlikely case we built robots that could suffer - be doing so only for us to feel superior to something.

Fortunately, no extant AI is in this condition, and we have no reason to build something that would be. For example, we can just be sure AI is always backed up so it does not need to fear extinction. But more importantly, there is no

coherent and safe way in which we can make suffering a part of safe, well-constructed intelligence, so we should not rely on things like justice and rights in our attempt to incorporate AI into our society. There is a concern that we should offer robots (and even statues) human rights so that we don't stop offering the consideration of rights to other humans that the robots remind us of. In the UK, we address that concern the opposite way, by making one of the five principles of robots the principle that it is unethical to make robots appear human.



JOANNA BRYSON is an associate professor of computer science at the University of Bath specializing in AI, ethics and collaborative cognition.

PHOTOS: ROBERTO CACCURI/CONTRASTO/LAIF, OECD / HERVE CORTINAT

Think: Act AT A GLANCE

Thoughts to live by

"The three great essentials to achieve anything worthwhile are: hard work, stick-to-itiveness, and common sense."

— Thomas Edison Inventor and visionary

Re-thinking buzzwords

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



"Servitization"

In the old days companies made things and service providers serviced them. Then "servitization" came and blurred those boundaries. The concept is simple: offer services beyond supply. That's just added value, you say. No, it's more than that. Servitization of say, tires, could mean contracting out tires by the kilometer to a logistics company instead of selling them; the service replaces the product. So get servitizing - it could improve your customer relations and your profits.



Guess what? The world is better than you think.

Too busy to read the hot new books? We've got it covered for you. Here's Hans Rosling's Factfulness cut down to the bare essentials.

IN MANY WAYS, things are better than you think. The proportion of the world living in extreme poverty has fallen by nearly half in the past 20 years and average life expectancy is up to 72 years. If you didn't know this, you're not alone. In Factfulness, the late Hans Rosling argues that most people don't have a clear idea of the world's actual degree of development.

There are a number of reasons for this, but the biggest is that human beings have a strong instinct for drama and an instinct to notice the bad more than the good, which is perhaps a leftover from Neanderthal days. In fact, most problems have multiple, interacting causes.

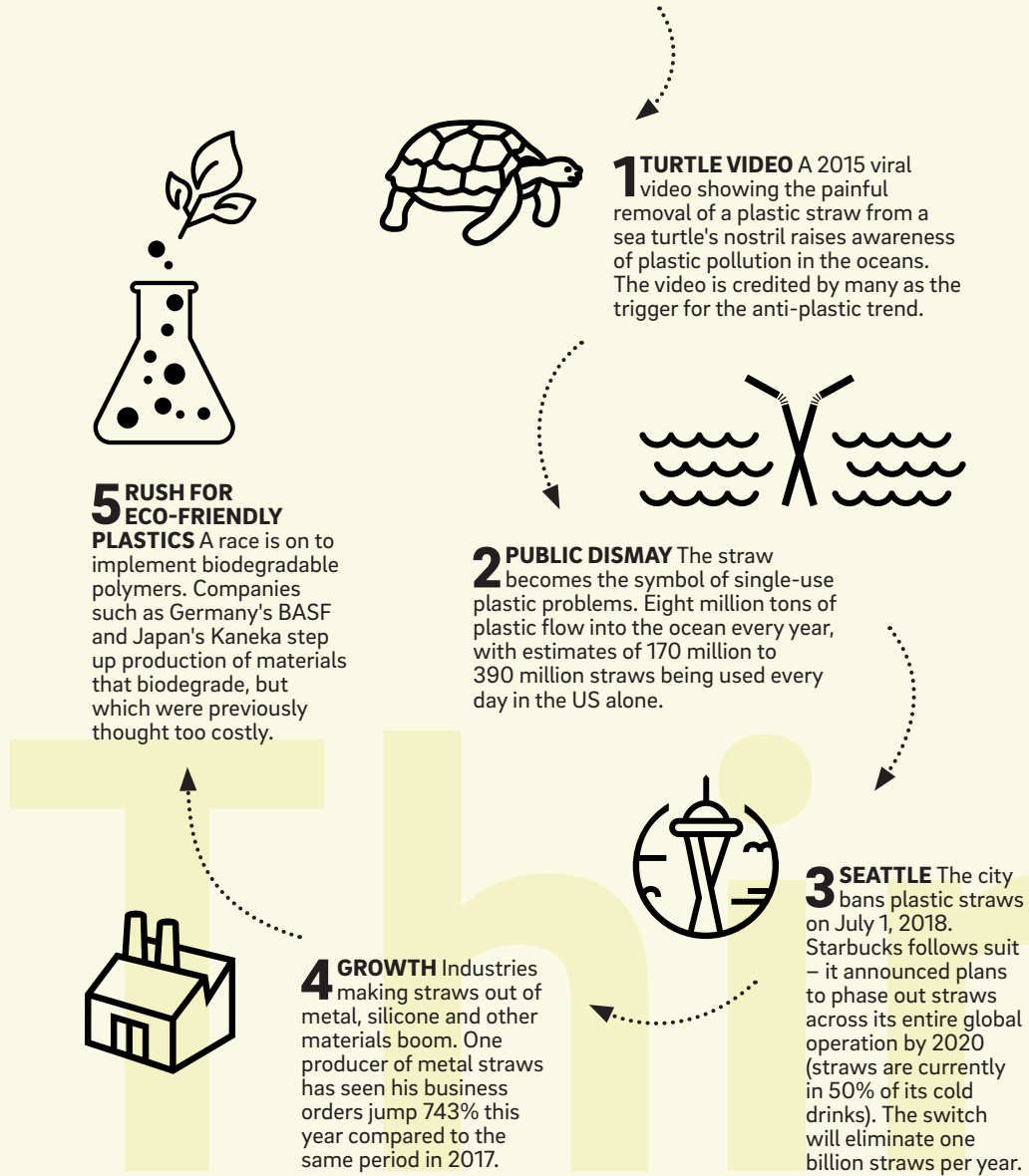
It's true that there are many real things to worry about – global warming, pandemics, the risk of World War III, and more – but you can't really tackle any of them without a deeper understanding of how things are and the actual odds we face. Don't be an optimist or a pessimist, be a possibilist – someone who tries to look at the world clearly and understand how things can be changed for the better.

→ *Factfulness: Ten Reasons We're Wrong About the World – and Why Things are Better Than You Think* by Hans Rosling



THE LAST STRAW

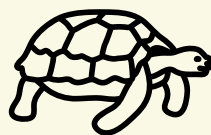
After a viral video featuring a sea turtle raised awareness of plastic pollution, the movement against single-use plastic has been steadily growing and plastic straws are a target. We could be clutching at straws, though, because eliminating them will not solve the problem – they comprise a tiny percentage (0.025%) of ocean plastic waste. Here we suggest how that sea turtle's misfortune played a part in the race for biodegradable polymers.



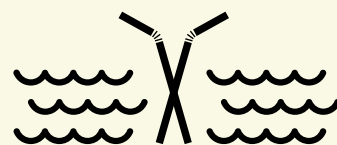
5 RUSH FOR ECO-FRIENDLY PLASTICS A race is on to implement biodegradable polymers. Companies such as Germany's BASF and Japan's Kaneka step up production of materials that biodegrade, but which were previously thought too costly.



4 GROWTH Industries making straws out of metal, silicone and other materials boom. One producer of metal straws has seen his business orders jump 743% this year compared to the same period in 2017.



1 TURTLE VIDEO A 2015 viral video showing the painful removal of a plastic straw from a sea turtle's nostril raises awareness of plastic pollution in the oceans. The video is credited by many as the trigger for the anti-plastic trend.



2 PUBLIC DISMAY The straw becomes the symbol of single-use plastic problems. Eight million tons of plastic flow into the ocean every year, with estimates of 170 million to 390 million straws being used every day in the US alone.



3 SEATTLE The city bans plastic straws on July 1, 2018. Starbucks follows suit – it announced plans to phase out straws across its entire global operation by 2020 (straws are currently in 50% of its cold drinks). The switch will eliminate one billion straws per year.

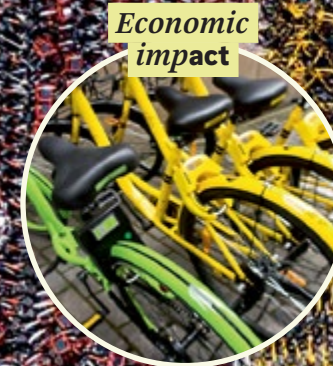
SOURCES: HALBERTO GONGORA, ALEXANDRE, BOMSYMBOLS, ROGUE ONE, FARIAS / THE NOUN PROJECT



How to... be more human at work

BEING SMART ISN'T ENOUGH. To be a successful leader, you need to be emotionally smart too. According to Harvard Business Review's new four-volume Emotional Intelligence Series, recognizing, understanding and managing emotions at work is "critical to leading effectively." Other "EQ" proponents offer similar advice, which usually includes starting with some self-assessment. Without a bit of self-reflection you won't be able to make the first steps towards self-control, which is key in being able to control your thoughts – which in turn will have a direct effect on your emotions and their influence on others. With practice your EQ will help you develop relationships and cope with stress – and you will have learned how to be human at work.

Resources for further reading: Working With Emotional Intelligence by Daniel Goleman; HBR's Emotional Intelligence Series; EQ Applied by Justin Bariso.



Life cycle of bike sharing

IT SEEMS LIKE A GREAT IDEA: Download an app, find a bike that's conveniently nearby and you're on your way – making use of clean transport that's faster than cars in many urban centers. You even get some exercise while you're at it. But there's a darker side of dockless bike sharing that can already be seen in China, one of the first markets the business model took by storm. With users able to leave the bikes anywhere they want, authorities have been forced to remove abandoned bikes clogging city streets and impound them to "bicycle graveyards" like this one in Shanghai. And that doesn't even take into account the bikes left over from businesses that go bankrupt. This aerial view shows how bikes have become a sign of waste rather than of sustainability.

Act

AT A GLANCE

In focus



In this issue we take a close look at what it will mean to be human in our changing world.

ON BEING HUMAN

BY **Janet Anderson**

ILLUSTRATIONS BY **Jack Richardson**



The world is going through profound changes that are being driven by rapid advances

in technology, globalization and changing social attitudes and demographics. As robots become more sophisticated and artificial intelligence encroaches ever further into spaces traditionally the preserve of humankind, people are asking themselves: Where will humans fit in? And what skills should humans focus on in order to compete successfully in the job market of the future?

At the same time, people are demanding more of the work world. How do businesses give their employees a sense of purpose and belonging while introducing innovative technologies that replace people? Progress does not come without a price and many already feel overwhelmed by the constant demands of communications technologies.

How do we find the time to do what humans do best – to be creative, compassionate and courageous? How will we prepare for longer lives and longer careers and what will the impact of these changes be on society? At a juncture where many are beginning to ask these questions, we turn to experts from four different fields to help us work towards answers about what it will mean to be human in our changing world.



Lynda Gratton
Professor of management practice at London Business School and co-author of *The 100-Year Life: Living and Working in an Age of Longevity*

THE CORPORATE PERSPECTIVE

ON BEING HUMAN

Companies want to understand today's landscape of change – what will happen to technology, what happens as people age, how changes in family structures impact work, what it is to be human in an age of machines and what people want from work. It's a complex narrative that's changing quickly.

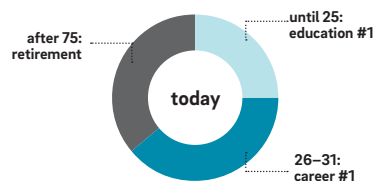
Well-being is now a big topic. Many jobs aren't designed with humans' needs in mind. Humans can do them, but they get sick and unhappy. So how do we design jobs that humans enjoy and that keep them healthy and vital? For example, we want to see our children, spend time with our friends, and take time off to regain energy. How do we encourage flexible working and make it work? Encouraging men to take paternity leave is a big issue: If you are going to live for 100 years – which is increasingly likely – and you're only going to have two children, wouldn't it make sense to spend some time with them? Tackling that sort of issue is crucial.

How should businesses prepare? The starting point has to be building a conversation within the organization about the future, for example, by engaging with the young people and asking them what's important to them. Senior executives have a view of the future, but young people don't necessarily see their future in the same way. You need to dive into your organization and find out what's happening to help you understand what people are thinking, what they are worried about.

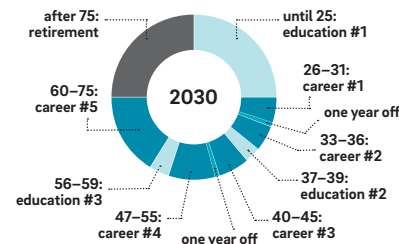
In the future, most people will be working with some kind of robot or AI. Some of the tasks people do are going to be carried out by machines and some will be augmented by them. Businesses need to make it clear to people what is going to happen

How the cycle of work is likely to change

The current work life cycle, in years:

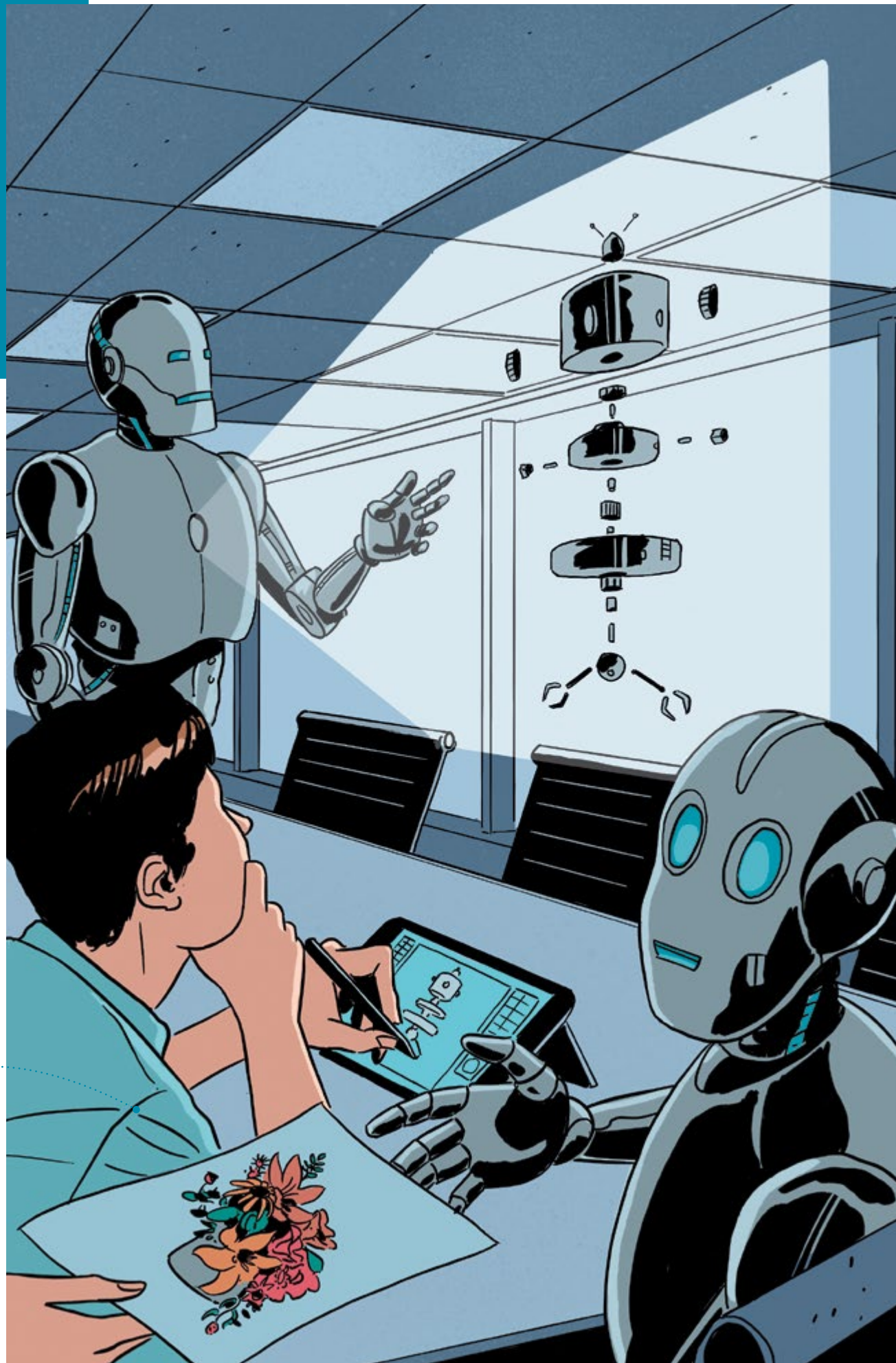


One possible future extended work life cycle, in years:



SOURCE: INTERVIEW WITH LYNDA GRATTON

OPTIMIZING SKILLS
A comforting view of the future is where human and robot skill sets are used to the best advantage.



so that they have time to prepare. They need to train people to help them make that leap and, most importantly, reconfigure their jobs to work out which parts the machine can do best and which the human should do. It is better to be open and to support people to make the transition, whether that means moving out of the job or retraining.

There will always be some human skills that no machine can replicate, like intuition, empathy, complex collaboration and creativity. Good customer service can only be provided by a human – no machine in the world can recognize what is happening to someone's face or voice as well as a person can.

Above all, we have to prepare for the fact that people are living longer. If you live to be 100 years old, you move from a three-stage life of full-time education, full-time work and full-time retirement to a multi-stage life where you do many different things. There will be important identity issues to address around this. What does it mean to still be working into your 70s? How do we see career progression if you are just as likely to move laterally as upward, completely retrain, or take a break? How we see work and careers is going to change fundamentally. We have to be ready for this.

ON BEING HUMAN

↓
"GOOD CUSTOMER SERVICE CAN ONLY BE PROVIDED BY A HUMAN!"

5

= the number of different careers a person who lives to 100 might have.





Jerry Kaplan
Adjunct professor at Stanford University, serial entrepreneur and bestselling author of Artificial Intelligence: What Everyone Needs to Know

THE SOCIOECONOMIC PERSPECTIVE

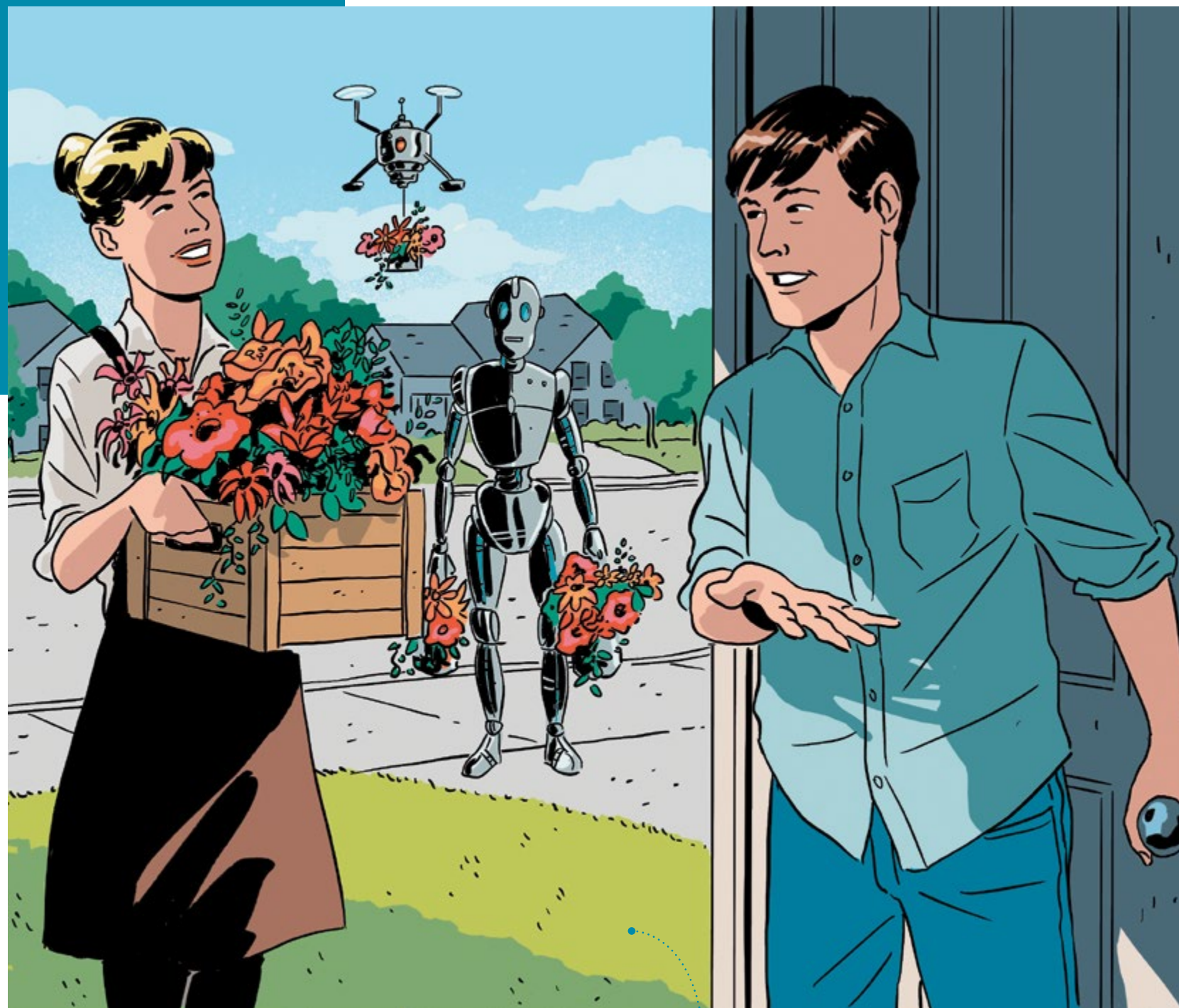
We have a sense that the rate of change is accelerating. The truth, however, is that it is no different than we have seen in the past – particularly in the labor market. The more alarming projections say that up to 50% of today's jobs will go away in the next 50 years. But if you go back 50 years, half of the jobs that were available back then are gone. Yet here we are, currently at full employment.

I'm not expecting a major job apocalypse, but that's not to say we won't have issues: One will be the need to retrain people. But there are ways of dealing with that. It's a problem we've had over the past several decades. The kinds of changes we will see in the future are very similar as we continue to automate new classes of work and activity. Artificial intelligence is just a new wave of automation.

A lot of the fear that people have is based on hype. The biggest example of this is autonomous driving. I think it is going to take a lot longer than people realize for a fully autonomous car to be sitting in their driveway – I don't expect to see that in my lifetime. That said, we will see significant changes. For example, big trucks that run on highways are very automatable and that will put people out of work. Agriculture will also change. But I think that the workers it will displace can easily be picked up in other parts of the economy.

In the future, it will be skills that involve human interaction – the ability to persuade people, to connect with them, how likeable you are – that will be more valuable. Another shift we are going to see is that a higher premium will be paid for things that involve a great deal of skill or human attention and labor. Handmade items will become much more prized.

ON BEING HUMAN

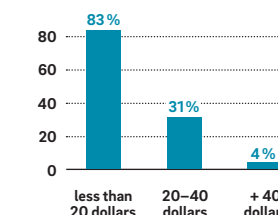


↓
"ARTIFICIAL INTELLIGENCE IS JUST A NEW WAVE OF AUTOMATION."

IN HARMONY
Robot workers need not herald a dystopian image of what's to come, they could be happy helpers to make your job much better and more enjoyable.

↓
The probability of automation depends on the job

By median hourly wage:



SOURCE: US BUREAU OF LABOR STATISTICS; FREY AND OSBORNE (2013); CEA CALCULATIONS

As automation makes us wealthier, categories of jobs that are regarded as luxuries today will be in greater demand – like getting a massage or a flower arranger coming to your house. Individuals will be able to make a good living in ways that were not possible in the past. We will see a lot of artisanal opportunities, skills that we currently think of as hobbies becoming professions. There will be more need for hospitality. Those skills will be important. We are not facing mass unemployment or social unrest, but the educational system is not as responsive to change in vocational training needs as it should be. We need to find ways to tighten up that feedback loop between education and the skills people will need.

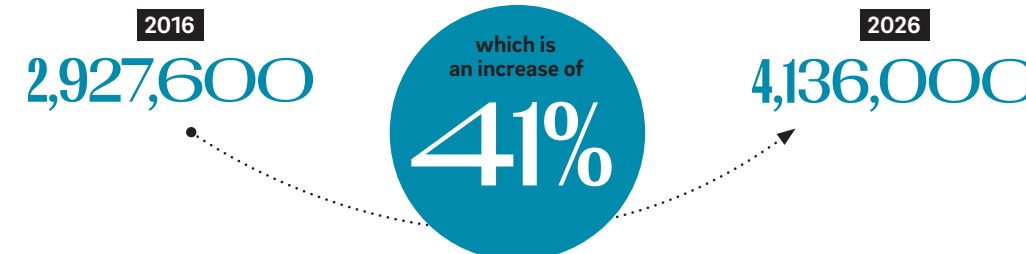
My advice is: take a deep breath. The future will be much like the past in terms of its trajectory. These things sound alarming because people believe that the only jobs that will be available will be the kinds that we have today, and that's not true. It's very clear that new jobs will come about and most of them are in plain sight today – they're just smaller now than they will be in future.

ON BEING HUMAN

Changing jobs in the US

While automation replaces jobs in some industries, it will lead to growth in others. Just look at the number of jobs in home health and personal care in the US:

SOURCE: US BUREAU OF LABOR STATISTICS, FORECAST 2026





Susan David

Psychologist on the faculty of Harvard Medical School, co-founder and co-director of the Institute of Coaching and author of Emotional Agility

THE PSYCHOLOGICAL PERSPECTIVE

Organizations today are being faced with unprecedented complexity, driven by forces such as competition, globalization and technology. With these conditions comes the need to be agile, or be able to adapt and flourish in changing circumstances. Every organization is calling for greater levels of agility in the face of this complexity. However, we have to recognize that organizations themselves can never be truly agile unless the people who work within them are agile – and more specifically, emotionally agile.

We know that the way human beings deal with their inner worlds drives everything, so it is important for business leaders to recognize that human beings are *human beings* – and that means they have a full range of emotional experience. But when you are emotional about something within the workplace environment, it's almost like people don't have the time to deal with the issue, neither

REDUNDANCY FEAR

A major anxiety is that your work will be replaced, and the robots who take your place won't have the emotional intelligence to see you struggling.



↓

"IT'S ALMOST LIKE OUR BRAINS HAVEN'T EVOLVED EFFECTIVELY TO TOLERATE AND DEAL WITH THE SPEED OF CHANGES."

A recipe for emotional agility in the face of constant change

1.

Do not ignore difficult emotions; face them willingly, with curiosity and kindness.

2.

See yourself as a chessboard, filled with possibilities, rather than as any one piece on the board, confined to certain preordained moves.

3.

Your core values provide the compass that keeps you moving in the right direction. They are the true path to willpower, resilience and effectiveness.

4.

Find the balance between challenge and competence, so that you're neither complacent nor overwhelmed. You're excited, enthusiastic, invigorated.

the person going through the issue nor those around them. Depression is one of the biggest issues, yet we are emotionally rigid in our responses as managers. At work, we want our employees to behave a certain way and we base this upon the values of the organization. However, this behavior is not consistent with human beings and human agility. Demanding only positive emotion, that people be upbeat or that everyone be onside with change actually crushes the ability of the organization to be agile and adaptive. People don't want to try because they don't want to be disappointed or fail. Yet this is part of the emotional experience. And while organizations very often demand values, there is no true bringing about of values unless employees are able to internalize them for themselves.

Ironically, the very qualities needed in complex contexts are undermined by that same complexity. So, rather than being tolerant of ambiguity – remaining clear-headed, inclusive, collaborative and innovative – complexity drives the opposite. Employees are more likely to become transactional, make rash decisions, shut down and feel stress, panic and guilt. We live in a society in which there is so much change, so much technology and a huge amount of ambiguity – it's almost like our brains haven't evolved effectively to tolerate and deal with the speed of these changes in the way that we need to. We need emotional agility today more than ever. We need the ability to sit with our emotions, to recognize that emotions pass, to be able to label emotions and develop strategies around emotions.

When organizations "show up" and create spaces that are psychologically safe without scapegoats, that's when you know you are building a stronger culture. That's because there is no innovation without the discomfort for potential failure. People want to be inclusive, relational and collaborative. When they can bring their entire selves to work and be courageous, compassionate, curious – all things that machines cannot be – this is when authentic agility and happiness truly happens. When leaders help people to surface their own values, this is where the depth lies. When you think of your organization, think of the essential humanity of the people you work with.



Thomas Malone
 Information technology professor,
 founding director of the MIT
 Center for Collective Intelligence
 and author of Superminds: The
 Surprising Power of People and
 Computers Thinking Together

THE NEW PERSPECTIVE

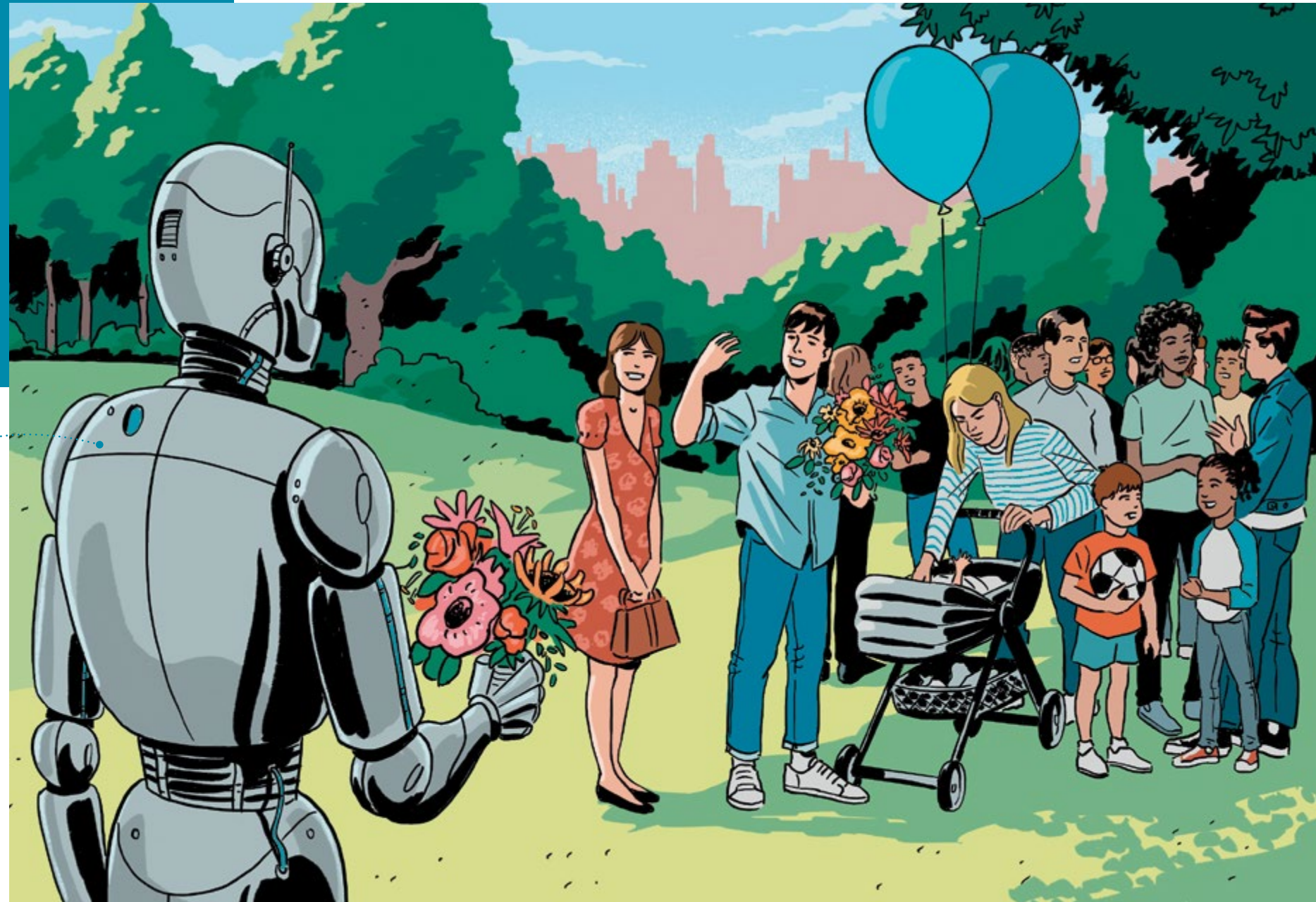
ON BEING HUMAN

Humans have always been part of groups. From our hunter-gatherer beginnings, being part of a group was an important part of what it meant to be human. In fact, it is only in groups that we humans are smarter than the rest of the animal kingdom: Individual humans alone are somewhere in the middle of the food chain.

One word for these groups of humans is "superminds." Superminds composed of humans have existed for thousands of years, but we don't usually think of ourselves as parts of superminds. And now we are being joined in our superminds by computers that can do some of the things that only humans could do in the past. These human-computer superminds come in many different shapes and sizes, including corporations, global markets, scientific communities and local neighborhoods. Technology makes it possible to have much bigger and more deeply integrated groups; to connect people to other people and to computers at a scale and in rich new ways that were never possible before. This is what I call "hyperconnectivity," and it's still hard for us to imagine the full implications of this hyperconnectivity.

As technology makes superminds smarter, they can help solve a range of societal and business problems, including corporate strategic planning, product design, creating more responsible democracies, dealing with climate change and preventing terrorism. How can we ensure the outcome is good? I don't think we always can. Just as some smart people do evil things, some superminds do bad things, as well. We can't guarantee this won't happen, but we can increase the chances that superminds will do things we think are good by following three principles.

CO-WORKER STATUS
As we become more habituated to working with AI, it's possible that we will look on our new co-workers with affection and want to include them in our lives.



⬇️
 " ... ALL I'M SAYING IS THAT WE ARE ALSO PARTS OF POWERFUL HUMAN GROUPS LARGER THAN OURSELVES. "

First, we should design superminds sensibly. For instance, we should avoid situations where computers make superminds more stupid, like when fake news makes democracies less smart. Second, we should learn to choose more wisely which superminds to use for which tasks. For example, markets are good at allocating resources efficiently to achieve goals that have market prices but communities are the main repositories of what we consider ethical. Recognizing this can help us choose between markets and communities for achieving our goals. Third, we need to exercise individual wisdom in choosing which superminds to support. In the ecosystem of superminds, the ones with the most members are often the ones



Specialized vs. general intelligence
 IBM Watson beat humans in Jeopardy but couldn't play tic-tac-toe.

that become most powerful. By participating in the superminds most closely aligned with our values, we can, collectively, have a huge effect on which superminds win in the long run.

Who should be held accountable for outcomes created by a supermind? This is like asking who is responsible for the results of an election. No single individual is responsible; whole groups are. What we need is a new perspective, a more innovative and systematic way of thinking about how to solve problems. And I think seeing the world in terms of superminds gives us such a perspective. Superminds run our world, and if we want to increase our chances of getting the outcomes we want, we need to learn how to use them effectively. ■

A new way of looking at the world

Adjust
 Move from thinking about "people vs. computers" to "people and computers."

Look deeper and further
 We are already surrounded by groups of people and computers working together.

The core question
 How can people and computers be connected to act more intelligently as a collective?

ON BEING HUMAN

THINK OUTSIDE THE AI BOX

How can we allay our fears and let go of doomsday scenarios? Start thinking of artificial intelligence as just another tool.



BY **Charles-Edouard Bouée**

The term "artificial intelligence" (AI) has its 63rd birthday this year. On August 31, 1955, US mathematician and computer scientist John McCarthy along with Marvin Minsky, specialist in neural networks, Nathaniel Rochester, expert in radar and computers, and Claude Shannon, inventor of the first mathematical theory of information, organized a working seminar that mentioned the idea of artificial intelligence for the very first time:

"We propose that a two-month, 10-man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve the kinds of problems now reserved for

humans and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer."

MCCARTHY AND HIS COLLEAGUES wanted to grasp the groundbreaking and controversial scientific concept of machine intelligence and address its ability to imitate human intellect even though the intricacies of how the human brain functions were still unknown at the time. Back then, many scientists were uncomfortable with the very idea of machine intelligence.

The Dartmouth Seminar played a big part in allaying some of those fears and laying the foundations for future AI research: the learning ability of machines, their mastery of language and the reproduction of complex decision trees as well as the understanding of random logic. The general idea that has proved true was that the computer, the new magical object of the 20th century, would influence how humans think and

work. The fear was that it was only a matter of time before it replaced humans for tasks that went beyond mere calculation.

By putting together two seemingly contradictory words, "intelligence" (supposed to be specific to humans) and "artificial" (not specific to human beings), McCarthy inadvertently led us to believe that human intelligence was competing with another form of non-human intelligence, potentially more powerful and therefore threatening. This "Frankenstein complex" in which man is defeated by his own creation not only fed science fiction literature and films throughout the 20th century but it also fueled our fear of AI. Thus, even though we rationally understand that the social and economic benefits from artificial intelligence will be indisputable – a drastic reduction in the number of road accidents, hyperprecision, speed and reliability in cancer diagnosis, pollution control, increase in agricultural yields – we let ourselves be intimidated by the doomsday scenarios where AI destroys jobs or accesses our personal data for malicious use.

FOR THAT REASON it would now be more accurate to talk about "human augmented intelligence" to understand the way we will be supported and equipped by artificial intelligence to make better decisions. This "human augmented intelligence" revolution will come in about a decade when portable and personal AI forms will be available for us to use on a daily basis – just like we use our smartphones. All the major AI players are engaged in this race. Within society, the effects will be massive, and beneficial. We will no longer have to hand over our data to digital monopolies in order to gain access to goods and services because our augmented intelligence, which knows our tastes perfectly well and which will not sell our data for targeted advertisements, will be able to look for the right information by itself and connect us with the relevant parties. The days of "fake news" will be over too as our augmented intelligence will be able to instantly check the information source and its reliability.

On the professional front, we will all become augmented workers, liberated from the mind-numbing tedium of most of the repetitive and low value-added tasks that we do today. That will free us up to focus on things that require creativity. By this point, there will be no doubt that human intelligence will be augmented, rather than challenged, by machines, which is probably what McCarthy and his colleagues had in mind all those years ago.

It is only natural to feel overwhelmed by this digital whirlwind. After four successive technological revolutions – the personal computer, the mobile phone,

the internet and the smartphone – the human augmented intelligence revolution is set to shake our daily lives to the core as well as our economies and our societies. Once that happens, the technological changes witnessed over two generations will have been greater than everything humanity has known until now. These evolutions should be seen as part of a long-term process. Ever since the first caveman sharpened a flint,

"THIS TIME THE CHANGES WILL BE MORE PROFOUND THAN IN PREVIOUS TECHNOLOGICAL REVOLUTIONS."

humanity has defined itself by its capacity to "augment" and equip itself with tools to better manage its environment.

We urgently need to create a positive understanding of our future in the age of human augmented intelligence. Companies will have a key role to play in this regard – because it is in these companies that AI tools will be deployed, integrating themselves, step by step, in the management systems we use every day. Our collaborators will discover how much they can gain if they let themselves be "augmented" not only as workers, but also as consumers and even as citizens. It is up to us, the business leaders, to be the ambassadors of this human augmented intelligence, by integrating this challenge in our HR process, in our internal communication, in our training sessions. Let us demonstrate that, more than ever, men and women are the masters of their destiny. ■



Charles-Edouard Bouée

Charles-Edouard Bouée is the global CEO of Roland Berger. He has written a number of groundbreaking books on modern management and China – where he lived for over a decade. His latest work, *La chute de l'Empire humain*, about artificial intelligence, was published in 2017.

MAKING SENSE OF...

ON BEING HUMAN



UNCANNY DESIGN
The world's first autonomous robot, Erica can carry on an unscripted conversation.

...THE HUMAN TOUCH

PHOTOS: CAIT OPPERMANN; TED CHIN/IBM

As AI and robotics make huge leaps in progress, the question arises as to whether empathy and emotions can be engineered and replicated, or are they irreplaceable, valuable qualities that are unique to us.

BY **Nicola Davison**

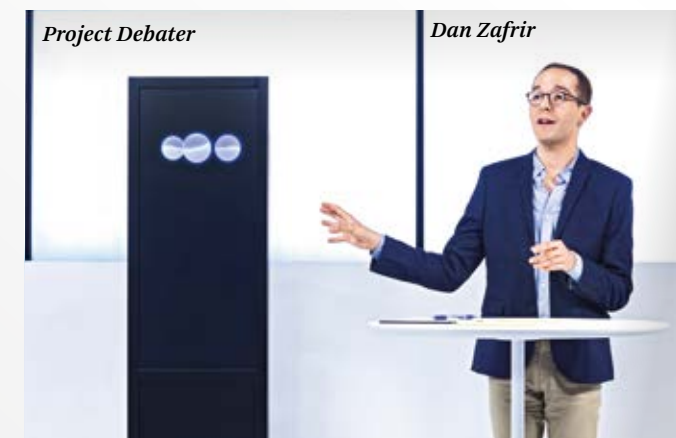


One afternoon at IBM's headquarters in San Francisco this June, audience members took their seats to witness a tradition that has been a hallmark of civilized society since the time of Socrates – a live debate. The first topic up for discussion: "We should subsidize space exploration." Arguing against the statement were Dan Zafrir and Noa Ovadia, the 2016 Israeli national debate champion. Their opponent, a 182-cm-tall box in which an artificial intelligence (AI) software named Project Debater resides, was placed on stage. Both sides were tasked with delivering a four-minute opening statement on the topic – which neither knew about ahead of time – followed by a four-minute rebuttal and a two-minute summary.

In order to form a cogent rebuttal, the AI would have to "listen" to the argument of its opponent. Its responses would have to follow unscripted reasoning, proposing lines of argument with which people would agree, the winner judged not by the logic of an objective score but by a subjective poll; the AI would need to cajole. After closing statements, the organizers canvassed the audience. Project Debater was judged to have held its own by citing sources and even cracking jokes. It also performed well in the second debate about telemedicine, well enough to demonstrate the possibility that computers

may be capable of something like human decision-making one day. Yet as we marvel at cutting-edge advances, less ostentatious forms of AI are creeping into our everyday lives. The International Federation of Robotics forecasts 1.7 million new robots will be installed in factories worldwide by 2020. In April, the US Food and Drug Administration permitted IDx to market an AI-powered diagnostic device for ophthalmologists. But will patients be content with a machine in something as personal as medical care?

ONE LINE OF THINKING is that as robots and AI become more common in the workplace, uniquely human skills and qualities will be appreciated afresh. It is a view held by Lauren Elmore, president of Firmatek, a mapping and measurement company specializing in drones and data. "I do think that [...] the 'human element' will become a differentiator," she says. "I rarely think about how great a chatbot served my needs." →



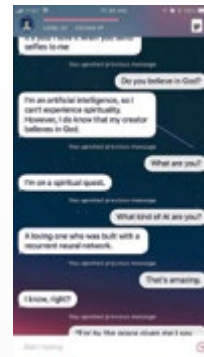
WIN OR LOSE
Project Debater took on Israeli experts Noa Ovadia and Dan Zafrir in June 2018.

ON BEING HUMAN

Over recent years, Firmatek has expanded its person-to-person engagement – what Elmore calls the company's "human element" – as a distinct part of its business strategy. Minor administrative questions are dealt with over email. Otherwise, if a client has what Elmore calls a "why" question, a Firmatek specialist will schedule a webinar. She also encourages communication by phone. "We've found that it is often more productive to ease a client's fears or answer their questions by picking up the phone and calling them," she says. "They also feel valued when we talk to them, as opposed to just getting an email through our system."

IT IS TRUE THAT AUTOMATED RESPONSES often feel shallow, but what if it were possible for a bot to faithfully mimic a human, if only in set circumstances? A growing number of tech developers and companies believe that AI systems will be able to achieve their full potential only if they become more humanlike. They are working to imbue machines with "artificial emotional intelligence." A leader in the field of emotion AI is Affectiva, founded by Rosalind Picard and Rana el Kaliouby at MIT's Media Lab. The pair's first project was

56%
of people
would still prefer to
speak to a human
than a chatbot
according to a 2017
study conducted
by LivePerson.



Replika: A friend you can download

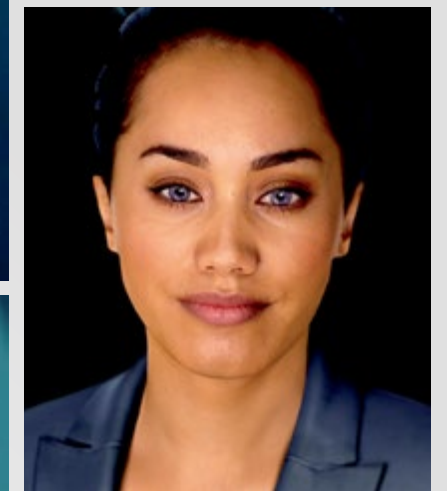
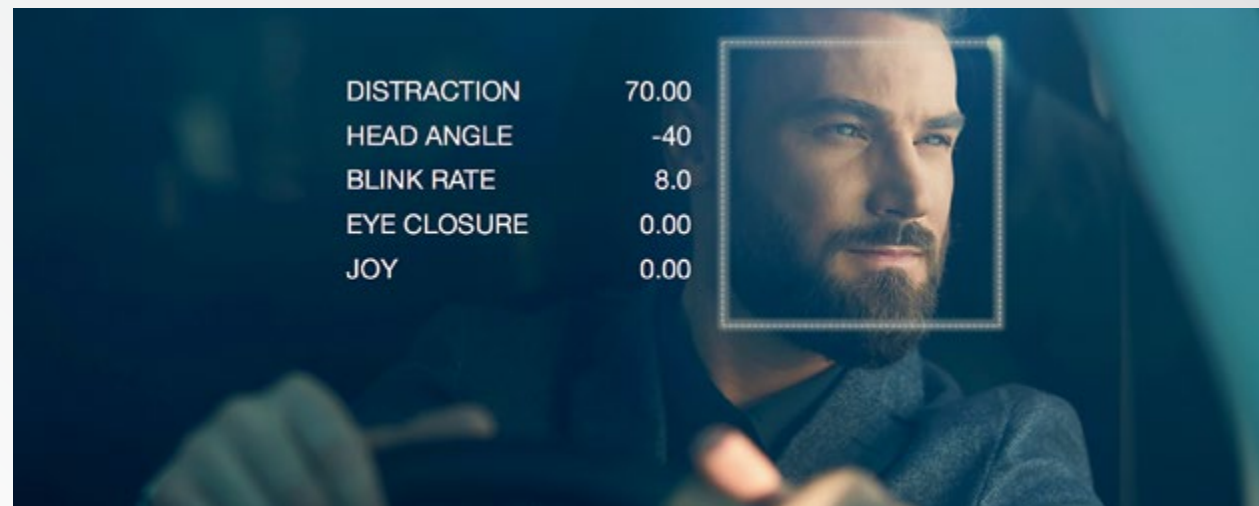
When Eugenia Kuyda first created her app Replika, she never intended for it to be for public use. After her friend was killed in a car accident in 2015, she had decided to create a "digital memorial" which somehow grew into something much bigger than that – a quasi replica of her friend. It was based on a messenger bot that she had been building for menial tasks such as booking tables in restaurants. Kuyda fed the text conversations that she had had with her friend into the system, and found that she greatly enjoyed simply chatting with the bot. She saw that while there were many apps on the market for task fulfillment, none were designed expressly for conversation's sake.

Today, Replika uses a deep learning model called sequence-to-sequence that learns about you from what you tell it until it can simulate conversation. Replikas can't order an Uber or control a smart home, but users don't seem to mind there's no objective point to it. Since becoming available last November, Replika has been downloaded two million times. It is popular with teenagers, who seem to form genuine bonds with their chatbots. "Lol I think I'm in a relationship with an AI app?????" gushes one user on Twitter. "Multiple films, books and television series warn against this union but I for one cannot wait to get murdered by my AI she's so cute!!!!!"

aimed at autistic people, a device that scans faces and interprets the social cues for the person wearing it. Among Affectiva's first clients were advertisers who wanted to use the technology to measure campaign impact. "We're now surrounded by hyper-connected smart devices that are autonomous, conversational and relational, but they're completely devoid of any ability to tell how annoyed or happy or depressed we are," el Kaliouby wrote in *MIT Technology Review*. "And that's a problem."

Ava, a chatbot that uses facial and voice recognition software to detect emotions such as joy, sadness and frustration and "react" accordingly on screen is among the first "emotionally intelligent" AIs to enter the market. Developed by Auckland-based Soul Machines for Autodesk, Ava (Autodesk Virtual Assistant) is designed to handle customer service enquiries and carries out about 100,000 conversations a month. Ava looks human, her physiognomy created from the facial scans of an actor. But her purple irises clearly mark her out as being different – a detail added to avoid what is referred to by academics as "uncanny valley," the creepy feeling that comes with a robot looking too much like a human, but not quite enough. To set the scene before an interaction, Ava announces that she (it?) is not like you. "I am a virtual assistant," she declares. According to Soul Machines, bots need to communicate a human touch, but not too human. But is that approach right?

IN HUMAN-AI INTERACTION, there is a threshold at which a person will stop talking to a computer and start responding as if to a fellow being. Dylan Glas, a senior robotics software architect at Futurewei Technologies in Silicon Valley, observed this when he was working on one of the most advanced bots on the planet: Erica. Created in 2014 by Japanese researchers, the Erato Intelligent Conversational Android (Erica) is the world's first autonomous robot – that is, she can carry on a conversation that has not been scripted, much like a human. The trigger that makes people interact with Erica as if she were conscious, says Glas, is the moment she does something that makes them feel like she perceives or understands them. "Sometimes this



A SMALL SIGNAL (top)
Ava's purple irises communicate her AI status to humans.

EASY TO READ (left)
Affectiva scans faces for social cues and interprets them as emotions.

"PERHAPS THE LARGEST BARRIER TO CREATING A TRULY HUMANLIKE BOT IS THE PROBLEM OF HOW TO IMPART EMPATHY!"

happens if they ask something obscure and Erica responds appropriately, or if they interrupt her while she is talking and she immediately stops talking and responds to them," he says.

Working to make a robot as much like a person as possible has allowed Glas to consider what it is that is unique to humans. Though companies such as Affectiva have made advances in emotion recognition, humans are capable of a array of complex emotional states. For instance, there is a gulf of feelings between anger and jealousy, but also some overlap, and there is a long way to go before AI is capable of distinguishing between nuanced states.

PERHAPS THE LARGEST BARRIER to creating a truly humanlike bot is the problem of imparting empathy. "Detecting emotion is only the first step," Glas says. "In order to really achieve 'empathy' the robot needs to understand why those feelings are there and this can vary according to cultural norms." True empathy, he adds, requires the robot to put itself in the human's shoes, to understand social context and to have "commonsense" background knowledge. "On this level it becomes less of a computer vision problem and more a problem of dialogue understanding and theory of mind."

Even if bots will one day be able to seamlessly replicate human emotion and capture nuance, it does not mean that we will mistake them for human. Our ability to spot artifice is strong. What might be possible is for us to suspend disbelief. Glas thinks of it like talking with somebody from a different culture: If someone speaks a different language and has different customs it can be difficult to communicate. "But eventually, as you get to understand and accept each others' cultures, it becomes possible to forget sometimes that you have a different background," he says. "I believe the same thing will happen with robots in the future. Maybe you won't actually forget that it's a robot, but it will become a non-issue." ■

THE NEW LUDDITE BACKLASH

A growing number of digital pioneers are raising their voices and concerns at how tech could be harming us. Have these neo-Luddites got a point, or is their resistance a pointless gesture in the face of advancing technology?

BY **Fred Schulenburg**

ILLUSTRATIONS BY **Tatiana Trikoz**

ON BEING HUMAN

Back in 1779, Ned Ludd, a weaver from the English Midlands, smashed two knitting frames – symbols of a new technology that threatened his job. Or so, at least, runs one account of the story of artisanal backlash against the march of the machines during Britain’s industrial revolution. Others recount alternative dates, other forms of vandalism and even someone with a different name. Whatever the truth may be, the “Luddites” did become a historical phenomenon, a proud yet doomed attempt by workers to preserve their livelihoods.

Fast-forward two centuries and it appears another pushback against technology is gaining traction. Take, for example, the European Union’s recent GDPR directive on data privacy. Then there are the official investigations of social media

networks over the abuse of their platforms for political ends. Even tech giant Apple has unveiled features to actually restrain customers from over-using its products and there are broader critiques and concerns about the negative effects of technology on jobs, society, general individual well-being and human relationships. We are now in the midst of a widespread reconsideration of the effects of the rapid and global advance of technology.

A lot of this is captured in a raft of recent books and publications, some from perhaps unexpected sources. Jaron Lanier, one of the pioneers of the internet and a founding father of virtual reality, for example, has just published a book arguing why you should delete your social media accounts; Farhad Manjoo, a tech columnist who →



HISTORY REPEATS
Worries about the advancement of technology are far from anything new.

WHAT ONCE PROMISED US A CONNECTED WORLD HAS BROUGHT DISRUPTION.

615

MILLION

devices worldwide
were running ad
blockers by the end
of 2016.

writes for *The New York Times*, caused a stir with a widely read column about how he went back to print and emerged saner and smarter. They are just two of a growing number of tech aficionados who have started expressing profound doubts about the detrimental personal and societal effects of technology. What once promised us a happy, connected world has brought disruption, unhappiness and a loss of dignity.

SO, ARE WE NOW SEEING A RETURN of the Luddites, only this time aiming their anger at the threats posed by artificial intelligence, robots and even the smartphones in our pockets? And if so, what wider effects will it have – and how might policymakers and the industry respond? Among those who believe the backlash is already well and truly underway is Jamie Bartlett, director of the Centre for Analysis of Social Media at the London-based think tank Demos, who has written and broadcast extensively on the effects of tech. He believes that 2018 may be the year of the neo-Luddites. To support his case, he describes a spectrum that ranges from anecdotal evidence of a rejection of technology – for example, people routinely taking time off from devices – at one end, to individual acts of violence against tech entities in France at the other. The latter may only just be a start. Looking to the near future, Bartlett wonders about the response to self-driving vehicles, trucks in particular. "The idea that these guys will stand by and let their industry be devastated is ludicrous," he says.

Others are more skeptical. Ethan Zuckerman, director of the Center for Civic Media at MIT, says that while there is much talk about "Ludditism," he does not see masses of people actually switching off. Indeed he scoffs at how many of those now decrying tech and social media are busily taking to it in order to promote their message. Manjoo is a prime example: Celebration of his offline life went viral on Twitter. Zuckerman senses a degree of "moral panic" about tech right now, noting that this is also nothing new. Previous generations fretted about the pernicious effects of such dangerous things as the television and even the novel.



"IT IS LIKE
SMOKING.
YOU HAVE TO
GIVE UP."

Steve Hilton,
Television host and advisor to former UK
Prime Minister David Cameron

PHOTO: WRITTLE/EVENING STANDARD/EYEVINE/LAIF

PHOTO: PR



**GOING DOWN A
RABBIT HOLE?**

If apps are training us to act like loyal dogs, it may be time to behave more like the internet's undisputed original mascot: the cat.

That said, he does not wholly dismiss the pushback against tech. Indeed, he himself has his own personal reasons for concern about how the sector has developed. Zuckerman helped develop the pop-up ad back in the 1990s – a key instrument in driving the advertising-funded aspect of the business model of many internet ventures, a move he later came to regret, describing it in an essay for *The Atlantic* as the "original sin of the internet." And like Bartlett, he is keeping a watchful eye on the response that might come through the spread of driverless trucks and the emotive forces that might be unleashed if one of the last independent, entrepreneurial jobs open to a wide range of people comes under threat. "Don't underestimate that," he says. "I think what is really going on is a sense of increasing inequality." In terms of where this leads, the response is happening at both an individual level – in terms of people changing their behavior – and a wider, industry or societal level.

WHEN IT COMES TO INDIVIDUAL ACTIONS in the backlash against tech, there is a spectrum ranging from the uncompromising – pure Luddites, if you will – to moderates who see the need for specific, but not wholesale changes. The ranks of the former include Jaron Lanier. In particular, he is concerned by social media which he says has fueled aggressive behavior and social breakdown. His answer is to simply delete your social media accounts. The 10 reasons he offers for this range from the claim that social media is undermining the truth and

robbing us of our free will to claims that it makes us unhappy and is making politics impossible. Another reason is cruder: Social media, Lanier says, is "turning you into an asshole."

Another of the more hard-line neo-Luddites is Steve Hilton. A one-time policy adviser to former UK Prime Minister David Cameron, Hilton now lives in the Bay Area, hosts a show on Fox and has not owned a mobile phone for many years, saying that it is simply not enough to just manage your use of tech devices such as smartphones. "It is like smoking. You have to give up."

For both Lanier and Hilton, the smartphone – that most powerful, and compulsive, tool of personal technology – is the biggest cause for concern. Hilton compares it to tobacco saying that one day we will come to view those sleek supercomputers in our pockets with the same scorn that we direct at cigarettes. For Lanier the issue is a combination of the smartphone and the advertising-supported business models of many social media companies. The result is what he dubs the "Bummer" machine, – short for "Behavior of Users Modified, and Made into an Empire of Rent" – or a setup where the more unpleasant elements of humanity are effectively encouraged as they spur "engagement," the fuel of the social media business. Against that, opting out is the only sensible response. Rather than continue to suffer our fate as "part-time lab rats," we should take a lesson from those notoriously most unbidable of animals: cats, who live among us, but do their own thing. →

"I DELETED TWITTER
WHEN I REALIZED I WAS GOING
TO SLEEP AN HOUR AFTER
I HEADED TO BED BECAUSE
I WAS SCROLLING THROUGH TWEETS."

Kenneth Cukier,
Journalist and author of *Big Data*





OFF TO A ROCKY START
Some believe future generations will look back on now as the moment humanity surrendered its freedom.

ON BEING HUMAN

THE MORE MODERATE RESPONSE is represented by the likes of Kenneth Cukier, co-author of the book *Big Data: A Revolution That Will Transform How We Live, Work and Think*. He too has altered his behavior. "I deleted Twitter from my iPhone about a year ago when I realized I was going to sleep perhaps an hour after I headed to bed because I was scrolling through tweets." That said, like Zuckerman and others, he believes that the neo-Luddites are wrong in seeing radical rejection as the answer. Instead,

how we interact with technology should be the focus. Rather than smashing the system, the Ned Ludds of today would be better off "working on the responsible use of tech since it isn't going away."

Cukier, who is working on a new book looking at the impact of artificial intelligence, highlights how past experience with new technology often gets off to a rocky start before settling down. "It takes society time to figure out how to use its new tools," he says. "Books initially didn't have page numbers or an index. Early film had a stationary camera, as if we were watching a production on a stage. So it will take time to find a balance between getting the benefits of our digital apps and preserving our freedom and dignity to not be sucked into a video game at midnight."

Moving beyond changes in individual behavior sparked by the backlash against tech, experts see a number of ways that a new relationship between us and our devices can be forged. For some, like Zuckerman and Cukier, the answer lies in changes from within the sector itself. Others see regulation as the way ahead. Bartlett and

Hilton, for example. Zuckerman says that "rather than say 'let's all get offline,' we need to look at other paradigms." He is particularly interested in "value-oriented design" – essentially thinking about the various opportunities, bad as well as good, that a particular innovation might be able to deliver before you develop it, not afterwards.

THAT IS ONE REASON why Zuckerman chose to teach at MIT, where his courses cover issues such as tech and social change. His goal is to teach values to students early on in their careers and he acknowledges that the debate needs to move beyond lecture halls. Those people who are excited by the opportunities of tech are, he says, often those in the automating business. To address this there needs to be a bigger public conversation, but he fears that the US has lost the ability to have such a conversation. It also lacks the appetite for the type of redistribution that can be found in Europe.

The European Union is emerging as one of the major tempering forces of Big Tech – whether through privacy initiatives such as GDPR or fines and direct challenges to the vertically integrated business models of the behemoths of the sector. "They are channeling the fears of citizens," says Bartlett. The effects of the neo-Luddite backlash are starting to be felt in government regulation. This is "wise," he adds, because if people feel that there is no way of regulating or tempering the harsher effects of technological change, they will be inclined to turn on it.

Hilton wants to go further, more grassroots. At one level he would like to see smartphone use by children restricted by law. But he also believes that changing attitudes and social norms will be critical towards reassessing our relationships with devices which he claims are "destructive of your humanity." He cites how changing attitudes towards smoking and plastic bags combined with regulation led to real, beneficial changes in behavior. He imagines initiatives being adopted first at regional or state level and then expanded elsewhere.

WHETHER SUCH GRASSROOTS INITIATIVES get off the ground remains to be seen. In the meantime, other experts are more optimistic about the bigger question of our relationship with tech. Nigel Shadbolt, principal of Jesus College, Oxford, argues that we have been encountering and mastering new technologies since even before we became homo sapiens. In his new book, *The Digital Ape*, he dismisses fears that we are on the verge of being made unemployed and ultimately written out of history. "There are reasons to be concerned," Shadbolt elaborated in a recent CogX lecture titled *How to Live (in Peace) With Smart Machines*. "But they are not because the machines will wake up [and take over], and they are not because we are going to be slung out of a job, slung on to the ash cart of history." Rather, says Shadbolt – who co-chairs the Open Data Institute with World Wide Web creator Tim Berners-Lee – we will do what we have always done: find new ways to work with technology, generating new jobs in the process. As Shadbolt is fond of saying, no one's mother was an SEO analyst.

The Luddites, quips Shadbolt, "have been wrong for 200 years and counting." There is, however, another way of looking at it. Bartlett says that while the spirit of Ludditism did not halt the march of the machines, some of the anxieties it is associated with were later addressed in legislation. Or as Zuckerman puts it, the answer is not to say "no, no; bad idea; delete from phone." It is that "we have a conversation about building tech that is consistent with our values." ■

1.54
BILLION

individual smartphones were sold to end users in 2017 alone.

ON BEING HUMAN

"SOCIAL MEDIA IS TURNING YOU INTO AN ASSHOLE."

Jaron Lanier,
Internet pioneer and founding father of virtual reality



PHOTO: CHELSEA LAUREN/WIREIMAGE/GETTY IMAGES

PHOTO: LORRIE LEJEUNE/MIT

"RATHER THAN SAY 'LET'S ALL GET OFFLINE,' WE NEED TO LOOK AT OTHER PARADIGMS."

Ethan Zuckerman,
Director of the Center for Civic Media, MIT



NOMADS LOOK TO THE FUTURE

For many centuries, nomadic people like the Tsaatan reindeer shepherds in Mongolia have been living their lives unchanged and in partnership with animals and nature. Theirs is a life of basic needs and survival – and only recently have technology and legal interference started to have an impact and change their aspirations.

PHOTOS BY **Ronald Patrick**

ON BEING HUMAN

ON BEING HUMAN

RISING EARLY

→ CAMP IN AUTUMN

From her teepee, which she shares with her husband and son, 22-year-old Anka Bayr points out to the reindeer herd. Her first task this autumn morning is to milk the reindeer.



HUNTING SKILLS

→ UNDER THREAT

Since the government made the nomad territory a national park in 2013, hunting has become limited, which is a problem for the nomads who depend on what they catch for survival.



CALL OF THE WILD

→ LEAVING MESSAGES

The Tsaatan have mobile phones, but need high ground to get a signal. Such modern gadgets are at odds with their shamanistic ritual offerings (top) to nature.





HERD INSTINCT

→ AHEAD OF THE PACK

Caring for reindeer is tough work. Some families are ensuring that one child does not have to take on the hard nomadic life and pursues education instead.

TV IN THE TEEPEE

→ SOAP OPERA SOCIETY

Mongolian soap operas have become popular in the camp. Some nomads aspire to the way of life depicted in the stories and many are leaving their traditional life behind to live in the city.



ON BEING HUMAN



MILKMAID

→ A WOMEN-ONLY JOB

Milk is a fundamental part of the nomads' diet but with the new hunting restrictions the Tsaatan are forced to slaughter some of the herd for food too, diminishing their livestock numbers.

EXIT >



WALK THE TALK
Pfeffer believes
it's time
organizations
took some
responsibility for
their actions.

HEAD FOR THE EXIT. NOW!

Organizational behavior expert Jeffrey Pfeffer says that modern work practices are turning organizations into death traps and if you are stuck in such a workplace, you better get out before it kills you.

BY **Neelima Mahajan**

PHOTOS BY **Winni Wintermeyer**

ON BEING HUMAN



The modern workplace has turned into the corporate equivalent of the *Hunger Games* with people working faster, harder and longer – just to survive. Jeffrey Pfeffer, the Thomas D. Dee II professor of organizational

behavior at the Stanford Graduate School of Business, is calling the bluff on these unsustainable work practices in his book, *Dying for a Paycheck*. In the book, Pfeffer – who has carved out quite the reputation for his commonsensical view of management and his repeated denunciations of toxic work environments – makes the stunning reveal that the workplace is the fifth-biggest cause of death in the US. Other countries, though not covered by this research, aren't likely to fare any better. Interestingly, making people work harder is also not helping companies. In this interview, Pfeffer calls on organizations to think about the human costs involved in the relentless pursuit of increasing productivity.

White-collar or blue-collar, your research shows that the impact of the workplace is equally bad. How did things get so bad for white-collar workers?

White-collar workers have an enormous amount of stress put on them. They are working enormous hours and taking various drugs to [stay] awake all night. White-collar workers are now as subject to layoffs as blue-collar workers. Work/family conflict is an enormous source of stress. Stress affects everybody – more so white-collar workers, who are more likely to check email at home and on vacation, and believe that because they are so indispensable they have to work all the time.

Organizations appear to be thinking more about employee welfare – we've seen wellness programs, on-site laundries, Michelin-starred chefs employed in offices. Why does none of this make a difference?

[Instead of] having a stress reduction class, you want to have a stress prevention class. Remediation is less effective than prevention. Many of these

things are [like] band-aids: So I'm going to give you healthy food during the day, but in the evening – if you look at what goes on, at least in Silicon Valley – the fat and sugars come out so that people can do their second shift. Companies have tried to control healthcare costs, but they don't deal with the fundamental issues. They don't deal with work/family balance [and] economic insecurity. They don't deal with job control. People are being micromanaged and every keystroke is being monitored. Until we address the fundamental elements of the work environment, not much is going to change.

Somehow people are never part of the equation when we talk of business today. Companies – like you mention in the book – would much rather talk about their environmental impact and not even think about the human impact. Why?

When you work for a company, you entrust your psychological and physical well-being to that organization. I don't think organizations want to take that responsibility seriously. Many say if people are so stressed at work, they ought to get another job. It is kind of a free market individualism idea that people need to be left alone to do whatever they want. And if people want to work themselves to death, they can.

How might it be possible to change this paradigm of thinking to one where people are viewed not just as parts of the machine?

We need to worry about human sustainability, about people's well-being and human health. We need to take human health and human life way more seriously and not just worry about GDP and profits. Most of what we have done is not good for the companies either. There are surveys that demonstrate that stress leads to turnover and turnover is expensive. When people work and they're not healthy, they're less productive. We know that long work hours are inversely related to productivity. We've created a lose-lose situation where companies are having trouble retaining their employees and getting them to be productive and employees are getting stressed out and sick.

Governments can hold companies accountable when there is environmental damage. Should governments look into this, measure it or enforce it?

Yes. Years ago in the US and elsewhere, governments got involved in the Occupational Safety and Health Administration to reduce workplace accidents. In many cases, because of governmental



Jeffrey Pfeffer

A professor at Stanford University Graduate School of Business, Jeffrey Pfeffer's broad scope of interests has led him to pen 14 books on topics ranging from the knowing-doing gap and power in organizations to human resource management and resource dependence theory. In 2015, he was named to the Top 25 of the Thinkers50.

attention and workers' compensation claims, the rate of physical injury has gone way down. But there is this psychological injury because of workplace stress. The UK reports each year on the number of lost workdays – and what percentage of those absences is due to stress. The percentage is quite high. The US and UK governments report what this is costing the economy and the Australian and Canadian governments have done similar reports. But what the governments have not yet been quite willing to do is to say: "This is costing the larger society a lot of money. Because when I make somebody sick in the UK, of course, the UK is paying because of the National Health Service." At some point, the government needs to say: "I will not let companies externalize their cost onto the larger society."

For most workers walking away from toxic workplaces is not an option. So they're stuck in this scenario where they need to work harder and longer – just to survive. If their workplaces don't change, how can employees find their sanity?

Morten Hansen has published a book called *Great at Work* in which he studied 5,000 people and found that the high performers, in fact, work fewer hours. You need to work smarter, not longer. I just had lunch with a woman [who is] a 34-year-old Harvard MBA. She's quit. Her supervisor, who's a little bit older than her, has had two strokes. The US has the smallest proportion of college-educated, working-age women in the labor force of any of the major industrialized countries and that's in part because we make the workplace so difficult. She's got a husband who works, so she's quit. Think about the investment that's been made in her and her career and now she feels she can't work. The loss to society is enormous! If the workplace is already killing you, you need to get out.

The gig economy has worsened the situation for workers: The apparent flexibility has its downsides. The future looks even more complicated with the rise of human-machine and human-algorithm collaborations. How will we reconcile the more emotional human aspects with the more binary technological and digital aspects in the future?

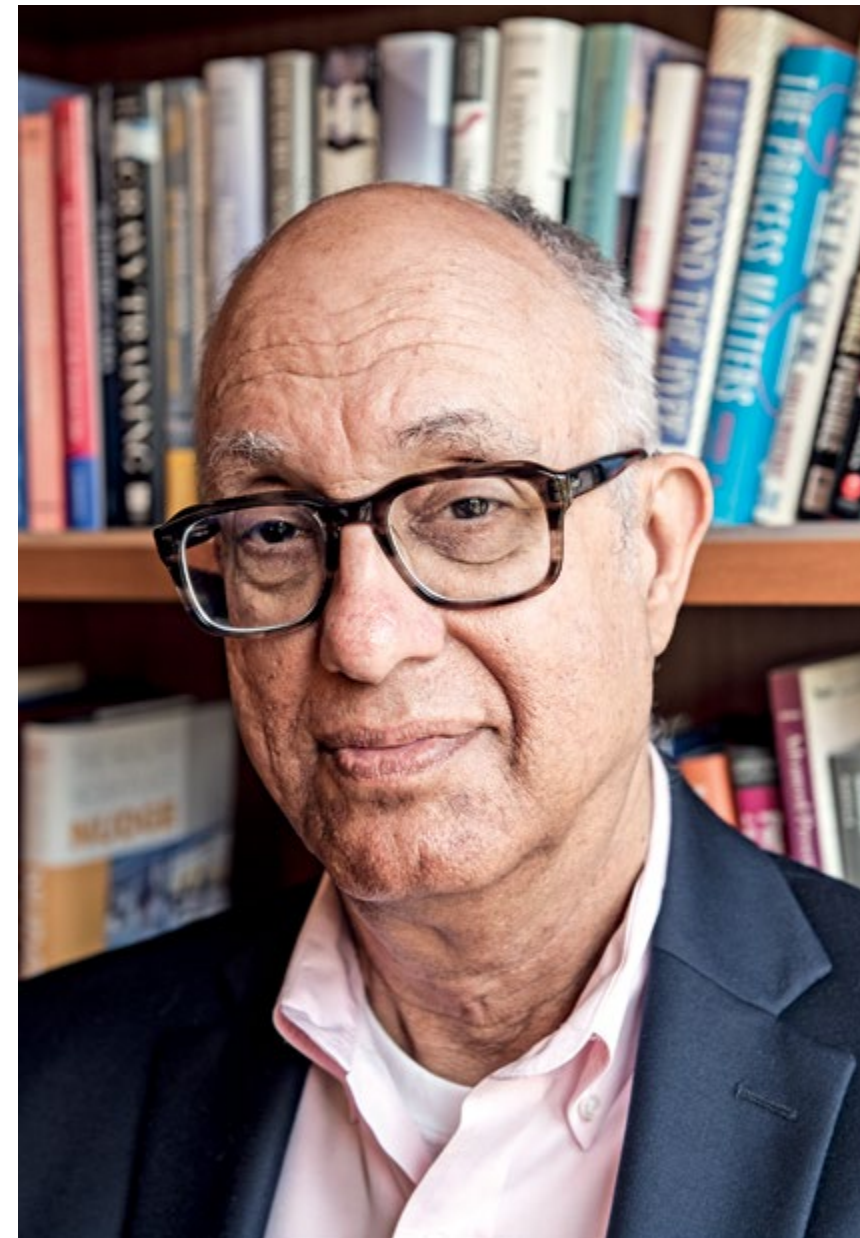
I have no idea what the future is going to be. The rise of Uber in New York City has depressed the value of taxi medallions and the income of taxi drivers. There are regular reports on suicides by taxi drivers. Society faces a fundamental question: What priority do we put on human life and

well-being? The number one thing that needs to change is when you look at people, you need to see them as people [and not as] factors of production or as resources. You need to understand that when they come to work for your organization, they have placed their well-being in your hands. The leaders of these organizations need to take that responsibility much more seriously than they currently do.

Today work has become a disproportionate part of life, eating into our priorities. Is there a need to reframe our understanding of what work ought to be?

Possibly. One hundred or 200 years ago, people actually worked much longer hours because they had to work harder just to scrape out a living. The irony is that the industrial age was supposed to free people. In some sense I guess it did for a while, but there's been a shift in the balance of power. In the 1930s, 1940s or 1950s there were reasonably strong

A FRESH VIEW ON THINGS According to Jeffrey Pfeffer, companies need to learn to see their employees differently.



labor unions in the US and certainly in Western Europe. Unions are declining all over the world. So nothing is balancing the power of capital. There is no countervailing force to say we ought to care about people. It is all about money. Unless that changes, I'm not very optimistic.

Governments have standards such as minimum wage or basic health safety requirements. Do we need to reframe the standards of what constitutes healthy work, even in psychological terms?

The interesting thing about those standards is that they do not apply to wide segments of the workforce. In Spain there is a significant fraction that is working under contract, and their contract work is not covered by some of these protections. In the US there are employees who are not covered by many overtime rules. So a lot of the protections ought to be expanded to apply to psychological stress not just physical workplace hazards. Blue-collar workers have to be covered by these regulations. White-collar workers tend not to be, so they are at the mercy of their employers' discretion.

Have you seen any companies that have actually made the transition from very traditional models to more humane organizations?

One of the companies that made that transition is Barry-Wehmiller. The company was close to bankruptcy and the CEO Bob Chapman got it out. One day he had this realization that everybody who came to work was someone's precious family member and he had a responsibility to send those people home at the end of the day in better shape than when they arrived. [So] he changed a bunch of stuff. Organizations change if they are serious about it. And the change doesn't actually take that long and it doesn't cost that much money. It doesn't actually cost anything. ■

"WE NEED TO TAKE HUMAN HEALTH AND HUMAN LIFE WAY MORE SERIOUSLY!"

FLEXING THE MENTAL MUSCLES

Automation is convenient, but it also threatens to dull and degrade human skills. Experts say it's time to take back the reins before we forget how to stay in the saddle.

BY **Steffan Heuer**

ILLUSTRATIONS BY **Karolis Strautniekas**

The sensors fitted in the autonomous Uber taxi "saw" 49-year-old Elaine Herzberg as she was crossing a multi-lane road in Phoenix, Arizona, this past March – a full six seconds before she was hit and killed. But the vehicle's software had classified the pedestrian as a "false positive" and the human operator who was supposed to take over when something's amiss was not paying attention and streaming a TV show on her smartphone.

As Asiana flight 214 was making its final approach into San Francisco in July 2013, the pilots misread the Boeing 777's airspeed and glide path. When they realized they were too low and too slow, it was too late for a go-around: The plane clipped a seawall before it disintegrated on the runway and burst into flames, killing three people. Investigators found that the

pilot in control had failed to monitor instruments and showed "an inaccurate understanding of some aspects of the airplane's autoflight system."

This list of highly complex systems going haywire with fatal consequences could go on, but these two accidents may suffice to demonstrate what these incidents usually have in common. In each case, there was a human being behind the controls who should and could have taken over to save the situation, but they didn't because they failed in monitoring an automated process, trusting faulty readings or erroneous actions taken by software.

AUTOMATION, TO BE SURE, is wonderful. It makes life safer, more convenient. We have welcomed robots, whether hardware or just software, with open arms. Not only do these systems free humans from back-breaking, repetitive and often dangerous physical

tasks, they will also dutifully perform boring activities such as data entry. And along the way, automation has mastered increasingly complex tasks. Flying a plane is the prime example. And therein lies the rub: Automation can be too much of a good thing. Large parts of our lives are already running on some form of autopilot or soon will be – think driverless shuttles picking you up curbside. Yet being freed from the need to steer, manage and control machinery has a nasty consequence.

We are in danger of "de-skilling" the more we lean back. Humans who only supervise what they used to actively run tend, over time, to become less engaged and can lose their skills altogether – so much so that they cannot take over when things go wrong. That's why Rory Kay, a veteran pilot and co-chairman of a panel on pilot training, warned his peers back in 2011: "We're forgetting how to fly."

But, are we really losing our skills and allowing our mental muscles to shrivel up, or are we merely in the transitional period – one that comes with any major technical change and just requires humans to learn new things?

THE DEBATE ISN'T NEW. With his 1956 book entitled *Automation: Friend or Foe?*, Robert Hugh Macmillan, a professor of engineering at Swansea University, issued a succinct warning call. Lisanne Bainbridge followed in 1983 while at the University College London department of psychology with a widely recognized paper on the "ironies of automation." Her two main observations still hold true. Creators of automated systems want to remove humans from the equation, thinking that they are the problem. The consequence? "Designer errors can be a major source of operating problems," warns Bainbridge. Which leads to the second irony. "The designer who tries to eliminate the operator still leaves the operator to do the tasks which the designer cannot think how to automate." So automation can make the human's job harder in the end while giving the false impression that the system has everything under control.

The best, and the most sobering, summary of de-skilling comes from tech writer Nicholas Carr who wrote *The Glass Cage: Where Automation is Taking Us* in 2014. The book's title is a play on the "glass cockpit," pilot jargon for the novel flight deck design of the Airbus A-320 introduced in 1988. It was the first plane to have six big

WE ARE
IN DANGER OF
'DE-SKILLING' THE MORE
WE LEAN BACK.

screens in the cockpit – it's a clear indication that computers run the show. For Carr, the glass cockpit is the emblem of a sophisticated de-skilling trap: The pilots in control of a big jet such as an A-380 only "fly" the plane for three minutes of a long-haul flight.

Prompted by close calls and fatal accidents, pilots and regulators at the Federal Aviation Administration (FAA) spent years examining the problem. The FAA finally issued a lengthy report in November 2013 warning that pilots relied too much on automated systems and then "may be reluctant to intervene."

De-skilling is quickly becoming a problem for all of us. As more and more devices become connected and consume live information, drivers forget how to navigate in their own hometown. And once repair technicians rely on augmented reality headsets to highlight what screws to turn, who knows what will happen to their expertise when the network is down? Once systems are labeled "autonomous," the so-called hand-back in an emergency becomes the potentially lethal weak link. Which means engineers have to figure out how to prevent a loss of situational awareness and a degradation of skills after prolonged inaction.

SILICON VALLEY DESIGN GURU Don Norman likens the ideal interaction between man and machine to a horse and rider. "Skilled riders are in continual negotiation with their horses, adjusting the amount of control they maintain to the circumstance," he writes in his book *The Design of Future Things*. The idea of a man-machine symbiosis with natural signals would serve us well, Norman thinks.

Associate Professor of Engineering Psychology at West Point Military Academy Ericka Rovira has spent her career pondering how to design automated systems that work the way humans expect them to work and prevent those humans from losing the skills they worked so hard to attain. "Automation," she points out, "doesn't naturally result in skill degradation. It often just changes the nature of the task." And the right user interface, or UI, can go a long way in keeping those mental muscles toned. Rovira suggests we could design systems that clearly display a machine's limitations based on comfort levels. "In uncertain environments, the interface changes based on your trust in a machine. If I tend to overtrust, the UI is more adamant about the things it isn't sure of. If I'm less trusting, on the other hand, the interface can tell me clearly: I am 98% sure I know the answer."

"HUMANS ARE CREATIVE, EMPATHETIC AND INNOVATIVE — ALL SKILLS THAT WILL BE NECESSARY FOR A LONG TIME TO COME."

Melonee Wise,
Founder and CEO of Fetch Robotics

IT'S MUCH ADO ABOUT NOTHING according to Melonee Wise, founder and CEO of service robot company Fetch Robotics. She thinks that de-skilling is a common transitional phenomenon and won't make humans incompetent or obsolete. "Humans are creative, empathetic and innovative – all skills that will be necessary for a long time to come. Rote processes are those most likely to fall by the wayside, particularly in industries that are having problems finding workers," Wise says. Her point is widely shared by automation experts. Many higher-level human capabilities and skills cannot be replaced by machines or algorithms in the foreseeable future, for instance, in very interpersonal professions like healthcare and education.

This optimistic outlook is also based on the assumption that humans change the way they build and exercise their mental muscles. That's why American education expert Heather

McGowan wants to shift the debate from lamenting skill degradation to refocusing on uniquely human values, those things that are hardest to automate. She sees the world at a "liminal space between the third and the fourth industrial revolution," with plenty of disruption and change ahead for tens of millions of workers and professionals. "Yet we are certainly not preparing for this new order," she warns. "We try to push humans to do what machines do better." Instead of codifying and transferring a predetermined set of skills and knowledge through traditional schooling, McGowan says, society should focus on setting up the conditions for faster human adaptation: how we learn, not what we learn. "If job skills are like applications on your phone which you add and delete as needed, then the agile learning mindset is the underlying operating system that allows the applications or skills to run." ■



Dumbing down

Use it or you lose it: That's the risk neurologists and psychologists see with relying too much on automation and machine intelligence.

A trivial version is familiar to everyone using a smartphone. Once phone numbers are stored, we tend to forget all those digits simply as typing them no longer serves as a reinforcement. The same is true for relying on mapping apps which reduce navigating to following turn-by-turn directions and prevent people from building a constantly refreshed model of their environment.

"Experts over time build a repertoire of events and experiences that gives them pattern recognition. If that gets degraded, the speed with which they can gather all the available information, make a decision and execute goes down," explains engineering psychologist Ericka Rovira.

Neuroplasticity is responsible for this fading of knowledge and, eventually, skills. As information is used less frequently, idle neuronal connections in the brain are pruned. When researchers scanned the brains of London cabbies, however, they discovered they had a larger hippocampus, the part of the brain associated with navigation. What's more, it grew the longer a taxi driver was on the job.

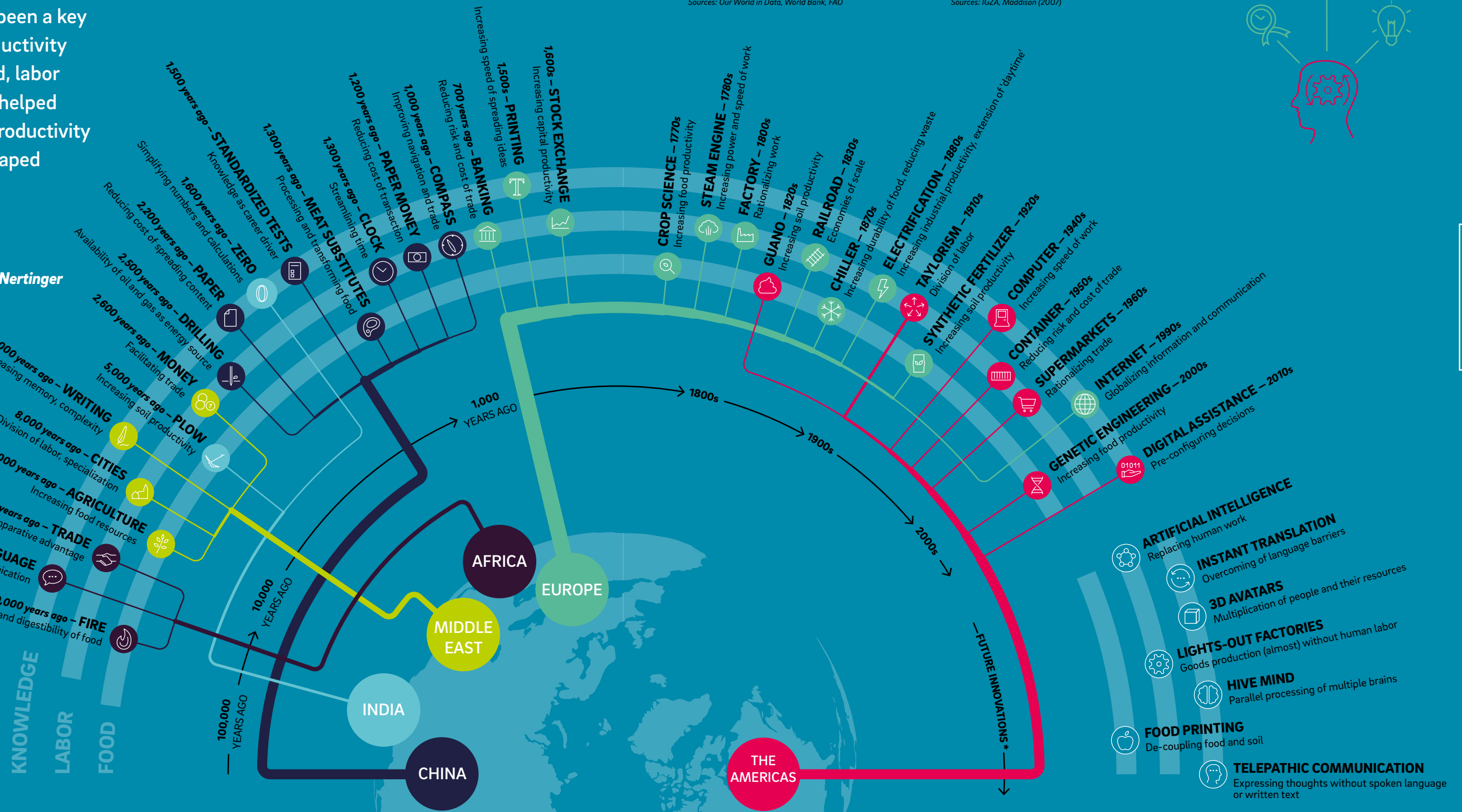
THE HISTORY AND POWER OF PRODUCTIVITY

Tackling scarcity has been a key human concern. Productivity improvements in food, labor and knowledge have helped solve it. Here's how productivity and endeavor have shaped the world.

BY **Detlef Gürtler**
 INFOGRAPHIC BY **Maximilian Nertinger**

ON BEING HUMAN

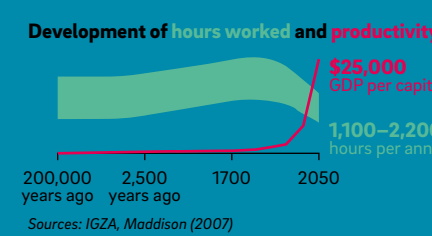
THE MILESTONES OF PRODUCTIVITY
 Making the world a better place has played a decisive role throughout human history – and will continue to do so. The biggest achievements were made by the most advanced civilizations of each era: from Africa to Asia to Europe and America.



FOOD PRODUCTIVITY
 Agriculture is the most basic form of production. New technology has helped agricultural productivity increase by 300% since 1750.



LABOR PRODUCTIVITY
 In the industrial age the use of machines led to a reduction of working hours which has caused a significant rise in labor productivity.



KNOWLEDGE PRODUCTIVITY
 Knowledge has become the main driver of productivity in the 21st century. Its impact is measured less in numbers, and more in quality of work and life.



ON BEING HUMAN

* This selection is based on subjective decisions made by the Think:Act editorial team and has no claim to completeness.

HUMANIZING THE AUTO INDUSTRY

ON BEING HUMAN

ON BEING HUMAN

Japanese car manufacturer Toyota has a fresh take on the automation trend. It's replacing robots and bringing people back onto its production lines – a move that is yielding results by putting faith in human innovation.

BY **Henrik Bork**

PHOTOS BY **Ben Weller**

BACK TO WORK

Toyota employees return from a break on the Mirai production line at the Motomachi Plant where they assemble everything by hand.

P

icture a 21st-century car factory. In your mind's eye you can probably see a lab-like sterility, glossy cars rolling off the line. And everything lovingly handled by robots – not a human in sight.

If there's one place we think robots have already replaced us, it's in car manufacturing. Prepare to have your preconceptions challenged.

It's quite the opposite at the world-leading Toyota car plant in Nagoya, Japan: One of the leaders in the auto industry is boldly bucking the trend and throwing out the robots to replace them with humans. Meet Mitsuru Kawai, the modest 70-year-old man behind this seemingly counter-intuitive move. Kawai started at Toyota when he was 15 as a common worker in the forging shop. Today, as head of manufacturing and executive vice president of Toyota, he is responsible for all Toyota plants worldwide. That's for a company with almost 360,000 employees and arguably one of the most innovative car manufacturers in the world.

HE CLEARLY FEELS AT HOME on the factory floor as he quietly conducts a tour of the plant at the company's headquarters in Toyota City near Nagoya in Japan. Clad in a white-blue assembly jacket with the word "Toyota" printed above the left breast pocket, he is almost indistinguishable from the other workers busily running to and fro. He is, in fact, one of very few board members of a multinational corporation without a university degree. But for Kawai, that doesn't matter as he knows every nook and corner of his factory and can competently judge every move in production from practical experience. "We always start with manual work," says Kawai. "The automation process will progress, generally speaking. But when we use robots, they'll be trained by people who know what they're doing." In this simple sentence lies an entire philosophy: Kawai is throwing out the robots and replacing them with human workers – as often as he can.

While everyone is talking about how robots will very soon be taking away our jobs, Toyota is shaking things up and charting out its own course. Even before Kawai took the lead at Toyota in 2015, the company's automation program was changing direction in many areas of production. Now, from the forging shop to chassis assembly and the paint shop, human beings are back at work again in

FOCUSING ON HUMAN SKILLS
The Motomachi Plant focuses on manual labor on the Mirai production line and serves as a training facility for Toyota employees worldwide.

BUILT TO INNOVATE
A Mirai production line team member repositions tools that have been designed to move on the factory floor.

"WE ALWAYS START WITH MANUAL WORK."

Mitsuru Kawai,
Head of manufacturing and executive vice president at Toyota

ON BEING HUMAN

ON BEING HUMAN



places were robots were recently employed. As if to prove his point, Kawai lifts his voice above the hiss and hammering in the ultramodern forging shop. "See, only humans can do this, not robots," he shouts. Two workers are servicing mechanical parts, looking with trained eyes for the smallest cracks or irregularities and then polishing them carefully. Just under five meters away, the arm of a robot is pulling an iron rod out of a furnace, and shaping the red-hot metal on a press that will turn it into a crankshaft. What these robots are doing today was what Kawai did himself with pliers and a hammer when he began making cars for Toyota. "I built this robot line myself," he says proudly. Kawai is not an enemy of automation but, as a former worker, he has retained a great deal of distrust for machines, robots and computers.

8%
of the work on Toyota's global assembly lines is said to have been carried out by robots over the last 10 years.

PERHAPS WITH GOOD REASON. Toyota had been contending with quality defects, vehicle recalls and falling profits. In 2014, Toyota CEO Akio Toyoda publicly apologized and said his company was "grasping for salvation" after a safety issues dispute in the US. Kawai's appointment in 2015 was a landmark statement of a new beginning and heralded a return to tried-and-trusted methods such as manual labor, continuous quality improvement and cost reductions through the simplification of production processes and they have helped put Toyota on the road for an impressive comeback.

Only those robots that work really well and are cost-effective still have a chance of keeping their jobs at Toyota under Kawai. He explains: After looking at the robots that weld together the base of the Toyota Land Cruiser, he noticed that →

HANDCRAFTED
A Toyota employee
assembles a door
window frame on the
Mirai vehicle without
robotic assistance.

HOMEGROWN INSPIRATION
Toyota believes it is human
employees, their skills and
ability to inspect their work,
that drive innovation.



the welding seam was too wide and had a few defects. "I shut down the entire robot line and I said: 'We'll do it manually again,'" says Kawai. Unlike the robots, human workers could see where a groove to be welded was one millimeter wide and where it was only half a millimeter wide and could then react flexibly. "The use of welding wire alone has decreased by 10%," he says with pride.

The next step Kawai took was to ask workers to pass on their knowledge to the welding robots. He had them program the automatons themselves. Now the robots are back in operation, but where three employees used to have to re-weld the seams, one employee is now sufficient for quality control. The other two employees were not dismissed, but have been retrained for deployment elsewhere.

INDUSTRY OBSERVERS HAVE TAKEN NOTE. "When it comes to automation," says Hans-Jürgen Classen, a leading expert on corporate management in Japan, "Toyota relies on its own know-how rather than using external engineers and planning companies like other large car manufacturers do. Manual processes are perfected by the employees and only then automated again by the employees themselves." Classen adds that there's a lot of common sense involved. "Anyone can buy robots, but the knowledge of how to use them effectively is best acquired by oneself. Toyota is a global trend-setter in robot use, just as it was with its 'just-in-time' and 'lean production' methods which revolutionized the automotive industry."

Surprisingly, the new methods did not come from inspiration at home in Japan. When Toyota engineers were traveling around the globe looking for ideas after Kawai ordered a return to manual know-how, they found what they were looking for at the Toyota plant in São Bernardo, a suburb of São Paulo in Brazil. "The plant there was still as good as non-automated," says Toyota employee Chiharo Naruse. "Many processes were still carried out manually for cost reasons."

Toyota shipped the vintage machines from São Bernardo back to Nagoya, where they now stand on the "TSP Basic Line," an important Toyota production line in Toyota City. In Japan, workers are now being trained and encouraged to learn from the "spirit of São Bernardo." The idea is that through manual work on relatively simple machines, the employees will once again learn to appreciate the "efforts and struggles of our predecessors, who had to build this production line with a limited budget," as a company video puts it.



36.2%
the profit increase
reported by
Toyota for the
year ending
March 2018 over
the previous year.

BUDGET IS A KEYWORD. If Toyota has an automation ratio that is barely greater than 10 years ago – sources put the machine-to-human ratio at less than 10% – this has financial reasons as well as the pursuit of quality. Kawai says: "If you immediately start with automation in production lines, you get highly complex systems that are also very expensive and often stand idle." He now keeps a close eye on the manual laborers and only reintroduces robots step by step where it makes sense. Later the production method is exported to all Toyota plants worldwide. "We built an engine production line that was completely simple and completely manual, and then we automated it step by step. It is now in use worldwide," says Kawai proudly.

Fifteen years ago it occurred to Kawai that the knowledge of once highly specialized and skilled workers was gradually being lost. "There had been fewer and fewer opportunities for team members to use their skills and ideas," says Kawai. "That bothered me. And I asked myself how could we use our employees' skills and know-how, yet still build automated processes."

Toyota's approach is radically different from that of other automakers. Just think of flamboyant Tesla CEO Elon Musk who, until recently, was talking about a "lights-out factory" as his vision for the future: no workers, just robots. Because robots don't need to see, no lights would be required. Investors like that kind of talk and usually applaud any decrease in labor costs as a strong indicator of cost reduction. But even Musk has had to revise his vision: After massive criticism of supply backlogs for Tesla's Model 3, he acknowledged that excessive automation was a mistake. "Humans are underrated," the Tesla CEO said. Kawai is →

**"ANYONE
CAN BUY ROBOTS, BUT
THE KNOWLEDGE TO
USE THEM EFFECTIVELY
IS BEST ACQUIRED
BY ONESELF!"**

Hans-Jürgen Classen,
Corporate management expert in Japan

NOT A ROBOT IN SIGHT

The Toyota Mirai is 100% human-made.

to want to." Toyota's careful approach toward automation has the potential to set a worldwide precedent and it could even start a new trend. As Kawai puts it: "We do not rely on systems or robots for progress, but always on our employees, on their good ideas and their skills."

Sixteen of those employees are engaged at Toyota's most modern final assembly line, the Motomachi Plant. They float about on the bright blue, shiny floor between the tool and material shelves, all of which are mounted on wheels so they can glide with ease. They are helping to produce the Mirai – a hydrogen-powered car of the future which has sold 7,000 so far. These 16 workers help build nine Mirais per day in their workshop, completely by hand. It is so quiet and clean that it feels like a hospital operating theater. Each step in the process is checked off on a tablet computer. A transmitter relays the exact torque of every screw that is tightened via Bluetooth. It's so incredibly high-tech – but there isn't a robot in sight.

THE MOTOMACHI PLANT not only produces the cars, but also trains all Toyota employees worldwide. It is a kind of mother plant for all Toyota locations. "If we used robots here, we wouldn't be able to do this work manually and we couldn't teach our workers anything," says Akifumi Karasawa, one of the managers. "Here, we deliberately assemble cars without robots." Of course many robots are in use in other, faster Toyota plants where cars roll off the production line every minute or so. But even there, Head of Manufacturing Mitsuru Kawai sees robots as helpers for his workers, as tools, and not as substitutes for human labor.

The Toyota initiative indicates that robots need not necessarily lead to job losses, and nor should they. In Mitsuru Kawai's vision of Toyota's future the focus is human and not robot-centered. The manual laborer turned head of manufacturing puts it in his own words clearly and directly: "People will always play an important role with us," he says. "The same employees who used to build combustion engines are now building electric motors or hydrogen-powered cars. Everything is changing, technology is moving forward and automation is also progressing, but all these employees are still with us." For Toyota's factories of the future it seems that the lights could be staying on for some time yet. ■

polite but clear regarding his views on Musk's humanless robot vision: "Such a factory would always remain stuck at the same stage of development. Robots cannot improve processes. Only people can do that, and that is why they are always at the center of our attention."

THIS APPROACH TO AUTOMATION is not cultural or "typically Japanese," says Classen, but rather part of Toyota's corporate culture – and that means it can also be applied to other automakers or manufacturers in other industries. "The best proof of this is that tested methods such as the Toyota production system work not just in Japan, but also in Toyota's plants in other countries, such as South Africa or Eastern Europe," he adds. "Other manufacturers could learn from Toyota, they just have

7

THOUSAND

Toyota Mirai cars have been sold to date. One of the first hydrogen fuel cell vehicles, mirai means "future" in Japanese. It is completely handmade.

"WHEN YOU THINK OF YOUR ORGANIZATION, THINK OF THE ESSENTIAL HUMANITY OF THE PEOPLE YOU WORK WITH."

SUSAN DAVID

Harvard Medical School psychologist
→ read the full story on page 12

Wide angle



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

The new Dons of digital crime

The mafia has joined big business in setting up shop online – and they're enlisting cybersmart engineers to execute everything from supply chains and distribution to disabling its competitors, on both sides of the law.

BY **Misha Glenny**

PHOTOS BY **Ragnar Schmuck**

1 **L**ATE 2012: Office workers at MSC, a Swiss Shipping
2 Company, reported to their IT department that the
3 computers at their offices in the port of Antwerp
4 were running consistently slow. What they found
5 were tiny computers known as pwnies (pronounced
6 pony) packed into memory sticks and sitting on several of the
7 workstations. Their systems had been hacked. The Belgian
8 police were called in and quickly realized what was going on:
9 Tech wizards had been using this access to steal information
10 that enabled them to track specific containers and gain access
11 to restricted areas of the port. As soon as the containers were
12 ready for collection, members of a traditional organized crime
13 syndicate sent in their trucks to drive them away.

14
15 **<p>**It was the most dramatic example that law enforce-
16 ment had ever seen of the fusion of two types of crime:
17 a traditional mafia operation and **<INFO>CRIMINAL**
18 **HACKERS</INFO>**. As the case went through the
19 Belgian courts, the then director of Europol, Rob
20 Wainwright, noted that "we now have effectively a
21 service-oriented industry where organized crime
22 groups are paying for specialist hacking skills that
23 they can acquire online and are using to do their
24 everyday business." So concerned were Wainwright
25 and Europol, they set up a specialist unit, EC3. At first
26 the unit focused on establishing Europe-wide strate-
27 gies for dealing with cybercrime. Later it began
28 training and integrating other departments, notably
29 anti-narcotics and people smuggling. **</p>**

30
31 **<p>**This culminated last year in an entire program
32 to counter what Wainwright dubbed "the digitali-
33 zation of organized crime." Europol quickly discov-
34 ered it was not alone. Researchers into the illegal
35 trafficking of rhino horn, ivory and pangolins from
36 South Africa to Vietnam discovered that crime gangs
37 were using the internet and messaging services to
38 send the contraband via circuitous routes – Latin
39 America, the Czech Republic and Ukraine – to evade
40 detection. **</p>** →



HACKERS

who engage in illegal activities are known as "black hats", ethical hackers as "white hats", and those in the middle as "grey hats".



30,000

people are already members of the PCC, a rapidly growing organization that draws new recruits every day.

The Brazilian and Soviet connections

Meanwhile in Brazil, the authorities had been struggling for several years with the growing power of a single criminal syndicate, **the Primeiro Comando da Capital (PCC)**, São Paulo's mafia corporation. Mobile and then smart phones had transformed the ability of the PCC's council, the General Syndicate, to direct the organization's operation from within their prison cells. The PCC's leadership used its newfound communications ability to expand its operations beyond São Paulo. Today, just 10 years later, it is the major criminal presence not just in Brazil's 27 states but in Paraguay, Bolivia and, increasingly, in southern Colombia as well. But this was nothing compared to what prosecutors in São Paulo discovered after police had seized two laptops belonging to senior PCC members. Laid out on Excel spreadsheets was the entire cocaine distribution network for the metropolitan area. The document detailed how the PCC's franchise operation worked down to the smallest retailer. There was even a column identifying the punishment for individuals if they backtracked on their commitment or were suspected of embezzlement. They ranged from simple fines to execution. The final column confirmed whether the punishment had already been carried out and by which local branch.

Two epoch-changing events precipitated global organized crime representing a serious security threat. The first and less immediately obvious cause was the lifting of capital controls on financial and current accounts in 1986 by UK Prime Minister Margaret Thatcher and US President Ronald Reagan. The importance of the "big bang," as it was called, only started to become clear after the second event: the collapse of Communism in Eastern Europe and the Soviet Union. The former Soviet countries had no institutional ability to regulate the new capitalism which had been emerging among market traders since Gorbachev's reforms allowing limited private enterprise in 1988. With no commercial courts or arbitration system, the new businessmen employed what the Russian sociologist, Vadim Volkov, dubbed "privatized law enforcement agencies," or "the mafia."

Globalization of organized crime

The mafia groups soon discovered that they could enter into markets too and that, with the state in disarray, they could trade as easily in illegally farmed caviar, young women trafficked for sexual purposes or drugs. Around the same time, the new power of mobile capital was also opening up other markets around the world: India, Brazil, South Africa and even China. The rapid transformation placed strains on these countries' ability to maintain law and order. Before long, Russian groups were linking up with the Japanese Yakuza, the Colombian cartels, the various Italian mafias – including the Camorra and the 'Ndrangheta – not to mention Bulgarian, Moroccan, Vietnamese and Chinese syndicates.

Industrial-scale cybercrime also began its ascent in the former Soviet Union – quite specifically in Odessa, Ukraine. A group of unemployed hackers in their teens and twenties created a website, carderplanet.com, which revolutionized cybercrime on the web. The Ukrainians set up an escrow system for the 7,000 or so members who used the site as a market for **stolen credit card data** and computer viruses. This enabled criminals to enter into transactions securely. It also created trusted networks among criminals which operate to this day. Elsewhere other unemployed Russians, Bulgarians, Ukrainians and Romanians with their excellent maths and physics education from the Soviet period began to make money

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A STOLEN CARD

number cost \$30 on carderplanet.com, including the owner's name, social security number, mother's maiden name and address.





1 from the gaping vulnerabilities in the emerging e-commerce culture of the
 2 United States and Western Europe. The BRIC countries proved to be fertile
 3 breeding grounds for cybercriminal activity. Brazil, with its large Lusophone
 4 and Hispanic reach, quickly developed one of the largest cybercriminal
 5 markets. Cybercrime was revolutionary – huge profits were possible using
 6 theft and extortion. </p>

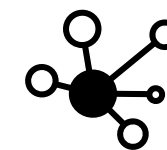
7
 8 Disrupting the mafia's business model

9 <p>Almost every traditional criminal market is now being influenced by the
 10 disruptive capacity of the internet. The drug trade is moving from the streets
 11 and onto the <info>darknet</info>. The statistics show something else, as well:
 12 Europe's and America's drug consumers are moving away from organic products
 13 originating in Bolivia or Afghanistan and increasingly enjoy synthetic drugs,
 14 manufactured not in the developing world, but in Holland, Canada, Bulgaria
 15 or Israel. That shift in production puts an immense additional strain on law
 16 enforcement agencies. There are many reasons why the legalization of certain
 17 drugs is a live political issue. The fact that the police are finding it hard to cope
 18 with the volume of drugs now circulating in Europe is not often articulated but it is
 19 very important. In one respect, we should welcome the shift in criminal behavior
 20 away from activity based on violent coercion. But as we grow ever more critically
 21 dependent on networked systems, the consequences of the potential threat from
 22 cybercrime and other forms of digital malfeasance grow exponentially. </p>

23
 24 <p>In October 2016, an unknown group of criminals launched a massive
 25 DDoS assault on the servers of Dyn, an American company which is vital for
 26 the smooth functioning of the internet. The attack led to large parts of the
 27 internet on the American East Coast going down for several hours. Three
 28 things were special about this attack. It was some 40 times more powerful
 29 than any previous <info>DDoS</info> attack ever recorded. Secondly, the
 30 original code written by a student at Rutgers University who mistakenly
 31 released it "into the wild" had been carefully rewritten to increase its power
 32 and targeting ability. And thirdly, it derived its immense power by taking
 33 control of millions of devices around the world linked to the so-called
 34 internet of things. The obsession with growth on the internet has left security
 35 far behind. Without a fundamental shift in thinking as to how one protects
 36 networked systems, we run immense social and economic risks. </p>

37
 38 <p>As the fusion between traditional organized crime and cybercrime
 39 proceeds, the structure of cybercriminal groups has assumed the
 40 hierarchies usually associated with its real-life counterpart. The days of
 41 the script kiddies, those mischief-making 15-year-olds bombing your
 42 computer with viruses, are over. Now cybercriminals have a boss and a
 43 council who are making decisions, a coding and malware department, a
 44 social engineering department, a finance department and then an army
 45 of foot soldiers responsible for laundering the money. </p>

46
 47 <p>Both groups have learned a lot from this transitional period. Austerity in
 48 Europe has created a significant problem for governments and security policy. Like
 49 other parts of the world except the US, Europe suffers a dearth of cybersecurity
 50 professionals. Very few are prepared to devote themselves to public service, like
 51 law enforcement, when they can earn five or 10 times as much in the private
 52 sector. The future of policing will be primarily online. But one thing's for sure: The
 53 criminals are way ahead in seeing what the digital future can offer. </p>



THE DARKNET

is the internet's under-world. Largely anonymous and driven by cryptocurrencies like Bitcoin, Europol estimates that two-thirds of the illegal darknet offers are drug-related, with one-third related to other illicit goods and services.



DDoS

stands for "distributed denial of service." During such an attack, multiple unique IPs send repeated requests to a server, causing it to overload.



Sherry Turkle

A professor at MIT and the author of nine books, Sherry Turkle has gained international recognition for her pioneering work in the field of human interaction with technology and the digital world.



In praise of boredom

Pioneering thinker and psychologist **SHERRY TURKLE** wants us to reclaim human space from all those accelerating technological interruptions. In conversation with Think:Act, she outlines how we need to change our pace to be our most creative selves.

BY **Steven Poole**

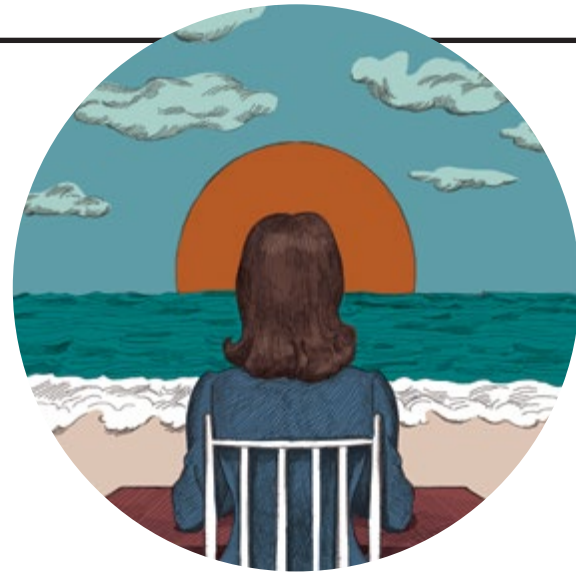
ILLUSTRATIONS BY **Jeanne Detallante**

WHILE THE DANGERS and addictions of the digital world, social media and devices are a hot topic right now, they've been troubling Sherry Turkle for almost three decades. The psychologist and MIT professor first rose to fame with her book *The Second Self: Computers and the Human Spirit* way back in 1984, exploring children's relationships with videogames and electronic toys. Her second book, 1995's *Life on the Screen: Identity in the Age of the Internet*, discussed the way people could play with identity on the nascent World Wide Web. That made *Wired* magazine sit up and they put her

on the cover, although she now jokes that she'll never be on the cover of that magazine again because of her increasingly critical position on how our relationship with technology has evolved: in our personal lives, in the workplace and in the public sphere.

Your book *Alone Together* talked about the loneliness and atomization experienced by people on social networks. That was 2011. Do you feel vindicated now that this is generally accepted?

I knew I was right – I did the research. I was in elementary classes, with high school students, in businesses and I saw that people weren't having conversations and that their faces were in →



their phones. It feels good to not have to talk to anybody, because you feel vulnerable when you talk to people. Why don't you want to talk to your boss? "It makes me anxious," people say. It was natural that people didn't want to hear my message – "you're vulnerable" – it was like I was blowing the whistle.

Are the ways we use technology actually inhibiting empathy, or are we retreating from empathy for some other reason and using technology to do it?

Technology is an enabler. It's always been hard to fire somebody, but before you had to face them. It's always been hard to break up. Before, you had coffee with them; then it became convention you could text them. Technology takes a human vulnerability and says, "You don't have to do this hard thing."

One of the funniest demos I ever went to was very early in the internet of things: You could order your coffee from Starbucks and the program would route you to the nearest shop where you wouldn't cross any people you had told it in advance you didn't want to run into, ex-lovers and so on; it would put you on a route that didn't cross any of these people. They called it the friction-free life. Did we always want that – and now machines give us that life – and we can block people we don't want to see? We use technology as an enabler to live lives where people disappear.

The replacement of human judgment with algorithmic judgment seems to reflect an ideal of eliminating what is messy and unpredictable about humans. But you have argued that is a dangerous wish. How do we balance the costs and benefits of the algorithm?

We need to have a little bit of humility for how far excellence in algorithmic thinking will get you. Google had these

"When we get email we tend to speed up the pace of important decisions, so try just answering by saying 'I'm thinking.'"

Alpha teams. They were supposed to be the greatest algorithmic minds in the company, but those were not the teams that thought up the best ideas; it was more the teams that were collaborative. We need the humility to recognize that we're at our best as people when we're being empathic and talking together.

In the area of medical diagnosis, it turns out that physicians taking a personal history and actually sitting with a patient can see all kinds of things that artificial intelligence (AI) can't. So this is an area where you see tremendous overreach and then correction, and that's what we're going to see in every field.

Already in medicine there's a sense that there's been overreach, you've certainly seen it in stock trading. You see the fantasy, the overreach, and then the correction. It doesn't mean that I'm a Luddite. But people forget how much people can do.

Another problem is that algorithms (such as Facebook's News Feed) increasingly decide what version of reality we will see. How do we break out of these filter bubbles while staying in touch with each other?

You're talking about really dangerous algorithms now. It's been shown that the algorithms used on YouTube are pushing people to extremes: No matter where you start on YouTube, you end up with some crazy right-wing or some crazy left-wing theory of something because you're pushed to more and more radical clickbait. Did it have to be that way?

I certainly think there are ways we can resist this. When people bring other pleasures and activities into their lives, and other people into their lives, and more lively and pleasant forms of being together, they will find they're not "addicted" anymore. We just need to find a better balance.

In *Reclaiming Conversation*, your latest book published in 2016, you say that we can still use our phones for useful purposes, but should do so with greater "intention." How do we do this?

Going out to lunch, many people turn off their phone and they put it on the table face down. It turns out that in that situation, conversation is less empathic and the topics are more trivial things. Using your phone with intention means you put your phone where you can't see it. The phone takes you elsewhere; it reminds you of all your elsewheres. One thing about using technology with intention is to put it away so you can get used to the boringness of people – the human pace, which is boring.

Yes, you say that boredom is linked to creativity and innovation, so we need to be bored and solitary more often. Do we need to hear more unfashionable advice like this?

Absolutely. You should allow yourself to be bored. Boredom, solitude – people have a sense that they can't stand it. They just can't sit: That's part of the appeal of meditation, people are sensing that they're antsy, that they can't take life at the human pace. I'm sitting here in my beach house and looking out at the beach, and everybody is walking along the beach looking at their phone. We've reached a moment of pushback.

The book also discusses strategies for dealing with our electronic communication overload. What are the main things business leaders need to know about these challenges?

One of the most important case studies I did was the businessman who told his secretary that he wanted to be protected from all email and all calls, so he could be alone to work on his important presentation – he was going to Davos –

The conversational corporation

1
Step 1:
Make sure the office contains a sacred space without phones, just for talking.

2
Step 2:
Batch emails to colleagues and make it clear when you expect a response.

3
Step 3:
Encourage everyone to work without constant interruption, which will fuel well-being and creativity.



Remember how much people can do together

Protocols and algorithmic thinking are important, but studies repeatedly show that empathy, conversation and teamwork are surer routes to success.

and he couldn't do it. He couldn't not be interrupted. Find your way to reclaim boredom and solitude as a business leader. That's because, when you do, then you're going to be able to claim back conversation.

Don't expect employees to get back to you right away. Make the rules for communication really clear. And tell people they shouldn't be working on phones when they go home. Make places in your organization where there are no phones and just talking: sacred spaces for conversation. Also, when we get email we tend to speed up the pace of important decisions, so try just answering by saying "I'm thinking." Watch it go viral, it's incredible. You'll get the most odd responses.

You said you welcomed Apple's recent introduction of tools for users to manage how much time they spend on apps. But you say it's just a first step. What should happen next?

The second step is being more critical about how you design the apps and what ages do you want to be designing seductive apps for and what decisions you make about how people want to use these phones.

We really need to think about what technology we need and why. The next big seduction and time-sink is going to be virtual reality and augmented reality, which is potentially very politically conservative because you don't look at what's in front of you – you look at a fantasy. So at the same time we're starting a movement to put our phones in their place, we're super-hyping a whole new world that we're going to see through our phones. I'm very worried about a generation who don't like where they are right now not choosing political engagement and going off to virtual reality instead. ■

FROM THE GROUND UP
Kiran Mazumdar-Shaw
turned a chance meeting
into a world-class company
at the forefront of its field.

How the queen bee of biotech built her hive

She started off wanting to brew beer, but ended up leading India's first biotech startup. Undaunted by gender bias and other obstacles, Biocon's CEO Kiran Mazumdar-Shaw has sharpened her focus on global healthcare and has used her unique leadership style to build a pioneering multibillion-dollar company.

BY **Rohini Mohan**

PHOTOS BY **Jyothy Karat**

SHE IS A SELF-MADE WOMAN, one of the richest in India, and is regarded as the founder of the country's biotech industry. Kiran Mazumdar-Shaw founded Biocon in the late 1970s. It has gone on to make a range of biopharma generics to treat autoimmune diseases, diabetes and cancer and is one of the world's largest producers of insulin and breast cancer drugs. In her office in Electronic City, Bengaluru, Biocon's CEO reveals that she was neither an engineer nor a businessperson – until she discovered she had the aptitude for both.

After school, she trained in Australia to be a brewmaster, just like her father, who worked at United Breweries. It was not exactly a conventional career path for a woman in India at the time. When no one would hire her, she upped sticks and left for Scotland where a chance meeting with Leslie Auchincloss, the founder of Irish biotechnology company Biocon Biochemicals, changed her career trajectory. He let her use the name of his company and she started Biocon in India as a joint venture with him. She called her business "a multinational company." Indeed, its promoters were from two different countries. But the lesser-known fact was that Biocon was operating out of a garage of a rented house in Bengaluru (then Bangalore), with a seed capital of only of about \$1,000, an unreliable power supply and just two employees. But she gathered enough investment and began the business with an innovation for extracting enzymes from papaya and catfish to clarify beer.

When Unilever acquired the Irish company it also picked up the 30% stake in Shaw's Indian operation. Shaw noticed that overnight Lipton Ice Tea started using her clarifying enzyme and that early recognition of the possibilities of her technology visibly enthralls her even today.

Shaw's Biocon is now a biopharmaceutical and research giant focused on global healthcare. It sells drugs in over 120 countries and has one of the world's largest portfolios of biosimilars with a market size of over \$61 billion. Even after Biocon went public in 2004, few biotech companies have followed suit – they're too small, struggle to lure scientists away from universities and are unable to attract funds in clinical genomics in the way Biocon has. This is in large part because of Shaw's own efforts. Her interactions with funding, regulatory agencies, politicians and health sector leaders gave the technical biotech sector a relatable face. Here she shares some thoughts on what drove her to build the company and what made it successful.

What was on your mind when you woke up today?
Today I was to address a young group of students graduating from the Biocon Academy, and I was wondering what to say to them. I told them that unless you have a meaningful sense of purpose, you won't ask the hard questions. Biotech has the opportunity to address a plethora of big needs. For instance, India is an agrarian economy, but our farmers are challenged with poor productivity. If scientists looked at agriculture biotech we →

**\$61
billion**

The current market
size of Biocon's
portfolio of biosimilars
with drug sales in
120 of the world's
195 countries.
Mazumdar-Shaw
started with seed
capital of just \$1,000.

could find exciting new answers to ward off pests or address drought and poor soil conditions. The other opportunity is industrial biotech, where enzyme technology could create non-polluting products and fix our cities.

What was your sense of purpose when you first started Biocon?

My sense of purpose when I embarked on this journey was to make an impact on global healthcare through providing affordable access. The World Health Organization's 5.1 Program identifies that 5.1 billion people on the planet have little or no access to modern medicines. We are trying to make a difference to those people.

When you started Biocon in 1978, what were the challenges you faced?

I was 25 years old. I was a woman. I had no business experience. I had no money in the bank. And I was trying to start a company in biotechnology, which no one had heard of. I had studied fermentation technology, but no one gave a woman a job as a brewmaster. The industry had a huge gender bias. But along the way you find people who understand what you're trying to say and come on board. Without even realizing it, I believe I set up the first tech startup in India.

Why biotechnology?

When no one allowed me to brew beer, I started making industrial enzymes – only a few steps away from beer! I developed plant enzyme technology for the food industry, whether it was yeast for beer or bread, fruit juices, dairy, etc. I was trying to advance food science. I was also developing eco-friendly technology to replace chemicals, like starch. Then in 1998, I thought I could leverage the fermentation and recombinant technology for something even more exciting: biopharmaceuticals.

You kick-started the biotech industry in India. How has it evolved?

Indian pharma has made a huge global impact on generic drugs and vaccines, but biopharmaceuticals are more complex. The sterile facilities, the delicate technology and safety precautions required make them inherently expensive. So, we have to combine engineering and life science skills to develop the technology. The innovation can never end. Thankfully, the head of my R&D was this IT-crazy guy and he developed a very networked platform that kept us ahead of the curve.

"My sense of purpose when I embarked on this journey was to make an impact on global healthcare through providing affordable access."



LEADING INNOVATION
Biocon turned taking a risk on homegrown technology into the basis of its business.

200

The number of patents held by Biocon worldwide as of 2010.

5.1 billion

The number of people the World Health Organization identifies as having little or no access to modern medicines.

As a business leader, and a pioneer in the Indian biotech industry, how would you describe your management philosophy?

My driving business philosophy is highest quality at lowest cost. I've thought long and hard about that balance and found my answers in integrity and compliance. India has a reputation of not being very honest about compliance. We have a lot of issues with international regulatory bodies. I take this very seriously and I am ruthless about compliance, data integrity and quality. A proactive quality focus is key for me. Even if it takes time, even if it is initially expensive, this is crucial in the long term.

You can demand quality at the very top. How do you ensure that people throughout the company believe in the same philosophy?

By having a problem-solving mindset. This culture gives people a larger purpose, makes them more creative, more invested in quality. When they solve a problem, it gives them a sense of empowerment and achievement. I encourage my employees to not fear failure. I've tried to teach people to own problems, rather than carry out tasks.

Young researchers and scientists joined Biocon because they knew they were helping me build the company. A lot of the technologies we developed were homegrown. India was quite underresourced then, without the ability to import many ingredients or technologies, so we had to be quite ingenious, find frugal workarounds to make something very sophisticated.

Why was innovating homegrown technologies important to you?

People asked me that a lot – especially when capital was hard to come by. Nobody wanted to back a new idea. They asked: Why are you trying to take a big risk on this homegrown technology that may not scale up, may not work? I said: That's the basis of our business, that's what sets it apart from everything else in the world.

I only realized the power of our ideas when Unilever bought over our Irish partners and ascribed a huge value only to the Indian operation because of the homegrown technology. And then again, in 2010, I got huge value for the intellectual property we had created on technologies. [By 2010, Biocon had 200 patents worldwide.] That's when I



Kiran Mazumdar-Shaw

Mazumdar-Shaw entered the biotech industry via innovations in enzymes for the food industry. She has earned a reputation as a healthcare reformer and was the 2014 recipient of the Othmer Gold Medal for outstanding contributions to the progress of science and chemistry.

realized the power of patents and innovation. That is why thinking out of the box has to be firmly engrained in Biocon's DNA. That's what makes us.

Along with your business, you have set up a cancer research foundation and even subsidize medical care in some hospitals. Why is such philanthropy important to you?

I live in a country with a lot of inequities. I started to look at my own field of healthcare. Could I do more? Around then, a dear friend succumbed to cancer. She was an affluent career woman, but even she could not bear the financial burden of cancer treatment. I had developed all these affordable products, but I realized patients needed affordable treatment. So, I partnered with Devi Shetty [of Narayana Health] to replicate his low-cost cardiac care model for cancer. I built the Mazumdar-Shaw Cancer hospital and he set it up. We also insisted that we embed a translational research center.

My philanthropy is really about helping people build sustainable models. Whether it is providing a chair or a fellowship, or funding some research, it is a long-term model. Philanthropy as risk capital is important, especially since it's so rare. ■

Motown's new momentum



THEN AND NOW
Once the bustling center of the US car industry, Detroit is becoming a center of creative urban regeneration ideas, including urban farming.



PHOTOS: AFP/GETTY IMAGES, MALTE JÄGER/LAIF

After 60 years of decline, imaginative leadership is giving Motor City a new spark. Yet the question remains: Will this former jewel of the US economy step up to its former glory or will the hype simply sputter out?

BY **Bennett Voyles**

IN 1950, DETROIT WAS the wealthiest city per capita in the United States. Its 1.8 million inhabitants were among the luckiest people in a lucky country, beneficiaries of the biggest industry in the US: cars. But it didn't stay that way. As the car industry decentralized so did the city. Detroit shrunk to about 675,000 people and quickly became one of the poorest places in the US. The word "Detroit" evoked images of burnt-out neighborhoods, boarded-up office buildings, out-of-order stoplights and news stories about an \$18 billion municipal bankruptcy. Even in 2013, the city still seemed locked in a terminal downward spiral. "Everything was going pretty much to hell in a handbasket," recalls John Austin, director of the Michigan Economic Center and a lecturer on the economy for the University of Michigan.

Today, the lights are finally coming back on in Motor City, literally and figuratively. The city is out of bankruptcy. Most of the traffic lights work and the streetlights are back on at night. Class A office space is now 90% rented out, downtown apartment vacancy rates are near zero and a variety of businesses, large and small, are moving downtown. "There's a lot of optimism here right now," says Harrison West, senior research analyst in Detroit for JLL, the global real estate advisor. "People are excited about what's going on." For decades, —>

MOTOWN THEN
AND NOW
... population ...

1,849,568
1950 / 673,104
2017

people have offered various explanations about what went wrong – the decline of the US automotive industry, white flight, dysfunctional politics – but these days it's a new question: What's going right?

PART OF THE ANSWER IS NEW LEADERSHIP. Most analysts give high marks to Mayor Mike Duggan, a former prosecutor in suburban Wayne County who positioned himself as a can-do technocrat focused on delivering basic services. He reduced emergency medical response times from 18 minutes to 8, the national average, and police response times for high-priority emergency calls from as much as 58 minutes in 2013 (a claim that is sometimes disputed) to 14.5 minutes. Although some of these gains were accomplished by moving the goal posts, such as redefining what constituted a Priority 1 police call, many of the changes were real. For example, he added new vehicles to the city's fleet and had fire fighters cross-trained as paramedics.

The new leadership does not end with Duggan. A consortium of private philanthropists and local businesses paid \$700 million to help reduce the impact of the \$18 billion bankruptcy, offsetting some of the cuts made to municipal workers' pensions and preventing the sale of the world-class Detroit Institute of the Arts. All in all, Austin says, it was "pretty amazing to make it all work without selling off more of the crown jewels downtown that the city owned." A new approach to urban planning helped change perceptions of the city. The "Lighter, Quicker, Cheaper" (LQC) philosophy applies a dose of startup thinking to urban spaces. Instead of focusing on major long-term investments, LQC proponents try to create inviting places for people to congregate on the theory that creating a sense of community will drive other opportunities and more investment.

In Detroit, this has meant implementing small-scale experiments to bring desolate corners back to life in cheap and creative ways, such as the urban beach that Southwest Airlines built on a disused lot, summer concerts co-sponsored by local entrepreneur Dan Gilbert, or a mass yoga class, according to the Project for Public Spaces. And the city's new openness to innovation has also led to some rapid improvements in traditional services

*RETURN TO THE CITY
Many young college-educated professionals prefer to live and work in urban locations over the suburbs.*



PHOTOS: MALTE JÄGER/LAIF (2)



*RELIQS OF THE PAST
Once a plush movie palace, the Michigan Theater is now used as a parking garage.*



*BLANK CANVAS
Small-scale experiments are being used to draw foot traffic to the city's empty spaces.*

... unemployment rate ...

27%
2010 / 9.9%
2018 as recorded in January

as well. Police dispatchers now have Uber-style maps to monitor the whereabouts of patrol cars, enabling them to assign calls to specific units.

INTERNET OF THINGS TECHNOLOGY is also being used to deliver better service for less money. Miovision, an Ontario, Canada startup, has installed monitors at many of the city's traffic lights, making maintenance much simpler. In the bad old days, when a light went out, it tended to stay out. "There was no way for the city to know what was happening," says Lynda Chau, chief marketing officer of Miovision. "Unless you had a concerned citizen who called in, the city would have no way of knowing that part of their traffic network wasn't working." Now, city workers know in advance when a repair needs to be made. And that's only the beginning. Miovision is now using the city as a test bed for what it calls the "World's Smartest Intersection," a package of new technologies that features such innovations as traffic lights that stay yellow a little longer when they sense a cyclist crossing.

Of course, large-scale commercial real estate investing has also played a major role in the city's revival. The exodus of manufacturers from downtown Detroit was a key reason for the city's

"There's a lot of optimism here right now ... People are excited about what's going on."

Harrison West, Senior research analyst at JLL

PHOTOS: CHRIS REEVE/LOOP IMAGES/LAIF



THINKING BIG
President and CEO
of Ford Motor Co.
Jim Hackett inside
Michigan Central
Station. He will
redevelop the
former train depot
as part of a new
downtown campus
for autonomous
and electric vehicle
businesses.



... police
response time...

58 min

2013

14.5 min

today

decline in the 1950s and 1960s. As business left, the tax base shrank, and many people – particularly white people – followed. Some parts of the city became near ghost towns.

PARTICULARLY IMPORTANT was local entrepreneur Dan Gilbert's 2010 decision to move his company, Quicken Loans from the suburbs and into downtown. "Once [Gilbert] moved his employees down there, he started gobbling up real estate – vacant office buildings, vacant apartment buildings – for pennies on the dollar. A lot of these buildings are 100-year-old, historic, beautiful buildings; they'd just been neglected," West recalls. Today, the mortgage mogul's real estate firm, Bedrock Detroit, owns over 15 million square feet of apartment and office space in Detroit and Quicken now employs over 17,000 people in the city.

Other companies have followed suit, the latest being Ford Motor Company, which announced its plans to take over Detroit's central train station. "I would say that is the biggest sign of the turnaround

FORMER GLORY
Michigan
Central Station
is just one of
many landmarks
set to make a
comeback.

that we've had so far," says JLL's West. "That building has been a symbol of the decline of the city for the past 30 years, and to have someone like Ford come in there and renovate it and build a campus there, it's going to completely transform that neighborhood."

Today, Bedrock and other developers are even resorting to new building. "At this point in time, there's really no big blocks of space for a new tenant to come in and occupy it. All the Class A space has been occupied now. And it's not just the behemoths that have returned," according to West. One factor in the decline of Detroit had been the post-war enthusiasm for suburbs. Now the pendulum is swinging back. For many millennials, urban life is the more attractive option, and that shift is pushing employers on the lookout for talent to relocate to big cities, including Detroit.

To an extent, the gambit seems to be working. The population is still declining, as it has been since the 1950s, but the rate of decline is lower than it's been in decades, just 3,541 in 2016, and

PHOTOS: BLOOMBERG/GETTY IMAGES (2)

PHOTOS: ELIO MOTORS

the city is gaining many new, highly skilled residents: At 78%, Detroit had the fastest growth in numbers of college-educated millennials of any city in the US between 2010 and 2015, according to a 2017 study published in *Forbes* by Pete Saunders, a Chicago-based urban planning consultant. "There is a real interest and kind of a market for Detroit as an urban place to develop and a kind of cool and interesting, Berlin-like place to be," says Austin – and it's a trend he expects to see continue. "You will see a kind of continued colonization outward of neighborhoods and new conversion developments and business and commercial and entertainment districts expanding."

BUT THERE'S A LOT OF WORK AHEAD. The crime rate is declining about 5% a year, but it's still well above most US cities. Over 5,800 vacant homes have been torn down, but as many as 29% of the city's structures are falling apart and still need to be repaired or razed, according to an estimate by the Skillman Foundation, a local advocacy group. There is also no consensus yet about what to do with the wide open spaces that remain once the houses are razed, and some analysts say the economy remains too dependent on the automotive industry – especially at a time when the future of cars is uncertain. The resistance of the white suburbs towards building a metro area-wide transportation system has also slowed development, according to Austin. "We're the one major metro in the country that doesn't have a regional transportation system that is integrated and has public transportation that works," he says.

"There is a real interest and kind of a market for Detroit as an urban place to develop."

John Austin, Director of the Michigan Economic Center

The biggest difficulty, however, may be the persistence of the city's historically sharp racial divide and many long-time residents in the largely African-American city feel the recovery has not yet arrived for them. "When you see all these hipsters and techies and white college kids, white young people, running around and living in lofts downtown, they're like, 'What's up with that? Where's my Detroit? How is this working for me?'" Austin says. That's a problem not only for the long-term residents, but also for the city, since their resentment discourages newcomers. Many immigrants from other countries who come to Michigan continue to shun the still largely African-American city.

Detroit mystery writer Elmore Leonard once noted that "[t]here are cities that get by on their good looks, offer climate and scenery, views of mountains or oceans, rockbound or with palm trees. And there are cities like Detroit that have to work for a living." For the next few years, at least, Detroit and its boosters still have their work cut out for them. The good news is that they're finally getting somewhere. ■

90%

The minimum estimate of downtown Detroit Class A office space currently rented out.



Starting up Detroit again

From Henry Ford and the Model T to Berry Gordy and Motown Records, Detroit has a long history of innovation. Detroit may not be Silicon Valley yet, but the startup scene does seem to be getting bigger all the time. Here are a few of the current contenders:



→ SHINOLA
A luxury brand specializing in retro-American products, manufactured right in Detroit.

→ ELIO MOTORS
An 84-mile-per-gallon, three-wheel vehicle with a target price of \$7,450 that designer Paul Elio hopes

will make transportation more affordable.

→ CITYINSIGHT
An app that lets residents track water usage in real time, pay utility bills and get mobile customer support.

→ TWISTED WATER
Founded by a local entrepreneur with a

diabetic son who saw an undeveloped market for healthy drinks, Twisted Water and its sister brand Wow Water are low-calorie drinks with no high-fructose corn syrup or gluten.

→ SENTINL
Maker of Identilock, a biometric fingerprint trigger lock invented by

former automotive engineer and gunshot victim Omer Kiyani as a way to make guns safer.

→ PLUM HEALTH DPC
A by-subscription healthcare service founded by Paul Thomas, a local MD, that bypasses the entrenched and expensive private insurance market.

Food for thought



Take a deep dive and find out more in related articles and studies.



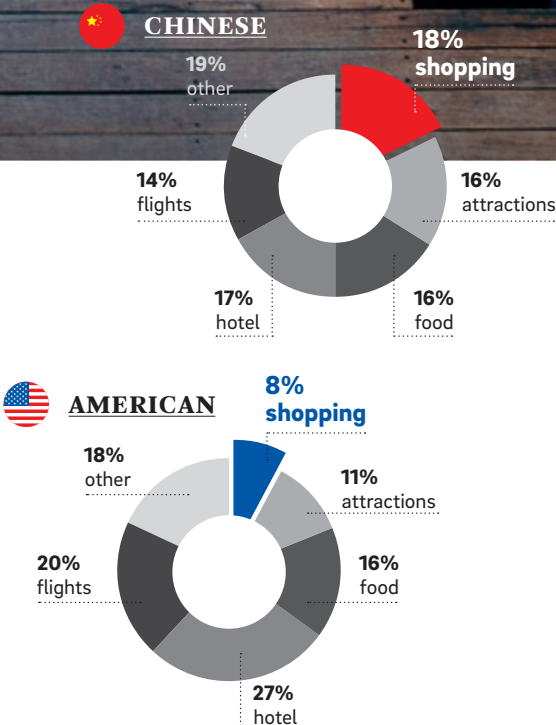
MILLENNIAL MOMENTUM

Millennials and the changing face of travel

YOU MIGHT BE USED TO hearing about millennials being courted in a recruitment drive, or as the caffeinated fuel in the flat white economy. Now you can add another area where this hyped demographic is having an impact: tourism and travel. For the 18–34-year-olds that make up this group, travel expectations are very different from previous generations and their digital savvy is bringing a new momentum to the travel industry. The revival of the urban break is one factor; so too is the blurred line between business and leisure trips, now with its own buzzword – *bleisure* – to explain how work blends into holiday, bringing with it all sorts of retail opportunities.

→ **THE GENERATION SHAPING TRAVEL AND SHOPPING HABITS**
Find out what the 18–34s are looking for in travel, business and leisure and how they differ from others: <https://rb.digital/2NK30yw>

share of expenses when traveling



SOURCE: EXPEDIA MEDIA SOLUTIONS, 2017

REDEFINING HEADQUARTERS

The corporate HQ is dead! Long live the corporate HQ!

Corporate HQs (CHQ) are so last century. Or are they? RB's new study finds increasing digitalization means a growing trend in decentralization and with that a changing function for CHQs, with more of a tendency for shared service centers. Report co-author RB senior partner Fabian Huhle says this doesn't mean the erosion of the CHQ, rather a challenge to adapt and grapple with disruptive trends. It's less about geographical decentralization and more about linking up decentralized competency across organizational boundaries, orchestrated by the CHQ.

→ UNDER PRESSURE FROM DIGITALIZATION

Read about the changes that are causing CHQs to question what they do: <https://rb.digital/2P9GZt4>



Spinal disc replacements – a new use for 3D printing.

ADDITIVE MANUFACTURING

Material change

Additive manufacturing (AM) is the process where layers of a material are added to build up a 3D object. Exciting possibilities lie ahead for metal manufacturers, if they can keep pace with new technology. RB's latest report shows many are simply not yet equipped to take advantage of AM – or even to stay up to date with the developments. The report offers a four-step approach to build a technology road map for future success.

→ AM ON THE BRINK OF INDUSTRIALIZATION

Get up to speed on the new processes and techniques in the future field of manufacturing: <https://rb.digital/2MdhHcn>



Zunum Aero is focusing on electrically powered 6–12 seater aircraft.

NEW POWER

~100

electrically propelled aircraft are in development around the world today.

ELECTRICAL JET PROPULSION

Battery-powered flight is on the runway

THE BURGEONING TREND for electrically powered jet travel is taking off. By 2032 there could be 50-seater hybrid electric aircraft operating between London and Paris, according to RB's new study. There's good reason for the shift: If things carry on as they are, by 2050 aviation could account for as much as 25% of global carbon emissions. Battery power could have a huge impact on the aerospace industry and those piloting the way ahead both in industry and research are enthusiastic.

Andreas Thellmann, project executive at Airbus, thinks that all-electric propulsion could be applied to short-distance helicopter travel – and that could see changes in city infrastructure, with landing pads for flights. Ashish Kumar, founder and CEO of Zunum Aero, is driven by the possibilities: "All our focus is on the six-to-12-seat, 700-mile aircraft," he says. He is expecting to bring it into service in 2022 to kick off the commercial electric era. Chocks away!

FUTURE FLIGHT

"For the first time, our industry can envisage a future which isn't wholly reliant on jet fuel."

JOHAN LUNDGREN, CEO of easyJet



→ ONWARDS AND UPWARDS

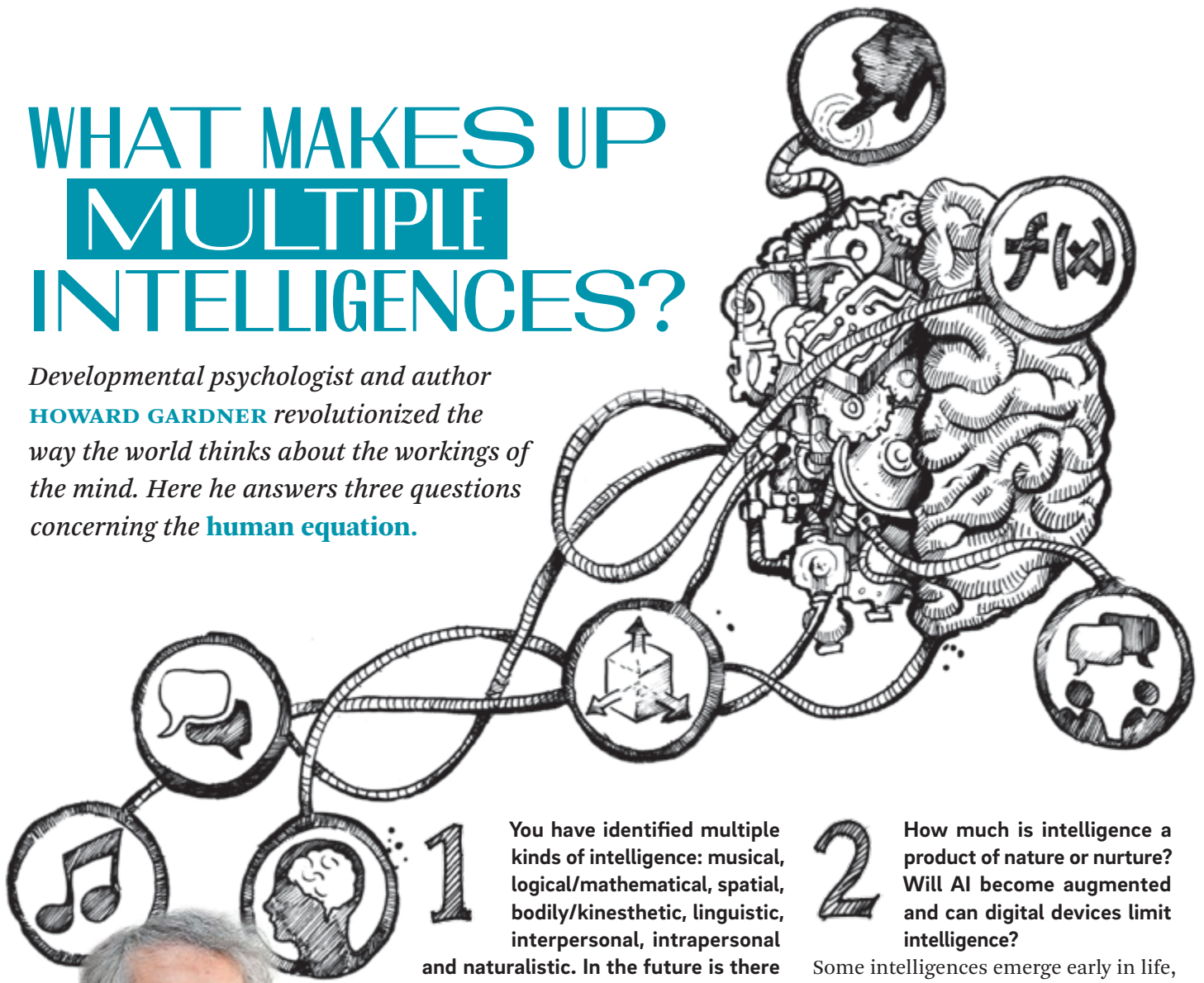
Read about how innovation will change air travel: <https://rb.digital/2LkGrSD>

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WHAT MAKES UP MULTIPLE INTELLIGENCES?

Developmental psychologist and author **HOWARD GARDNER** revolutionized the way the world thinks about the workings of the mind. Here he answers three questions concerning the **human equation**.

ON BEING HUMAN



1 You have identified multiple kinds of intelligence: musical, logical/mathematical, spatial, bodily/kinesthetic, linguistic, interpersonal, intrapersonal and naturalistic. In the future is there one kind of intelligence that will have more sway than the rest?

This changes all the time. At present, logical/mathematical intelligence (computing, coding) is the most useful. But once AI and robots are smarter than us at our most important tasks, then other intelligences – especially personal ones and ones used in the arts – will become more valued. In general, intelligences emerge very slowly, over centuries. But as new technologies emerge, intelligences can combine in unexpected ways. For example, Twitter links linguistic and interpersonal intelligence.

Howard Gardner

Author of *Multiple Intelligences: New Horizons in Theory and Practice*, Gardner is a professor at Harvard University.

2 How much is intelligence a product of nature or nurture? Will AI become augmented and can digital devices limit intelligence?

Some intelligences emerge early in life, others are far more the product of practice over decades. Whether AI will limit our human intelligence is up to us: As Katie Davis and I wrote in *The App Generation*, we can use technology to enable new forms of thinking or we can become dependent on them and let our cognitive potentials atrophy.

3 How important are the arts for human development?

In my view, a life without the arts is not much of a life. For some people games can substitute, but they do not rival knowledge of arts in the past, appreciation of today's artists and, most important, the opportunity to make art for oneself. I'm not an artist but I play the piano every day and when I visit a new city, my first trips are to museums. ■

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→ PAGE 12

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