SEE YOU IN THE FUTURE

Imagine how your business will act on today’s trends tomorrow.

ACCENTURE RESEARCH
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WHAT ARE BUSINESS FUTURES?

Organizations should contemplate alternative futures built on predetermined trends and logically consistent assumptions.”

Vikram Mehta, Chairman, Brookings India and Senior Fellow, Brookings Institution
“One of the most striking features of the economic landscape over the past 20 years or so,” Federal Governor Ben Bernanke told a gathering in Washington early in 2004, “has been a substantial decline in macroeconomic volatility.”¹

Four years later, Lehman Brothers collapsed. The largest bankruptcy in United States history plunged the world into financial crisis and heralded the onset of the worst recession since the Great Depression.

**Few people saw it coming. Yet the trends that led to the downturn were already in play.**
But, if these and other indicators were apparent, why did the calamity catch so many economists, policymakers and business leaders by surprise?

We believe it was a classic case of not seeing the forest for the trees, a failure to see how the collision and interplay of several individual trends could create an entirely different economic and business environment.

Recognizing trends is not the same thing as imagining what might happen when trends intersect. Not that making sense of it all is easy. Indeed, a recurring theme we encounter in our conversations with corporate executives is that despite—or perhaps because of—the exponential increase in the amount of information about trends and the availability of sophisticated quantitative models to analyze them, strategic decision making today is more complex than ever before.

**To address this decision-making challenge, we propose a new approach: We call it Business Futures.**
Business Futures is an analytical approach that aims to combine insights from data-driven forecasts with speculative storytelling to hone practical decision making about the future (see Our Approach on p.82 and meet the Advisors who helped shape our Futures on p.84).

In the pages that follow, we present four key business futures out of the many possible scenarios that we envisioned using this approach. For each future, we explore a story from 2023—a fictional but plausible version of the issues that will affect the business environment if the trends we observe now continue to collide. By engaging in imaginative thinking that is grounded in horizon scanning and text analytics, corporate executives will be better prepared to anticipate the future from multiple new perspectives—and more able to lead their companies to success.
Let us take you on a journey to help you better understand some of these Business Futures. We outline trends impacting the future, explore the challenges and opportunities for today, and step inside 2023 to see what it might look like.

“We are rather good at seeing trends coming but we constantly underestimate the impact of their interplay and the way they combine and influence each other.”

Bruno Giussani, European director, TED, and Co-founder, Giussani Group
BUSINESS FUTURE #1:
THE WORLD OF “TECHNO-POLITICS”

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Growing populism and anti-globalization sentiments have led to more strict state control over digital technologies and the cross-border flow of data and information. But companies that develop geopolitical as well as technological savvy are likely to be rewarded.
The trends driving the “Techno-Politics” future:

- rising inequality
- increasing populism
- rising economic nationalism
- rising data nationalism
- massive expansion in digital data
- the digitization of everything
WHAT’S DRIVING THE WORLD OF “TECHNO-POLITICS” TODAY?

ANALYSIS
CHALLENGES
OPPORTUNITIES

“Companies must make geopolitical awareness part of their DNA.”
Nader Mousavizadeh, Co-founder & Co-CEO of Macro Advisory Partners
There are already signs of rising economic nationalism and stricter state control over the cross-border flow of data and information. For example:

- Russia requires that companies processing the personal data of its citizens must use databases physically located in Russia.\(^2\)
- Fewer than 40 countries had data privacy laws in 1997; today, there are 120.\(^3\)
- Since 2008, more than three times as many trade restrictions have been put in place among G20 countries than have been removed.\(^4\)
The trend toward geopolitical fragmentation has gone hand-in-hand with—and arguably represents a reaction to—the growing ability of technology to connect the world. Outsourcing and labor-saving technologies lie behind much of the recent increase in income inequality in many countries, across the OECD.

Almost as important is the extent to which inequality has become more obvious to the public, as communications technology makes it easier than ever for people to compare their own situations with those of others, in their own countries and elsewhere.

The widening gap between expectations and perceived reality is stoking populism and discontent with “establishment” institutions, including governments and large businesses. In 2016, references to multinationals in the media were more negative than at any point in the previous decade. Exacerbating economic concerns, societal cohesion is often being challenged by rapid changes in culture, making groups that once belonged to a privileged majority feel marginalized.

The richest 10 percent of the population now earn nearly 10 times the income of the poorest 10 percent, up from seven times in the 1980s.¹
Technology is also empowering a wide range of people to act on their disaffection, challenging the state in three new ways.

First, social media connects like-minded people, facilitating cyber-activism within and across countries—with the worrisome result that incorrect information can spread quickly among like-minded people, and be difficult to challenge. Second, cyberspace opens new opportunities for cross-border criminal enterprise, such as phishing; according to ThreatMetrix, the third quarter of 2017 continued to see a significant increase in cyber attacks from emerging economies. Third, emerging technologies can alter geopolitics dramatically by opening new possibilities in warfare, such as the Islamic State hacking commercially available drones to drop small bombs.

In the next three to five years, more friction is likely to occur between the world of technology and the geopolitical landscape, bringing in its wake threats to national security, social stability and data privacy.
Within five years, companies could face much stricter state control over digital technologies.

Growing populism and anti-globalization sentiments could lead governments to focus more on erecting digital borders to accompany economic and physical ones, and on shaping what happens within those borders.

Weaponization of emerging technologies, such as drones, robotics and AI, is likely to make governments more aware of the risks and strategic importance of these technologies, and more willing to intervene in their development and use for business.

Companies could face greater reputational risks from the rapid spread of misinformation.
Advancing technology
As advancing technology continues to cause industries to converge, companies from more sectors might feel the constraints inherent in data nationalism that now mainly affect IT companies. This could slow the pace of innovation in areas that rely on the exchange of data, such as personalized healthcare, connected cars, and the smart home.

Data flow
Increasingly, it may become difficult to run a global business that relies on the free flow of data and digital technology, with multinational companies having to bear higher operational and compliance costs. Their ability to provide data analytics and cloud services across markets could be compromised, which could lead them to reassess their geographic footprint or reallocate investments across markets.

Talent
Companies may face greater challenges attracting and retaining talent. Governments, under pressure from citizens who fear losing their jobs, may introduce new restrictions on the nationality of employees. Companies might also find that their own employees’ growing awareness of the different pay levels offered in different locations undermines employee morale and productivity.
Corporations that develop geopolitical as well as technological savvy are likely to be rewarded. So are those which pursue a “multi-domestic” strategy, working with governments to shape national ecosystems and seeking to develop new partnerships—for example, with local firms—that deepen their understanding of local markets.

Organizations may benefit from developing new technology, products, services and business models that are demonstrably socially beneficial. Current examples of such efforts include the low-cost satellite networks planned by Samsung, Google and SpaceX, which will enable more people in low-income communities to access the economic opportunities provided by the Internet; the mobile-enabled temperature sensor device developed by Nexleaf Analytics, which remotely monitors vaccine refrigerators in countries such as India and sends SMS alerts of any problem; and the “Disputed by fact-checkers” banner recently introduced by Facebook in response to concerns about misinformation.
Sales executive Gérard Montagne commutes daily to Ghent in Belgium from his home in Lille, France. Until last week, he could almost literally make the trip blindfolded: His car’s AutoDrive feature handled all the highway driving. But, since the French government’s emergency data control regulations came into force, he can use the feature only within French borders. Today, as he approaches the Belgian frontier, he disables AutoDrive and takes control of the steering. “It’s really annoying,” complains Montagne.
Montagne and other French motorists may have a sympathetic ear at the Ministry of Transport in Paris.

The ministry has issued a clarification saying that the new regulations—which, among other things, require all data pertaining to French citizens to be processed and stored on servers physically located in France—were not intended to hinder French citizens driving French-registered cars across borders. Meanwhile, the ministry has summoned carmakers for urgent talks to explain how the regulations apply to motorists.

For their part, carmakers are wary and have temporarily disabled some features until their legal liability is clarified. And who can blame them, given recent, high-profile examples of companies breaking new rules that are often complex and unclear?

Last week, a leading energy company was fined EUR 1.3 billion for failing to adequately separate its EU and United Kingdom data processing before the end of the pre-Brexit transition period.
“Digital technology is connecting the world, while geopolitics is fragmenting it,” laments Tatjana Mäkinen, a senior policy analyst at Technology 4 Equality (T4E), which was set up in 2019 to advocate for cyber openness and transparency.

“A few years ago, only the likes of China, Russia and Turkey were imposing onerous nationalist restrictions on data. Now, it seems everyone’s caught up in tit-for-tat responses. Moving data across borders has become difficult, global supply chains are more challenging to manage, and Digital Rights Management (DRM) and Intellectual Property (IP) protection have become a legal minefield.”

The new, stringent, French regulations were hastily approved after the terrorist attacks on July 14, 2023, when hijacked outside-broadcast drones—allegedly hacked from servers based in North Africa—were crashed into Bastille Day events in Marseilles and Paris. The laws were the sort of response voters had demanded when they elected the populist La France au Travail coalition to form the new government. During the campaign, the party had stressed that it is as important to secure virtual borders as physical borders—as online trade grows in importance, transactions are increasingly made in virtual money or cryptocurrency, and cybercrime is rampant.
France is not alone. “Populists everywhere have rebranded themselves, softening their image and broadening their appeal,” says T4E’s Mäkinen. “Rather than encouraging voters to blame immigrants for widening inequality and the lack of stable, well-paid work, they are stirring up popular resentment against technology companies and big business.” They have also raised concerns about privacy and the manipulation of information: “La France au Travail won, in part, by exploiting public anger about the perceived attempts by social media platforms to tweak voters’ newsfeeds in ways that would nudge them to vote for more mainstream parties.”

So far, the tide shows few signs of turning. The United States recently imposed punitive levies on 3D printers made by non-US-based companies. Meanwhile, new federal procurement regulations require bidding companies to disclose the percentage of workers who are United States citizens in each of their locations.

The impact on businesses has been profound. From connected cars to personalized healthcare, companies that built their strategies on global expansion are struggling to cope with higher operational and compliance costs.

The Accenture CEO survey 2023 found that 83 percent are actively reassessing their geographic footprint, delaying or abandoning plans to enter new markets.
How should companies operate in a world where more restrictions are affecting data, technology and people?

“Every multinational that wants to become a digital business now needs to be geopolitically savvy,” counsels Mäkinen. “That means working with national governments to try to shape the environment within national borders, and forming new kinds of local relationships. Sometimes we find that the same service can be offered under different brands in diverse markets.” Many companies are moving in this direction, a trend that has spawned a new buzzword: the GMDC—“globalized multi-domestic corporation,” as opposed to multinational.

Many GMDCs are also embracing a phenomenon known as “radical transparency,” going above and beyond legal requirements to be open with data about their employees, supply chains and operations. But not everyone is convinced: One recent study found only modest evidence of recovering levels of public trust in the private sector. The survey also pointed to lower employee morale as workers become more aware of the earnings of their counterparts in other geographies.
Mäkinen’s group is frustrated that more GMDCs aren’t coming to the defense of technology as a force for good. Notes Mäkinen:

“These crazy situations, like AutoDrive turning off at the France-Belgium border, should provide an opening to educate voters on the costs of virtual borders. Because often those costs aren’t obvious.”

“I recently talked to a leading drone manufacturer about how much effort they’re having to put into protecting their IP in different jurisdictions—and how that complicates the process of improving their technology. Among other things, their drones are delivering vaccines to remote areas. The more efficiently they work, the more lives they save.”

Mäkinen reels off standard examples of innovation improving lives:

- Community-level solar power, dramatically increasing the availability of electricity.
- Low-cost satellite networks, spreading Internet access and creating new economic opportunities in emerging countries.

But, in the wake of the Bastille Day attacks, La France au Travail has turned “the-Internet-is-good-for-you” on its head: The party warns that spreading Internet access means that more cyber terrorism and criminality will emanate from emerging countries that are supposed to be the beneficiaries of the technology.

And if that argument carries the day, techno-borders are unlikely to come down any time soon.
What does this mean for your business?

- The weaponization of emerging technologies, such as drones, could lead to greater government regulation of their use.
- Disaffection with established institutions could harm those that are perceived as insiders.
- Technology is creating new sources of reputational risk for organizations.
- Companies will look for opportunities to use, and demonstrate, the potential of technology for good.
BUSINESS FUTURE #2: REDESIGNING LIFE

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Wearables and apps that boost physical and mental performance have improved employees’ performance in the workplace, while greater longevity and health consciousness have spawned new products and services in a wide range of industries. But the blurring of the boundaries between personal and professional life has raised serious ethical and legal issues.
The trends driving the “redesigning life” future:

- Increasing number of older people
- Rising bio-connectivity
- Increasing investments in AI
- Increasing number of massive health data sets
- Growing interest in enhancing human performance
WHAT’S DRIVING REDESIGNING LIFE TODAY?

ANALYSIS
CHALLENGES
OPPORTUNITIES

“The blurring boundaries between silicon and biological, artificial and natural, mechanical and living systems are creating risks and ethical concerns.”

Angela Wilkinson, Oxford Futures Limited
The dramatic increase in life expectancy in the past 100 years is one of humankind’s greatest achievements. Yet, the sheer size of the aging population is challenging public budgets for healthcare and retirement. United States state, local, and federal governments are estimated to be about US$7 trillion short in funding future pension payments for public employees. In addition, the funding gap for Social Security and the hospital insurance component of Medicare is estimated at US$16.6 trillion. China’s pensions shortfall will probably reach US$11 trillion in the next 20 years.

At the same time, chronic illnesses, which lower people’s cognitive and physical performance, are more prevalent: the number of people with Alzheimer’s is projected to nearly triple by 2050. Mental illnesses also appear to be occurring earlier: rates of depression and anxiety among teenagers have increased by 70 percent in the past 25 years.
Increasingly, technological innovation is playing an important role in tackling these health concerns—and improving not just life span but also healthspan.

Companies such as Neuronetics, BrainsGate and Lumosity are researching brain-boosting technologies. The social impact of self-driving cars will include helping the elderly to be more mobile. Assistive technologies, such as communications robots, are showing some effectiveness with dementia patients. Numerous research institutes, technology titans and startups, such as the SENS Research Foundation and Google-backed Calico, are focused on understanding aging at the level of genes, cells and tissues.

At the same time, millions of sensors attached to everyday objects and individuals are creating high volumes of data that are being used not only to measure and track human behavior and performance, but also to predict, alter or enhance it.
Wearables, sensors and health apps are empowering individuals to take more control of their well-being and lead healthier lifestyles.

Affordable DNA tests offered by companies such as 23andMe and AncestryDNA provide people with information about their genetic profiles,\textsuperscript{20} while platforms such as ZocDoc and Haodf expand choices and transparency in healthcare services.\textsuperscript{21}

In the next three to five years, the growing ability of AI and quantum computing to derive insights from massive data sets may enable the rise of digital avatars capable of answering specific patient queries and scheduling appointments with specialists, and real-time analysis to identify potential problems. Technology could help humans to live lives that are not only longer, but also healthier and happier.
Wearables and apps that can improve physical and mental performance have obvious potential to improve employees’ performance in the workplace. But their further blurring of the boundaries between personal and professional life is likely to raise ethical and privacy issues.
**Data sharing**
There could be more debate about several issues—the extent to which employers can expect employees to share data, such as their physical movements around work premises and how often they take a screen break; the responsibility of companies to prevent the data being hacked; and possible discrimination against employees deemed to have a higher risk of being sick.

**Work-life balance**
Concerns will extend beyond the workplace. As people live longer, companies may need to provide a supportive environment for employees whose work-life balance is challenged by the practical and psychological burdens of caring for elderly relatives, in the same way many companies cater to employees with young children.

**Career paths and training**
As rising life expectancy challenges the current social contract, and leads to more pressure on workers to stay in the workplace beyond current retirement age, companies could face a greater need to manage teams of workers from several generations—with not only different strengths and talents, but also different attitudes, raising the risk of stereotypes undermining morale and productivity. Career paths and training programs may need to be rethought to make best use of aging, but nonetheless valuable, talent.
Greater longevity and health consciousness could present opportunities to redesign products and services in a wide range of industries. For technology companies, there is significant potential to create value by extracting insights from health data that currently exists in silos.

For example, in 2016 Apple acquired Gliimpse, a startup that had built a personal health data platform that enables Americans to collect, personalize, and share their health data. Together with Apple’s CareKit open-source platform, HealthKit app, Apple Watch and iPhone, the company is establishing an end-to-end experience for consumers.

If the ethical and privacy challenges can be met, many companies will be able to improve productivity and safety through wearables in the workplace. For example, wearables with EEG sensors can be used to monitor brain activity and help employees with time management by suggesting the best moments to focus on difficult problems.

Technologies that enhance cognitive and physical performance should also enable companies to benefit more from loyal and experienced older employees whose productivity might otherwise decline with age. Elon Musk’s company, Neuralink, is hoping to create devices that can be implanted in human brains. This digital layer for human brains could significantly boost intelligence and ultimately create brain-to-brain knowledge networks.
IMAGINING
REDESIGNING
LIFE TOMORROW

OCTOBER 1, 2023
BUSINESS IMPLICATIONS
Over lunch, Harvard MBA students are discussing the job offers they have received. Bao Hou will join Taste23, which produces personalized nutrient shakes based on an individual’s DNA profile. Kavi Patel will work on inter-generational wealth transfer products for a top investment firm. Otto Abel is taking up a research role with New Social Contract, the public policy think tank best known for advocating a universal basic income as a response to tech-disrupted labor markets.
Two themes emerge from the conversation.

Their new roles reflect how rapid improvements in healthcare and longevity are transforming industries and society. And most students are excited about their new employer’s offer to help them better control their health, principally with the aid of wearable technologies.

The exception is Kelly Borislavov. “You don’t worry,” she asks her peers, “about giving your employer access to your innermost thoughts?”

“I mean, if the IT department monitors all your EEG readouts, they’ll see if you’re annoyed when you receive an e-mail from your boss. Or thrilled when an attractive co-worker invites you for a coffee.”

Kavi Patel smiles and shrugs: “I don’t think I’d have had many offers if I came across as a privacy freak. And why wouldn’t I want to take any opportunity to stay healthy?”

“I love my virtual personal assistant reminding me to drink and take regular breaks. My employer has a wellness avatar that, if I enable access to my medical history and genetic code, will give me incredibly precise, personal medical advice.”
Borislavov isn’t buying it:

“And if they let you go? Did you read about that tech employee who committed suicide last week?”

“She couldn’t get new medical coverage after she left her job, because insurers could access all the data her company had collected on her—and none of them were willing to cover her medications for depression and psychosis.”

Otto Abel sees such cases as inevitable wrinkles in the transition to a new paradigm. He says:

“You ain’t seen nothin’ yet. When companies have brain-to-brain knowledge networks via neural laces, you won’t be able to opt out and still do your job properly.”

Abel is betting that Chinese companies will embrace the idea and that the United States cannot afford not to. “Anyway, people forget how quickly we all came to accept what the consultants called ‘productivity-enhancing tech.’ As recently as 2017, it was still seen as newsworthy when companies asked their employees to agree to be microchipped.”
For older generations, who did not grow up using apps and devices to track everything from their calorie intake to sleep patterns, the workplace wearables trend has been more of a culture shock. Oyibo Abiodun, Associate Professor of Productivity and Privacy at MIT, notes that opting out is becoming more frowned upon. “A few maverick Wall Street traders, for example, still refuse to have their hormone levels tracked. But the data are so clear about the link between spiking testosterone and excessive risk taking that most welcome the monitoring as a way to do a better job.”

Abiodun notes that proving you are fit to do a job is not a new phenomenon. Aircraft engineers, he points out, have always accepted the need for regular physical checks. “What’s changed with the so-called new Taylorist revolution—a technologically driven boom in measurement similar to that of the 1920s—we’re becoming so much better at analyzing employee health data in ways that can significantly impact a company’s bottom line. That’s especially true with older workers. Traditionally, productivity declined with age.

Now, companies can do a lot to arrest decline, with exoskeletons, for example, or testing employees’ alertness each morning and giving them personalized nootropics (cognitive enhancing drugs).”
Cultural attitudes toward workplace wearables began to shift during the 2020 United States presidential election campaign, suggests Abiodum. “Both candidates were in their 70s, and both agreed to wear EEG devices and other fitness monitors and make the data publicly available, to prove to voters that they weren’t too old for the job.”

Otto Abel, the student going to work at New Social Contract, agrees that the 2020 campaign put several aging-related issues onto the public agenda. He notes that life used to be viewed as separate stages: education, work, retirement. But working lives have become more fluid, he says. “Now people pre-retire, working part-time for a decade or two. They un-retire. And during the campaign, people talked much more about these issues.”

Abel also puts those issues in a much larger context. He notes that policy measures, like the Employee Family Flexibility Care Act, which gives workers expanded rights to take time off to arrange care for elderly relatives as well as to look after their children, “are only scratching the surface of what we need to think about. There’s:

- Urban planning—how can we make housing work for four or five generations living in the same place?
- How can we afford pensions, Social Security and Medicare?
- Credible projections that global population could reach 14 billion: Can the world support that many people?
- And, now that good health in old age is more a matter of personal responsibility for lifestyle than getting lucky with your genes, how should healthcare policy reflect that?”
While leaders struggle with those questions—or try to ignore them—companies are busily redesigning products and services to reflect the longer-lived society.

Kelly Borislavov has a job lined up with one such firm, Oldr, a startup helping older people stay safe and connected. The company uses AI to simplify tasks, such as video calling and online shopping, and its apps can monitor everything from an elderly person’s activity around the home to transactions on their bank account, alerting family members to any unusual patterns.

Better still for Borislavov, Oldr is taking a stand against workplace wearables. “It’s a perfect fit for me,” she says with a smile. “The founder is as skeptical as I am about AI-Taylorism. Yes, we can track how productivity increases, but not the unintended consequences.”

Borislavov continues:

“Does pervasive micro-tracking suppress creativity? Will personalized nootropics create addiction problems? My new boss likes that I value my privacy. She says that it helps me to understand the target market.”
What does this mean for your business?

- An intense focus on quantification and productivity metrics could have countervailing effects on creativity.
- Cognitive enhancement offerings to employees could become a new dimension in competing for talent.
- New exclusions could emerge, giving rise to a class of “uninsurables”.
- Transparency on the use of customer and employee data, and ways to safeguard it, will become the subject of major public debate.
BUSINESS FUTURE #3: THE IMAGINATION ECONOMY

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Advances in virtualization and immersive technologies have dramatically altered the way the world does business, with the wholesale reevaluation of strategies, business models and operations across many industries and sectors.
The trends driving “the imagination economy” future:

- Increasing demand for “experiences”
- Increasing economic nationalism
- Greater environmental concerns
- Growing consumer and enterprise appetite for immersive technologies
- Rising importance of innovation and speed as critical success factors
WHAT’S DRIVING THE IMAGINATION ECONOMY TODAY?

ANALYSIS

CHALLENGES

OPPORTUNITIES

“The Imagination Economy will create and disrupt economic value across multiple industries.”

Tim Harford, author, “Fifty Things That Made The Modern Economy”
Despite the remarkable progress of technology, from the telegraph to fax machines to video-conferencing, the physical constraints of distance and geography still shape how we live, work, produce and consume.

However, increasingly, advances in virtualization and immersive technologies are able to transport us into an entirely virtual world or seamlessly bring virtual data into the real world. After years of research and development (R&D) and investment, these technologies are becoming more affordable and gradually migrating from gaming to other industries.

Virtual reality (VR) could mean there will be less and less practical difference between what can be achieved by someone who is physically in the office and by a remote worker whose presence in meetings—and in chats at the water cooler—is virtual. Indeed, eventually, there may be no need to maintain physical offices, as remote workers interact entirely in a virtual office environment.

Products could be designed more quickly and economically in a virtual reality world. Rather than building physical prototypes to look for mistakes, engineers and researchers would be able to spot errors in VR at an earlier point in development. Ford is already using VR in its vehicle design.24 Augmented reality (AR) can also be used to improve manufacturing accuracy and productivity: Displaying work instructions on the objects being handled means workers no longer need to look away from what they are doing to see the next step in an instruction manual.
Virtual reality could transform the entertainment industry, enabling live events, such as sports competitions and concerts, to be experienced remotely in a more immersive way, and with no capacity restrictions—everyone will be able to occupy the best seat in the stadium. VR should also enable virtual tourism, creating an immersive, multi-sensory simulation of what it is like to visit famous landmarks and experience new cultures. Marriott Hotels has been testing virtual reality experiences, enabling guests to experience immersive travel stories shot in destinations such as the Andes or the streets of Beijing, by providing Samsung Gear VR headsets.25

The retail industry is also likely to be transformed by VR, since shopping is already evolving into something akin to entertainment. Alibaba and eBay are among online retailers that have launched VR stores, and immersive technologies could offer consumers new ways to compare products and interact with samples.26

In the next three to five years, the growing penetration of immersive technologies could fundamentally change how we interact with the world, blurring the boundaries between the real and the virtual in a new imagination economy.
The imagination economy is likely to call for businesses in many sectors to reevaluate their strategies, business models and operations.

**Retail**
As virtual reality becomes an increasingly acceptable substitute for physical experiences, such as business travel, tourism, entertainment events and mall shopping, industries that rely on brick and mortar may need to look for new sources of competitive advantage. One possible result is changing patterns in real estate values.

**Manufacturing**
In manufacturing, shorter product cycles enabled by VR and AR may change consumer expectations and create pressure on all businesses to keep up. There is significant uncertainty about how widespread use of XR could impact intellectual property and other legal and regulatory issues.

**Workplaces**
Workplaces may need to change their culture and training procedures to support more virtual collaboration and enable tasks to be performed by less experienced employees, with the help of augmented reality instructions. Companies will need to judge the pace at which they transition to virtual ways of working. Prematurely relying on immersive technologies that are not yet sufficiently reliable could be as much of a mistake as trying to come to grips with the phenomenon too late in the game. Employees and customers alike may also have privacy concerns, as activities are easier to track in virtual than physical reality. Shifting more activities into virtual environments increases vulnerability to hacking, spoofing and outages in connectivity.
Physical infrastructure and distance might become less of a concern when companies make choices of location, with teams of “holoployees” being able to collaborate across borders as easily as teams based in the same physical location.

This could become a solution to growing negative sentiment toward economic migrants, by reducing the need to physically relocate for work. But it also raises the question of whether policymakers will bring in controls around the movement of work, rather than the movement of people.

From training to multitasking to prototyping, VR and AR look set to create new ways for companies in many industries to improve their productivity and agility. First-day hires, guided by augmented reality instructions, may start to become as productive as experienced workers.
The imagination economy will create a highly disruptive environment, with the potential for young companies to emerge as dominant players by being the first to understand how XR experiences can create new kinds of value—perhaps by interacting with other XR experiences.

It is likely to become easier to build audiences in new markets without establishing a physical presence, and to reach consumers in new ways—for example, by creating VR kiosks in high-traffic areas such as metro stations. New ways of shopping should also create rich data that companies can use to improve their offerings. For example, the Canadian Tire store, offering a wide range of home products, provides consumers with VR so that they can experiment with new designs for their patios.\(^7\)
IMAGINING THE IMAGINATION ECONOMY TOMORROW

OCTOBER 1, 2023
BUSINESS IMPLICATIONS
“Isn’t this amazing?”

Manami turns to her friend, Kotone, and sees that her eyes are wide with wonder. In fact, the eyes she sees are not those of her friend but of an avatar that looks exactly like Kotone. The avatar’s expressions are being generated, in real time, through sensors attached to Kotone’s head, along with her extended reality (XR) headset. Kotone grins and nods—and so does her avatar.
Manami and Kotone are enjoying a private extended reality tour of Machu Picchu.

They have the place to themselves, apart from a virtual guide who can be summoned when they have questions. In physical reality, Manami and Kotone are in a Tokyo branch of VirTur, the company that was among the pioneers of XR tourism and is rapidly becoming a giant of the burgeoning XR economy, which ranges from augmenting the current physical world (AR) to creating new virtual, computer-simulated worlds (VR). They are in a climate-controlled room, where the air is cooled, thinned and scented like an Andean forest.

“There will always be some people who shun XR tourism, saying it is a pale imitation of physical travel,” admits Yori Koizumi, CEO of VirTur. But, as he is quick to point out, XR tours are available at a fraction of the price:

“Value has always been related to scarcity—only so many people can visit Machu Picchu at once. In XR, that’s no longer true.” Indeed, Koizumi argues that the XR experience is actually better in some ways: No endless plane journeys. No mobs of tourists. No environmental damage.
In addition to visiting historical sites in the present, VirTur also offers recreations and imagined alternative realities.

Says Koizumi, “When you’re touring Machu Picchu, you can toggle between the site as it is now and how it would have looked when constructed. If you want to, you can watch a 15th-century Inca human sacrifice.” It’s the twin impact of what he calls “the imagination economy”: “First, you can do the same things cheaper, faster and eco-friendlier. Second, you can do creative, new things.”

Koizumi runs VirTur entirely through XR, using a platform his company developed and is now marketing to other enterprises. As we conduct this interview, I am in my kitchen in Dublin, Ireland, while Koizumi, he tells me, is at his beach house in Okinawa, Japan. But we both appear to be in VirTur’s impressive boardroom, high in a skyscraper with sweeping views over downtown Tokyo. In fact, the boardroom itself is entirely virtual; VirTur no longer has a physical headquarters.

“The world is finally starting to transcend physical constraints,” Koizumi says. “As late as the 2010s, people thought there would never be an adequate substitute for face-to-face. They couldn’t imagine how immersive XR would become. People said long-distance phone calls were the ‘death of distance’; then they said the same about video calls. But, with XR, it’s finally true.”
Not everyone is favorably impressed.

Business travel is one market being squeezed by XR; it is set to experience negative growth in 2023, for the first time since 2009. Others have blamed XR for low growth in self-driving car sales, even as the market for self-driving delivery vans is booming.

But the naysayers appear to be in the minority. Well beyond the travel and tourism sectors, gross domestic product (GDP) is already shifting dramatically to the imagination economy. In the entertainment industry, for example, XR games continue to dominate; however, the live-streaming of events has also boomed. The biggest live-streaming event to date came last month, when more than five million fans virtually attended One Direction’s one-off reunion concert at London’s O2 Arena.

That record is expected to be overtaken when football’s World Cup kicks off in Qatar next month, an event for which VirTur is FIFA’s official XR partner. One decision is already causing controversy: With rumors of low ticket sales and few fans planning to travel to Qatar, VirTur is offering an “Enhanced Atmosphere” option, replacing the real stadium crowds—or the possible absence of them—with computer-generated fans. XR critic Dex Leigh, author of the recent best-seller, “What Is Real? XR, Fantasy and the Future of Humanity,” calls it “a worrying new milestone in the fragmentation of shared experience.”
Koizumi acknowledges concerns, but offers a counterpoint: XR is also helping us to understand reality better. “We recently worked with Caltech on an app for physics courses, enabling students to experience virtually what reality would look like if we could see it operating at a quantum scale.” The same goes for Leigh’s argument that XR addiction is becoming the new opioid crisis.

“Don’t forget XR has medical applications, too,” says Koizumi, “like helping to treat post-traumatic stress disorder (PTSD) in soldiers.”

In industry, it is augmented reality (one aspect of XR) rather than virtual reality that is transforming how employees are trained in technical skills. The ability to display instructions in real time removes the need for a worker to switch between a task and reading a manual. According to a recent OECD report, “Headsets On: The Manufacturing Impact of XR,” this is significantly improving both accuracy and productivity. New products are reaching the market more quickly as XR eliminates the need to build physical prototypes. However, XR is also contributing to downward pressure on wages in advanced economies, since new hires can often be almost as productive as workers with lengthy experience.
Back in Tokyo, Manami and Kotone have returned from Machu Picchu and gone shopping.

They sit in a coffee shop while wearing XR headsets and strolling virtual aisles, advising each other on how their avatars look wearing the latest fashions. Kotone buys a dress from Chika, which last week closed its boutique in downtown Tokyo and now operates solely from a distribution center in the suburbs. The dress will be delivered to her apartment by the time she gets home.

As retailers offload expensive, consumer-facing premises, and companies using VirTur’s platform rely more on work-from-home “holoployees,” commercial real estate values are in flux. Some predict that residential real estate patterns will also shift, as fewer people will want to pay a premium to live close to theaters or restaurants. Shanghai and Rio are among cities that have announced the cancellation of planned infrastructure upgrades, anticipating less use of public transportation.
As the clock in the virtual boardroom approaches the hour, Koizumi needs to conclude our interview.

He has an appointment with his intellectual property lawyer: A rival XR tourism startup is challenging VirTur’s exclusive deal with Peru’s government, which makes it illegal for other providers to render Machu Picchu in virtual form. He is alerted to the time by a secretary opening the door, nodding apologetically in my direction, and saying:

“Mr Koizumi? Your next appointment.” Koizumi grins at me. “Our latest implementation of the calendar pop-up,” he says. “Do you like it?”
What does this mean for your business?

- Fast, reliable connectivity will become the defining issue in making extended reality experiences successful.
- Organizations will reassess their real estate portfolio, e.g., a clothing retailer shifting from stores and warehouses to VR pop-ups.
- Organizational culture will be strengthened by shared virtual experiences.
- Companies will need to proactively consider their responsibilities toward ethical issues, such as addiction, that arise in the VR economy.
BUSINESS FUTURE #4: THE AGE OF (IN)SECURITY

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Our increasingly connected, data-driven and virtualized world has greatly improved how people live and work. That is the good news. The bad news? The same technology has also led to greater vulnerability to massive breaches in cybersecurity.
The trends driving the “age of (in)security” future:

- Massive increase in the world of sensors
- Rising number and cost of cyber threats
- Increased use of cyber attacks as a geopolitical tool
- Increased role of non-state actors in geopolitics
- Emergence of “fake news” technologies
- Growth in the adoption of data-driven decision making
WHAT’S DRIVING THE AGE OF (IN)SECURITY TODAY?

ANALYSIS
CHALLENGES
OPPORTUNITIES

“In a hyper connected world, the potential vulnerabilities multiply significantly.”

Sir John Sawers, Chairman & Partner of Macro Advisory Partners
With an ever-growing number of sensors generating more and more data, estimates indicate the world will have more connected things than humans by the end of 2017. New cars, for example, currently have somewhere between 60 and 100 sensors—a number projected to reach 200 as the sensors get smarter. The auto industry alone is expected to install approximately 22 billion sensors in its products by 2020. There is projected to be an order-of-magnitude increase in data being generated between 2015 and 2020. Already in 2016, the Internet handled more traffic every few seconds than it did during the whole of 1992.

Our increasingly connected, data-driven and virtualized world has greatly improved how people live and work, but has also led to greater vulnerabilities. In 2016, there were 15 separate mega data breaches, that is, a breach where more than 10 million identities are stolen. In 2017, the ransomware WannaCry exploited a vulnerability in Microsoft’s Windows operating system to lock up more than 300,000 computers in factories, hospitals, shops, schools and governments in 150 countries.
Hackers can take down entire online platforms or physical infrastructure.

In 2015, a hack on Ukraine’s power grid left 700,000 people without electricity for several hours. In 2016, a “botnet” of almost half a million connected devices, including webcams and digital video recorders, rendered websites such as Twitter and PayPal unavailable. Compared to previous eras, in which only a few large states generally had the tools to take down infrastructure on a massive scale, today’s geopolitical climate is more complex. Meanwhile, the destructive capacity of terrorist and criminal groups is growing, and attacks are harder to attribute with confidence.

Increasingly, cyber attacks impose serious financial and reputational impacts on business. In 2015, Fiat Chrysler recalled 1.4 million vehicles after technology researchers showed they could hack a Jeep Cherokee, remotely taking control of its engine, brakes and steering. Yahoo was hit by 43 consumer class action lawsuits after three data breaches between 2013 and 2016, which exposed a total of more than 3.5 billion accounts. Global spending on cybersecurity software, services and hardware is expected to reach nearly US$120 billion by 2021.

Increasingly, security is a central consideration for many companies; for example, Amazon’s cloud business, AWS, purchased cybersecurity company harvest.ai in 2017.
As online security considerations become more pressing, organizations are likely to face difficult choices between assessing the risks involved with leaving insecure systems in place and paying for the expense of an upgrade.

Windows XP, for example, is a 15-year-old operating system that has had no security updates since 2014 but still runs on nearly 6.5 percent of the world’s computers. Some of those computers are housed inside specialist tools: As a United Kingdom National Health Service cybersecurity expert pointed out, “you wouldn’t throw out your MRI scanner because it’s got XP.”
Growing security concerns may create the risk of a large-scale social backlash against platforms that are perceived to be insecure.

These concerns may dissuade businesses from embracing some important opportunities. Open source and collaborative culture can spur innovation and improve user experience by opening their product life cycle to a wider range of contributors, such as third-party developers and customers.

For example, the Android system is both praised by users for the convenience of having a variety of free apps available through its app store, and criticized for how many of those apps are poor quality or malware. However, security concerns might stop organizations from tapping into those opportunities.
As the capabilities of artificial intelligence (AI) expand, it is likely to create new threats. For example, researchers from the University of Washington have recently used AI to create a video of former U.S. President Obama speaking, raising the prospect of highly convincing fake audio-visual material that could be used to manipulate and misdirect. AI is also likely to make it easier for malicious individuals to collect and exploit sensitive information about other individuals.
Advances in AI create not only challenges to cybersecurity, but also opportunities to improve it.

For instance, Cylance, an American technology firm founded in 2012, is using machine learning to analyze past attacks with the aim of detecting and blocking viruses or malware before they harm users’ computers.43

More generally, as nascent Internet of Things ecosystems develop standards and frameworks that can enable acceptable levels of both compatibility between devices and cybersecurity, there are likely to be good opportunities for becoming an industry leader. Defining appropriate levels of security for different classes of data, implementing security practices consistently throughout value chains, and assigning responsibility for defending connected ecosystems against cyber attacks are among the issues up for discussion.
An interview with Kalos Herczeg, CEO, The Securating Foundation

Following the assassination of Senator Acker, cybersecurity is once again dominating the headlines. Were you surprised to learn how apparently easy it is to hack a pacemaker?

Kalos Herczeg: Unfortunately, not at all. Some of us have been voicing concerns for years about the vulnerability of connected devices. But it was still shocking to watch, especially when it came out that they’d hacked the pacemaker manufacturer’s Twitter account and tweeted out a countdown to Acker’s death. I was following it all on the verified newsfeed tick in the corner of my screen, thinking how unreal it was.
Do you trust the verified newsfeed?

KH: You can’t entirely trust anything these days, can you? However, it’s a useful tool, and I do think we’re getting better at verification. I don’t know if you saw it, but it was briefly—and erroneously—reported that the CIA had announced that it was a “state-sponsored” terrorist attack, and people started freaking out. Thankfully, that was rapidly shut down. It now looks like it was a domestic extremist.

On a happier note, you were in the news again this week when ThingSafe became the first company to achieve an AAA score from Securating. How high a standard does that represent?

KH: It means there’s nothing we think they could reasonably do to increase their security. Of course, we’re not saying it’s impossible to hack them. Nobody is bulletproof. And, like every company, there’s a limit to what they can do when a cyber attack takes the Internet offline, as happened across the East Coast last Tuesday.

What were the lessons learned from that incident?

KH: It revealed how ill-prepared many organizations are. We saw people locked out of their homes, cars stopping in the middle of the highway, holoployees bumped off their corporate platforms, XR shopping malls unable to take payments. One of the things we assess in the Securating process is how robust a company’s contingency plans are for such outages. Obviously, in many cases those plans were inadequate, to say the least.
For anyone who still isn’t familiar with Securating, who are you and what do you do?

KH: The Securating Foundation was set up by a group of Silicon Valley philanthropists who perceived the need for a kind of quality assurance scheme for online security—like “organic” labels on food—to guide consumers who are looking for a higher set of standards. We hoped to create a virtuous circle effect. The more consumers reward companies for having demonstrably good security, the more these companies will feature a good Securating score in their advertising, the more consumers will pick up the idea that this is something they ought to care about—and the higher the number of companies who will pay us to rate them.

What does the assessment process involve?

KH: We send a team into the organization itself to ask questions and look at its setup. And, we work with teams of white-hat hackers who try to take them down. That’s an ongoing service, by the way. The in-house assessments are periodical, but a company can have its rating downgraded at any time if we find a vulnerability and we don’t think they deal with it quickly enough.
How does it work? What sort of criteria do you use?

KH: We do have a checklist of criteria, of course. But there’s also a lot of judgment involved—it’s not just a box-checking exercise. This kind of benchmarking in security is relatively new. Only a few years ago, companies used crude measures, like what percentage of their IT budget was spent on security. And the threats are changing all the time. We’re currently developing criteria, for example, to assess companies’ preparedness to deal with sudden and unexpected changes in data regulations, as more countries erect digital borders.

We see the Securating logo everywhere now, but you started only 18 months ago. People talk about “insecurity anxiety” being at an all-time high. Is that why you’ve grown so fast?

KH: That’s part of it. More and more of our lives are effectively lived online, and increasingly in XR. It’s almost taken for granted. But few people truly understand the risks and the kind of security required. In the Cold War, for example, at least the balance of power was known. Everyone understood the weapons and the logic of deterrence. It was actually rather predictable.
And today it’s different?

KH: Dramatically. Think of all the variables: fragmented geopolitical competition, terrorist and criminal networks, and ever-evolving ways to mount virtual attacks due to the built-in security risks posed by lax controls in current technologies.

Most consumer surveys show that trust in a company’s ability to secure their data has become a top priority. What’s changed to make that happen?

KH: Some high-profile cases have made people more conscious of the value of their data, and the consequences of being hacked. Remember JagoBank last year? When its employee wellness service was compromised, and people had their most intimate medical details posted online?

What else is worrying people?

KH: The growing sophistication of phishing, for one thing. A few years ago, phishing e-mails would have highly suspect story lines—“I’m the widow of the former Nigerian defense minister”—and be riddled with spelling errors. Now, scammers have got AI collating information from various hacked sources and are creating highly plausible, personalized spoofed messages like, “Hey, I’m at Sally’s. Can you text me the PayPal password so I can pay for the pizza?”
Isn’t there also a feeling that you can’t escape it?

**KH:** Exactly. So more and more, consumers are looking for companies they feel they can trust to minimize the chance of something bad happening. Some incumbents are being caught by surprise by the rise of companies that have put security at the center of their offer, rather than price or convenience; companies like ThingSafe, which manages all a household’s connected devices and the data generated.

Should governments be doing more on data security?

**KH:** Have you seen the proposition on the California ballot, the one that makes it illegal to own a connected device without adequate protection against malware? Hopefully that’s a sign of legislation to come. But knee-jerk reactions to data nationalism from some governments have actually complicated security, because those measures haven’t been well thought through. Ultimately, regulators will always struggle to keep up with fast-changing industries—that’s why I prefer our approach of starting a market-driven race to the top.
What does this mean for your business?

- Organizations will need to prepare for a world where it’s not about “if” you get hacked, but “when” you do.
- Security will become a competitive advantage for companies, and league tables could emerge to help consumers and customers choose.
- An organization’s responsibilities for cybersecurity will be equal to those for physical security.
- Return on investments in technologies such as AI and blockchain can be maximized by using them to improve cybersecurity.
- Organizations can benefit by leading in setting an industry-wide or ecosystem-wide framework for specific cybersecurity issues.
CONCLUSION

The four Business Futures outlined are intended to be not only exercises in imagination, but also the basis for practical decision making and action. For every organization, the key questions for each future will differ.

“The big winners sense the future differently.”
Professor Gary Hamel, London Business School
Imagine how your organization would fare, in its current shape, in the operating environments we have described: What changes would you consider if you knew that such a future would come about? How robust are the possible options to the possibility of future developments unfolding differently?

We encourage leaders to think beyond our four futures. Select different trends, combine them in new ways, and ask what kind of future their interplay would create. In a world defined by the collision and interplay of those trends, what headlines could you expect to see? And what questions are raised by this potential tomorrow that you need to consider today?

Preparing for the future will never be an exact science. It will always require judgment calls that combine positioning for success in the most likely-seeming futures with hedging against inherent uncertainty. The Business Futures methodology is a new tool for CEOs to clarify and structure their approach.
As a starting point, we identified more than 100 existing and emerging global, cross-industry trends that will affect businesses in the medium and long-term—from climate change to sustainability to the evolving role of China on the world stage. To do this, we scanned more than 300 sources from the demographic and societal, economic, geopolitical, environmental, organizational and technological spheres.

Each of the futures explored in these pages emerges from the interaction of a different set of five of these trends. However, there are many ways to select a cluster of five from a hundred. How did we decide which of the possible futures to focus on? We used word analytics tools to filter and cluster the trends. Based on text analysis of more than 7,000 speeches by CEOs, we identified which topics are on the minds of business executives; in 2017, for example, social media and AI topped the list of topics mentioned in CEO speeches.

Our sentiment analysis of these topics also showed us that CEOs are particularly concerned about geopolitics and cybersecurity. For example, the sentiment associated with cybersecurity was negative 27 percent of the time in 2017, compared to 9 percent for virtual reality and 8 percent for macroeconomic conditions.

We used text analytics to assess the focus of the discussion on venture capital money flows, as a way to track interest in different technologies. Our mapping of connections among sectors showed a high volume of chatter on healthcare, AI and blockchain, and connections in geographies found growing attention to emerging technology countries, including China, India and Israel. We also examined the 300 most influential English blogs in politics, economics and technology to spot emerging hot topics.

Together, these inputs enabled us to look at the relationships among different trends and cluster them into selected groups, which we tested with our advisory panel. To explore the implications of these futures for organizations, we engaged with internal and external experts, from futurists to entrepreneurs and industry analysts, through a series of interviews and workshops.
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This project has been led by Accenture Research with expert input from Accenture Labs

Acknowledgements
We would like to thank the following individuals for their contributions: Omar Abbosh, Adi Allon, Michael J. Biltz, Sarah Bird, Paul Bjacek, Renee Byrnes, Susan Cozzolino, David Cudaback, Gwen Harrigan, Francis Hintermann, Dave Light, Nicolas Loterstein, Paul Nunes, Armen Ovanessoff, Eduardo Plastino, Ryan Shanks, Sarah Thomas, Andrew Wright.
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