

# Deloitte Review

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Future of work  
Health care transformed  
Connectivity and its potential  
Responsible business  
Strength in diversity



## The essence of resilient leadership

Business recovery from COVID-19

**Deloitte.**  
Insights

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### INTERACTIVE DESIGN

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### CREATIVE

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Dana Kublin

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### PRODUCTION

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Sara Sikora

## CONTACT

Email: [insights@deloitte.com](mailto:insights@deloitte.com)

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# LEADER

## — Opportunity and innovation in a time of pandemic —



**THOMAS SCHILLER**  
*Managing partner,  
 Clients & Industries,  
 Deloitte Germany*

**A**LTHOUGH THE AGONY is always different, most major crises inflict significant economic damage and can tear the fabric of society—but they also inspire innovation.

The COVID-19 pandemic has dramatically altered the way we live. While many aspects will prove temporary, there can be no doubt that we will find our world has changed in fundamental ways once the threat recedes.

Yet, although economists cannot revise down their 2020 GDP forecasts fast enough to keep pace with developments, not all is doom and gloom. The axiom of opportunity in crisis remains as true as ever. History has repeatedly shown that crises drive innovation. Whether technical, scientific, or developments relating to business models or societal institutions, such innovations all have one feature in common: They solve problems.

We are, for example, seeing how COVID-19 is fast-tracking digital transformation. In response to restrictions imposed to slow the spread of the virus, companies are embracing digitalization at rates far exceeding those achieved by all previous corporate investment and government programs.

While the logic behind digitalization remains the same as in the past, three reasons come to mind behind this energized uptake:

- Demand is driven by customer need. When there is no alternative to online services, customers often focus on solutions that maintain some semblance of business normality—and readily adopt them even if they are still evolving.

- 
- Supply capabilities are being pushed, so corporations are laser-focused and acting fast. Side issues are deprioritized, enabling companies to suddenly function far more efficiently as bureaucracy is eliminated.
  - Regulatory bodies are creating encouraging framing conditions. Governments are intervening through laws, regulations, and support programs that prioritize crisis response. These are largely accepted by everybody, as the overall benefit to society is placed before individual considerations.

We can be confident that the health issues brought on by COVID-19 will inspire innovations in many fields, including new drugs and medical devices, improved health care processes, and manufacturing and supply chain breakthroughs. And the development of innovations will not only be restricted to these obvious beneficiaries.

Consider the industry in which I have spent my own career: the automotive industry and its sales process. The days of having a coffee and a chat on fancy leather couches at local brick-and-mortar dealerships are gone. Instead, many customers accept—even demand—a multichannel sales and service interaction approach. Automotive original equipment manufacturers (OEMs) are realizing that they cannot wait another decade to enable this journey. As financial pressures mount, the urgency for transforming automotive sales networks grows ever more apparent.

This issue of *Deloitte Review* aims to provoke thinking on how such technological developments change our society and how, in turn, changes in society demand new technologies. The coronavirus may be the current accelerant, but it is also important to reflect on what the next driver may be, what new regulations might come out of it, and how the resulting innovations will likely become important for your business. ●



# on the

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[www.deloitte.com/insights/daily](http://www.deloitte.com/insights/daily)



## EMBEDDING TRUST INTO COVID-19 RECOVERY

As resilient leaders seek to shepherd their organizations and stakeholders through the COVID-19 crisis, trust—specifically, four dimensions of trust—will be critical to the recovery.

[www.deloitte.com/insights/embedding-trust](http://www.deloitte.com/insights/embedding-trust)

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# e w e b

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As the COVID-19 pandemic drives profound societal and organizational shifts, leaders have the opportunity to return to work by designing the future of work, building on the lessons and practices their organizations executed during the crisis.

[www.deloitte.com/insights/COVID-19-work](http://www.deloitte.com/insights/COVID-19-work)

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**SPECIAL FOCUS: COVID-19**

# The essence of resilient leadership

## **BUSINESS RECOVERY FROM COVID-19**

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PUNIT RENJEN

ART BY ALEX NABAUM

Whereas organizations used to describe agile change as “fixing the plane while it flies,” the COVID-19 pandemic has rewritten the rules of upheaval in modern times. Those of us leading any organization—from corporations to institutions to our own families—are not fixing the plane in midair, we’re *building* it. Times like these need leaders who are resilient in the face of such dramatic uncertainties.

## Resilience is a way of being

The first article in this series<sup>1</sup> described the essential foundations leaders need in order to effectively navigate through the crisis. Resilient leaders are defined first by five essential qualities of *who they are*, and then by *what they do* across three critical time frames: Respond, Recover, and Thrive.

As we progress into the Recover phase of the crisis, resilient leaders recognize and reinforce critical shifts from a “today” to a “tomorrow” mindset for their teams. They perceive how major COVID-19–related market and societal shifts have caused substantial uncertainties that need to be navigated—and seized as an opportunity to grow and change. Amid these uncertainties, resilient leadership requires even greater followership, which must be nurtured and catalyzed by building greater trust. And resilient leaders start by anticipating what success looks like at the end of recovery—how their business will thrive in the long term—and then guide their teams to develop an outcomes-based set of agile sprints to get there.

Resilience is not a destination; it is a way of being. A “resilient organization” is not one that is simply able to return to where it left off before the crisis. Rather, the truly resilient organization is one that

has transformed, having built the attitudes, beliefs, agility, and structures into its DNA that enable it to not just recover to where it was, but catapult forward—quickly.

**“The historic challenge for leaders is to manage the crisis while building the future.”**

— Henry Kissinger<sup>2</sup>

## The mindset shift: From today to tomorrow

For many of us as leaders in the early days of the COVID-19 crisis, the days started to blend together. In fact, some have said that the COVID-19 world has only three days in the week: yesterday, today, and tomorrow. In that spirit, resilient leaders need to shift the mindset of their teams from “today” to “tomorrow,” which involves several changes that have important implications for the path to recovery. Specifically, as shown in figure 1:

- The **situation** shifts from the unpredictability and frenetic activity of the early Respond period to a more settled, though still uncomfortable, sense of uncertainty (an “interim” normal). *The implication: The situation invites leaders to envision the destination at the end of Recover.*

- The **focus** of leadership expands from a very inward (and entirely appropriate) focus on employee safety and operational continuity to also include embracing a return to a market-facing posture. *The implication: Leaders should envision the destination in terms of desired stakeholder outcomes, not internal processes.*
- **Management** goals shift from managing the crisis—keeping the organization functioning—to managing the transition back to a restored future. *The implication: The Recover project management office may need a different skill set than the Respond project management office.*
- **Planning** shifts from short-term contingency planning to mid- and long-term economic and scenario planning to understand the related impacts on operations, employees, financing, and so forth. *The implication: It is critical to model the alignment of financial resources to the cash required to ramp-up operations.*
- **Leadership attitude** shifts from a primarily reactive mode to anticipating how to reinvent the organization. *The implication: Leaders should seize the opportunity to energize their teams by imagining a successful future and embracing trust as the catalyst to get there.*

FIGURE 1

Resilient leaders must understand the *mindset shift* from Respond to Recover



Source: Deloitte analysis.

## The only certainty is ... uncertainty

# “The recovery from the COVID-19 crisis must lead to a different economy.”

— *António Guterres, ninth secretary-general of the United Nations*<sup>3</sup>

The substantial shifts in society, its institutions, and its individuals during the crisis have introduced major uncertainties into our familiar structures. Assumptions about what is true and stable—for example, the freedom to move unrestricted in free societies—have been upended. These shifts have resulted in macro-level changes in and uncertainties about the underpinnings of business and society that resilient leaders must navigate:

**Changes in the social contract.** Societal expectations of corporations are being reframed to ensure the viability of all stakeholders. The implicit contract between businesses and their stakeholders has always been based on accepted—and generally unspoken—assumptions about “the way things are.” But the way things are has changed, and that contract is being rewritten. For example, in the implicit “future of work” contract, remote work may be both more productive for the organization and more desirable for employees. Further, there are new considerations around work/life balance, job fluidity, and employee well-being gaining prominence in ways that suggest these factors are reshaping a new standard for how, where, and when we work.

**Changes in the roles and rules of institutions.** As the crisis unfolds, we find

business doing government (such as by instituting employee stay-at-home orders before local authorities) and government doing business (such as by providing material financial support in exchange for equity), while nongovernmental organizations (NGOs) and other agencies are doing both (such as the World Health Organization shipping more than 2 million units of personal protective equipment to 133 countries).<sup>4</sup> Concurrently, public-private partnerships (such as the US National Institutes of Health teaming with American and European government agencies and over a dozen biopharmaceutical companies to coordinate an international research response to the pandemic)<sup>5</sup> herald a new form of cooperation that blurs traditional public/private boundaries, and may presage greater collaboration between government and business.

**Unpredictability in financing sources and uses and in capital markets.** The pandemic has sent financial shock waves through economies, sectors, governments, financial institutions, treasurer’s offices, restaurants, nonprofits, and purses. The sources and uses of cash and the movement of liquidity during the crisis have been unpredictable. Leaders will need to plan for wide variations in their financial position and needs, all of which are dependent on the disease’s progression, the level of government stimulus, and the pace of economic recovery.<sup>6</sup> They will also need to evaluate their ability to handle a potential mounting debt burden and the impact this will have on government and financial institutions.

**Permanence of customer behavior changes.** The crisis has already had a profound impact on customer behavior. As China’s markets reopened, a segment of consumers who visited physical stores

was reluctant to touch anything.<sup>7</sup> Consumer research by Nielsen asserts that, after the crisis, people’s daily routines will be altered by a new cautiousness about health,<sup>8</sup> suggesting that some shifts in behavior could be long-term. The significant increase in home deliveries has even increased the influence on behavior of an emerging player in the value chain: the independent delivery company. Leaders will need to anticipate whether and how the pandemic has permanently altered behaviors, experiences, expectations, and the role of digital engagement.

**Expectations for physical, emotional, financial, and digital safety.** Recovery will create anxiety among stakeholders as the post-COVID world takes shape. Understanding the fears that stakeholders are grappling with—and how their expectations for safety and security have changed, perhaps permanently—will be critical for leaders as they seek to restore confidence and chart a new path forward. It remains to be seen how the four “epidemics” researchers have identified—COVID-19 itself, fear of the virus, fear about the economy, and even fear of the ultimate vaccine—will ultimately be resolved.<sup>9</sup>

**“To get the world back on track requires controlling all four horsemen of the COVID-19 apocalypse—which makes the response far more complicated.”**

— *Joshua Epstein, professor of epidemiology, New York University School of Global Public Health*<sup>10</sup>

Each of these shifts represents a significant area of uncertainty for leaders as the world heads toward a new and yet-to-be-defined equilibrium. Amid the

uncharted waters of the COVID-19 crisis, leaders should expect a significant increase in the number of “unknown unknowns”<sup>11</sup>—or at least a precipitous contraction of confidence in what we once knew to be true. We have gone from a world of widely agreed-upon absolutes to a relative world where our feet are firmly planted in midair.

Yet we also see new business models emerging amid these uncertainties. An e-commerce supplier in Asia-Pacific opened up its logistics capabilities to third parties;<sup>12</sup> a major telecom company transitioned a large-scale tech transformation to 100 percent virtual delivery;<sup>13</sup> the strategic partners of a technology firm stood up a temporary finance function within days to provide critical services despite a pandemic-imposed hiring freeze;<sup>14</sup> and dozens of hospitals in China opened online fever clinics via a digital platform to meet the exponential growth in demand for online health consultations.<sup>15</sup>

## Trust as a catalyst of recovery

During the Recover phase, resilient leaders need to inspire their teams to navigate through these significant COVID-related uncertainties. But great leadership requires even greater followership—and followership is nurtured by trust. Indeed, many leaders have built a significant bank of trust from deftly navigating through the early frenzied, unpredictable stages of the crisis.

Although some may think of trust as an abstract, ethereal concept, it is, in fact, a quite tangible foundation that is essential to successfully reaffirming a strong relationship with

stakeholders through the recovery. Two attributes of trust are particularly relevant in this regard.

First, *trust is a tangible exchange of value*. It has no value in isolation, but represents value only in an interaction with others—for example, customers, suppliers, employees, investors, and team members. Likewise, trust is only built in relationships, where a real, genuine give-and-take provides mutual value. Trust is also accretive: Invested wisely and prudently, it grows through repeated affirming experiences; when invested poorly, it rapidly depreciates. Further, research demonstrates that trust also yields results such as economic growth and shareholder value,<sup>16</sup> increased innovation,<sup>17</sup> greater community stability,<sup>18</sup> and better health outcomes.<sup>19</sup>

Second, *trust is actionable, and human, along multiple dimensions*. Trust is nurtured and built

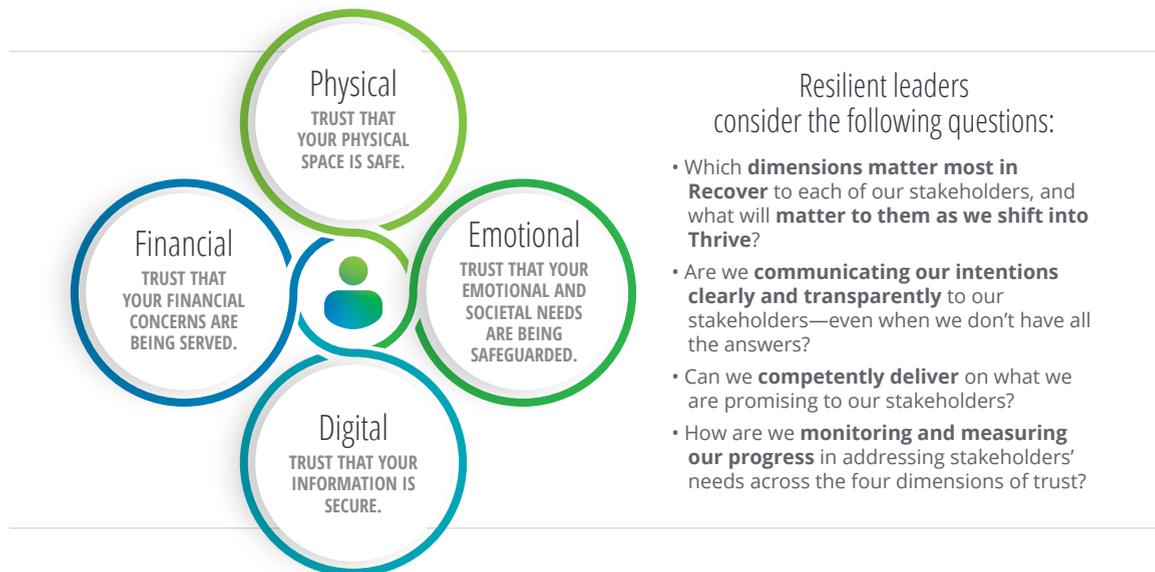
among stakeholders along four different dimensions: physical, emotional, financial, and digital (figure 2). And trust starts at the human, interpersonal level. COVID-19 has heightened stakeholder sensitivity across these four dimensions, which offers greater opportunities to act to build—or lose—trust. For example, trust may be built among employees when leaders thoughtfully consider how to reengage the workforce in the office (such as by reconfiguring the space to honor social distancing), or when they go to great lengths to preserve as many jobs as possible rather than just preserving profits. Similarly, trust may be built among customers when organizations add extra security measures to protect customer data from cyber threats.

Author Stephen Covey summed up the trust calculus well: “Trust is the glue of life. It’s the most essential ingredient in effective communication.

FIGURE 2

## Trust is human and multidimensional

Resilient leaders understand that recovery is a **human experience**. In order to shift the mindset to recovery, they need to understand the **four human dimensions of trust**.



Source: Deloitte analysis.

It's the foundational principle that holds all relationships."<sup>20</sup> And social impact investor Andy Crouch highlights the interplay between trust and an organization's recovery efforts: "In order to find our way to the new playbook for the mission and people that have been entrusted to us, we will need to act at every moment in ways that build on, and build up, trust."<sup>21</sup>

## Anticipate the destination

A recovery of this scale and scope hasn't been accomplished in most of our lifetimes, and it is complicated by the complexity of simultaneously navigating rapidly changing governmental mandates, fragile supply networks, nervous team members, and cautious customers.

Given the market uncertainties, companies that try to recover by relying on conventional wisdom may discover that the world they thought they knew is no longer there when they arrive. The way in which leaders created plans and playbooks in the past may no longer be relevant, especially if those plans and playbooks focus on either a functional or internal view. Organizations that are successful in the Recover phase must make clear choices about where, how, and when they want to emerge using these four moves:

1. **Define the destination.** Envision what being wildly successful looks like at the end of recovery, and determine what immediate steps can be taken to move quickly and decisively toward it.
2. **Anticipate outcomes.** Ensure that the path to success is defined by stakeholder-focused outcomes rather than internally focused functional processes.
3. **Run sprints.** Use agile principles to navigate the range of uncertainties—beyond just epidemiological factors—that the organization must traverse in the journey from its current state to the destination.
4. **Judge your timing.** Carefully sense when it is appropriate to pivot to Recover.

Imagine, for instance, the retail unit of a major telecom company. The destination at the end of recovery might include reopening 50 percent of its retail stores, shifting 50 percent of its customer renewal activity to being Web-based, and consolidating repair activities into central hubs in metropolitan areas. Its recovery playbook would detail the path to desired outcomes for customers (such as a new, touchless store experience, enhanced online ordering, and the establishment of repair hubs); employees (such as reopening stores and retraining workers for new needed skills); and suppliers (such as replenishing the supply chain to match demand estimates)—with provisions for adjusting those plans as the company learns more about consumer behavior, market needs, and competitive threats.

### DEFINE THE DESTINATION

Defining the destination first and then working backward is an approach that can help leaders create more aggressive and creative plans.

Envisioning the leadership team in a position of success is emotionally enabling, and it frees the team from some of the constraints of the present. It also disrupts incremental thinking, which often hampers creativity.

Identifying *immediate quick wins* to move rapidly and decisively toward the destination is important. Many companies find that the crisis has dissolved bureaucratic boundaries, making decision-making

more streamlined and action more responsive to accelerate outcomes.

Leaders will need to ask *key strategic questions* when defining the destination (for instance, “What is most important in creating advantage: strategy, structure, or size?”). The answers can suggest a variety of tactics to pursue during recovery, such as accelerating implementation of pre-COVID-19 strategic options, scaling pilots in progress, birthing new organic businesses, and even finding deal opportunities among distressed companies and brands.

A *recovery lab* can be an excellent way for senior leadership teams to explore these strategic questions. The tangible outcome of such a lab is a recovery playbook that has been codesigned (and therefore owned) by the entire senior management team. Beyond the playbook itself, the intangible benefit of doing this is that it encourages the senior team to mesh around a common goal, purpose, and set of outcomes.

Since the *recovery project management office* (RPMO) needs to be chartered, leaders should also consider whether they have the right team for this phase’s remit. This could be a great time to tilt the composition of the COVID-19 response team to include more operational expertise, recruiting team members with more execution-based skills and expertise. Also, given the added complexity of various stimulus programs and local regulations, the RPMO may have an elevated role in supporting functions such as legal and tax. Reporting within the RPMO should include a balance of internal operating metrics and external indicators that can provide real-time insight into macro recovery indicators. Organizations may need to invest in new data sources in the short term to provide required information about the pace of recovery.

Finally, *modeling the financial impact* of the recovery playbook is a critical check and balance. Does the plan hold up under various economic scenarios? Does the organization’s projected liquidity enable it to rebuild operations and working capital commensurate with the plan?

## ANTICIPATE OUTCOMES

We have identified six key macro outcomes that a recovery playbook should address (figure 3), and several core strategic questions for the C-suite to consider in setting scope and direction for the recovery plan.

In the first article of this series, we specified six priority functional areas to be addressed during the Respond phase: *command center, workforce and strategy, business continuity and financing, supply chain, customer engagement, and digital enablement*. A functional focus was entirely appropriate in the immediacy of the Respond phase. However, as noted above, the shift from Respond to Recover requires a mindset pivot from an internal, functional view to the outcomes-based view described here.

See the appendix to this article for more detail on what the C-suite should consider when developing the recovery playbook.

## RUN SPRINTS

Agile delivery principles are essential on the Recover journey. Not only might the destination shift as new issues emerge, but “unknown unknowns” can cause unexpected detours. Running the Recover program in short (such as six-week) sprints enables leadership and the RPMO to monitor the program and make mid-course corrections.

FIGURE 3

## A recovery playbook should map the path to six key macro outcomes

Outcome	Description	Core strategic question(s)
<b>Recover and grow revenue</b>	Recapture revenue and expand into new organic opportunities for top-line growth, customer experience, and profit margin	<ul style="list-style-type: none"> <li>• Should we engage customers for acquisition or maintenance?</li> <li>• What customer behavior changes are likely to be permanent?</li> </ul>
<b>Increase margins and profitability</b>	Adjust cost structure and investments	<ul style="list-style-type: none"> <li>• Should we manage for profit or resilience?</li> </ul>
<b>Optimize assets, liabilities, and liquidity</b>	Curate the asset portfolio (including M&A transactions), strengthen the balance sheet, and align the capital structure	<ul style="list-style-type: none"> <li>• Should we operate for cash or profit?</li> </ul>
<b>Accelerate digital transformation</b>	Accelerate digital capabilities to enable growth, decrease costs, and progress further as an insights-driven organization	<ul style="list-style-type: none"> <li>• How can we move faster toward digital transformation?</li> </ul>
<b>Support the workforce and operating structure</b>	Align the work, the workforce, and the workplace—as well as operating models, business models, and alliances—to deliver the Recover plan	<ul style="list-style-type: none"> <li>• How has the social contract with workers changed?</li> <li>• Do we have the right operating structures and alliances in place to deliver the plan?</li> </ul>
<b>Manage stakeholder expectations</b>	Manage and fulfill stakeholder expectations while proactively addressing risks	<ul style="list-style-type: none"> <li>• How have social and institutional expectations changed?</li> </ul>

Source: Deloitte analysis.

In the Respond phase, organizations around the globe demonstrated a remarkable agility to change business models literally overnight—implementing remote work arrangements, offshoring entire business processes to less-affected geographies, and collaborating with other organizations to redeploy furloughed employees across sectors. In each situation, the urgency of getting results trumped typical bureaucratic orthodoxies. Resilient leaders will harness those experiences to embed rapid, agile decision-making into the culture

throughout the Recover phase, doing away with traditionally cautious, silo-based mindsets.

**“The shift has happened in days, not months. Businesses may be able to learn how to move faster, acting in more agile ways, as a result.”**

— Amy C. Edmondson, *Harvard Business School*<sup>22</sup>

### JUDGE YOUR TIMING

One of the core questions many companies are already asking is, “When should we pivot to

Recover?” But the boundary between Respond and Recover is blended rather than a bright line. Due to the pervasive, far-reaching medical and economic variables, there is no simple, mathematical answer to the question. Effective sensing and artificial intelligence (AI) mechanisms can be critical inputs to augment what is still a qualitative decision of when, where, and how to restart.

The right time to activate the recovery plan will vary across geographies and sectors, and even among different companies in the same geography and sector. Regions where the infection rate has subsided will be more able to sustain activation than regions where the disease is still spreading. Sectors that have suffered a lesser impact, such as media or technology, may shift to recovery much earlier than heavily affected sectors such as transportation or leisure. And each company will have its own operating nuances: Those with widely dispersed back-office support centers or better visibility up the supply chain, for instance, may be able to begin recovery efforts sooner than those that do not.

Leaders weighing when to pivot to recovery also must consider startup lead times. For instance, a

retailer may be able to reopen in days, while some process manufacturing industries may require months for a shuttered plant to be recalibrated to required tolerances.

### WHAT'S NORMAL ... NEXT?

As organizations emerge from Recover and transition into the Thrive phase, trust, coupled with the five qualities of resilient leadership, serves as a strong foundation on which resilient leaders can build the business models to address the new markets that will emerge.

What might life be like after the crisis passes, and what will it take to thrive in a world remade? In a collaboration between Deloitte US and Salesforce, some of the world's best-known scenario planners developed four distinct scenarios that consider the potential future societal and business impacts of the pandemic (see sidebar, “The world remade by COVID-19: Scenarios for resilient leaders”).<sup>23</sup> The team explored possible disease progressions and severity, the level of collaboration within and between countries, the health care system response, the economic consequences, and social cohesion in response to the crisis. The four scenarios provide a

### THE WORLD REMADE BY COVID-19: SCENARIOS FOR RESILIENT LEADERS

**The passing storm.** The pandemic is managed due to effective responses from governments to contain the virus, but it has lasting repercussions that disproportionately affect small and medium businesses as well as lower- and middle-income individuals and communities.

**Good company.** Governments around the world struggle to handle the crisis alone, with large companies stepping up as a key part of the solution accompanied by an accelerating trend toward “stakeholder capitalism.”

**Sunrise in the east.** China and other East Asian nations are more effective in managing the virus and take the reins as primary powers on the world stage.

**Lone wolf.** A prolonged pandemic period spurs governments to adopt isolationist policies, shorten supply chains, and increase surveillance.

view of the future three to five years from now, created through a structured process to stretch leaders' thinking, challenge conventional wisdom, and drive better decisions today.

Sociologists have observed that history does not move linearly, but rather in cycles punctuated by a crisis approximately every 80 years.<sup>24</sup> Such generational cycles have been found in Old Testament, Homeric, and Islamic cultures, and have been proposed by prophetic archetypes such as Lao-Tzu and Buddha. Researchers have identified seven such cycles in Anglo-American history since the mid-15th century, with the last crisis being World War II ... 80 years ago:

Each time, the change came with scant warning ... Then sudden sparks ... transformed the public mood, swiftly and permanently. Over the next two decades or so, society convulsed. Emergencies required massive sacrifices from a citizenry that responded by putting community ahead of self. *Leaders led, and people trusted them* [emphasis added]. As a new social contract was created, people overcame challenges once thought insurmountable—and used the crisis to elevate themselves and their nation to a higher plane of civilization. ... [It] is history's great discontinuity. It ends one epoch and begins another.<sup>25</sup>

As resilient leaders embarking on recovery, we embrace trust as the essence of resilient leadership. Invest it wisely and it will yield extraordinary returns.

## Appendix: C-suite considerations for the recovery playbook

### RECOVER AND GROW REVENUE

#### *Strategic questions*

- Should we engage customers for acquisition or maintenance?
- What customer behavior changes are likely to be permanent?

#### *Key considerations*

- With the shutdown of the past several months, the organization should determine if customer behaviors and brand preferences have moved or changed. While many organizations may assume that they can message customers as they did precrisis, there may be a need to market new features of products and services to remain relevant and win back share.
- Because many customers have sampled new service delivery models, from virtual health care to home grocery delivery, it is possible that they have rapidly adopted what they perceive as safer and more convenient models of interacting with brands.
- The crisis likely created the opportunity for innovation to create new products, services, or markets by designing around constraints. Companies may find opportunities for cross-industry collaborations that did not exist before the crisis.

## INCREASE MARGINS AND PROFITABILITY

*Strategic question*

- Should we manage for profit or resilience?

*Key considerations*

- Most value chains precrisis were optimizing for operating efficiencies. The crisis revealed unexpected implications of this approach, such as that auto production could be held up by a single part that was no longer available in an affected area. Leaders should define where on the profit versus resilience spectrum they want their organization to sit across all operating categories.
- For example, given the uneven pace at which recovery is expected across industries and geographies, it is likely to be more important to enable sufficient flexibility, as well as visibility upstream and downstream, in the supply chain than to make tactical changes to the flow of goods.<sup>26</sup> While the organization lays the groundwork for alternate supply chain arrangements based on geographic and business resilience considerations, trends around concentration of supply may naturally reverse themselves to provide for future flexibility.
- As organizations incorporate customer demand expectations and patterns into supply chain planning, understanding customer demand signals based on data rather than intuition will be critical. The crisis may have exposed deficiencies in the availability and reliability of the data required to make meaningful decisions.

OPTIMIZE ASSETS, LIABILITIES,  
AND LIQUIDITY*Strategic question*

- Should we operate for cash or profit?

*Key considerations*

- Alignment of key lending and investor stakeholders on terms, timing, and capital availability is critical in this phase. Reorienting these stakeholders around cash generation versus profit generation may require some resetting of expectations.
- Assuming that the organization has taken steps to bolster its overall liquidity in the Respond phase, the critical consideration is the sufficiency of liquidity to fund operations during recovery across multiple economic cases over the next 18 to 24 months.<sup>27</sup> The more detailed the modeling around these cases, the better, given the large number of unprecedented factors (such as stimulus payments, local regulatory edicts, and so on) that could potentially impact cash flow.
- Tapping into the myriad of government assistance programs is also important in supporting this outcome.<sup>28</sup>
- The possible entrance of different classes of investors into the market (such as venture funds, sovereign wealth funds, and vulture investors) has the potential to place added stress on the organization as it executes its recovery plan. Staying alert to these external forces and leveraging the board for counsel and advice will remain critical to ward off this threat.

## ACCELERATE DIGITAL TRANSFORMATION

*Strategic question*

- How can we move faster toward digital transformation?

*Key considerations*

- At many organizations, the pace of digital transformation reached hyperspeed as a result of the crisis. While many were already taking an agile approach to digital transformation, the crisis likely exposed deficiencies and forced organizations to move faster. The crisis may have also unearthed some opportunities to pursue competitive advantage.
- In the Recover phase, leaders should prioritize the most important digital investments and potentially rethink the technical architecture. Just as with supply networks, the ability to draw on an extended network of digital solutions may provide a more resilient infrastructure and allow the organization to focus on its most strategic applications.
- The ultimate challenge may be around funding the investments needed to drive digital enablement. With the pace of change accelerating in technology, putting the organization on a path to constant and ever-growing investment in digital will prove challenging.

## SUPPORT THE WORKFORCE AND OPERATING STRUCTURE

*Strategic questions*

- How has the social contract with workers changed?
- Do we have the right operating structures and alliances in place to deliver the plan?

*Key considerations*

- Social distancing and other new practices and regulations have dictated changes in work, the workforce, and the workplace—the most prominent being the widespread shift to remote work. A big consideration is whether certain of these changes should become permanent. In some instances, for example, productivity may have increased as more tools to virtualize the workforce came into use.
- Once decisions have been made around where and how work will be done, several tactical decisions will be required, such as:
  - Whether employees should return all at once or on a phased basis over time
  - How the organization will ensure worker safety and well-being as the business recovers
- Now is also the time to determine whether offshore and/or outsourced capabilities are sufficiently diversified or whether they need to be reconsidered. The anticipated uneven reopening of markets and geographies will add an unusual amount of complexity to this analysis.

## MANAGE STAKEHOLDER EXPECTATIONS

### *Strategic question*

- How have social and institutional expectations changed?

### *Key considerations*

- Boards have become acutely aware of their responsibilities and also of their contributions to the financial, physical, emotional, and digital well-being of management, employees, investors, and other stakeholders.<sup>29</sup>
- Before the crisis, many corporations had already been stepping up to greater environmental and social responsibilities, as further codified last summer in the commitment made by the Business Roundtable's signatories.<sup>30</sup> A number of leaders are visibly acting on their stated environmental and social responsibilities in the heat of the crisis.<sup>31</sup> Senior leaders should set expectations for the range and measurement of their organizations' ongoing environmental and social responsibility efforts as they embark on the critical Recover phase—for their companies and for our globe. ●

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**PUNIT RENJEN** is the CEO of Deloitte Global. He is based in Portland, Oregon.

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## The heart of resilient leadership: Responding to COVID-19

The COVID-19 crisis unearthed unprecedented challenges for senior executives. See five fundamental qualities of resilient leadership that can distinguish successful CEOs, and specific steps that can enable organizations to emerge from this and other crises stronger.

Visit [www.deloitte.com/insights/COVID19-recovery](https://www.deloitte.com/insights/COVID19-recovery)





## Getting decision rights right

**A**S IMPORTANT AS it is for an organization to get decisions “right,” a surprising number of organizations lack clarity about just what decisions need to be made, who is responsible for making them, and how the decision-making process should unfold. Improving the way decisions are made can be good for business: Effective decision rights practices are an integral part of organization design maturity, which in turn is strongly associated with better business outcomes. One study showed that public companies with high organization design maturity enjoyed 23 percent greater revenue growth over the three years prior to the study than those with low organization design maturity.<sup>1</sup>

Fortunately, getting decision rights “right” depends largely on a surprisingly small set of factors. Organizations with high organization design (and decision rights) maturity characteristically:

- **Simplify and clarify decision rights across the organization.** Decision-making effectiveness depends critically on how clearly and simply the *who*, *what*, and *how* of decision-making are defined and communicated—that is, who is responsible for making which decisions, what decisions must be made, and how the decision-making process should work. Our research shows that clarity in decision-making has the potential to double the likelihood of improving processes to maximize efficiency.<sup>2</sup>
- **Establish strong, transparent accountability for decisions.** Accountability is not about identifying where to place the blame for decisions gone wrong. Instead, it’s about evaluating decisions’ outcomes against agreed-upon metrics and determining how broadly within the organization to share those evaluations. The aim is to enable the organization to better learn from both its failures and successes.

## Fortunately, getting decision rights “right” depends largely on a surprisingly small set of factors.

- **Align individuals in decision-making groups to a common mission.** Unhelpful competition and dissent within a decision-making group can slow the process and sabotage decision quality. Establishing a clear common mission for the group can help counter this risk, allowing the group to reach decisions more quickly and less contentiously.
- **Encourage distributed authority.** When appropriate, empowering line workers to make decisions can pay off in greater agility and responsiveness. To avoid creating confusion when this is done, it’s important to explicitly articulate which frontline workers have the authority to make which decisions under what circumstances.
- **Prioritize the customer voice in decisions.** Among the most important ways to better understand customer wants and needs is for organizations to listen more closely to what their customers are saying. Giving customer-facing workers more decision-making authority is one way to increase the customer’s influence over these decisions.

An organization that puts these attributes in place will be well positioned to improve both the speed and quality of their decisions—with positive business results. The data supports this relationship: In 2016–2017, public companies in our data set that excelled in the five areas mentioned increased their earnings per share (EPS) by an average of 45 percent year over year, while organizations that performed poorly in the five areas averaged an 88 percent EPS *decrease* year over year.<sup>3</sup> ●

To learn more, read the full article, *Getting decision rights right: How effective organizational decision-making can help boost performance*, on [www.deloitte.com/insights/decision-rights](http://www.deloitte.com/insights/decision-rights).



**FUTURE OF WORK**

# Superminds, not substitutes

**DESIGNING HUMAN-MACHINE  
COLLABORATION FOR A  
BETTER FUTURE OF WORK**

JAMES GUSZCZA AND JEFF SCHWARTZ  
WITH A NOTE BY JOE UCUZOGLU,  
CEO, DELOITTE US  
ART BY DAVID VOGIN



“AI systems will need to be smart *and* to be good teammates.”

– Barbara Grosz<sup>1</sup>

**A**RTIFICIAL INTELLIGENCE (AI) is one of the signature issues of our time, but also one of the most easily misinterpreted. The prominent computer scientist Andrew Ng’s slogan “AI is the new electricity”<sup>2</sup> signals that AI is likely to be an economic blockbuster—a general-purpose technology<sup>3</sup> with the potential to reshape business and societal landscapes alike. Ng states:

Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don’t think AI will transform in the next several years.<sup>4</sup>

Such provocative statements naturally prompt the question: How will AI technologies change the role of humans in the workplaces of the future?

An implicit assumption shaping many discussions of this topic might be called the “substitution” view: namely, that AI and other technologies will perform a continually expanding set of tasks better and more cheaply than humans, while humans will remain employed to perform those tasks at which machines cannot (yet) excel. This view comports with the economic goal of achieving scalable efficiency.

The seductiveness of this received wisdom was put into sharp relief by this account of a prevailing attitude at the 2019 World Economic Forum in Davos:

People are looking to achieve very big numbers ... Earlier, they had incremental, 5 to 10 percent goals in reducing their workforce. Now they’re saying, “Why can’t we do it with 1 percent of the people we have?”<sup>5</sup>

But as the personal computing pioneer Alan Kay famously remarked, “A change in perspective is worth 80 IQ points.” This is especially true of discussions of the roles of humans and machines in the future of work. Making the most of human and machine capabilities will require moving beyond received wisdom about both the nature of work *and* the capabilities of real-world AI.

The zero-sum conception of jobs as fixed bundles of tasks, many of which will increasingly be performed by machines, limits one’s ability to reimagine jobs in ways that create new forms of value and meaning.<sup>6</sup> And framing AI as a kind of technology that imitates human cognition makes it easy to be misled by exaggerated claims about the ability of machines to replace humans.

We believe that a change in perspective about AI’s role in work is long overdue. Human and machine capabilities are most productively harnessed by designing *systems* in which humans and machines function collaboratively in ways that complement each other’s strengths and counterbalance each other’s limitations. Following MIT’s Thomas Malone, a pioneer in the study of collective intelligence, we call such hybrid human-machine systems *superminds*.<sup>7</sup>

The change in perspective from AI as a human substitute to an enabler of human-machine superminds has fundamental implications for how organizations should best harness AI technologies:

- Rather than focusing primarily on the ability of computer technologies to *automate* tasks, we would do well to explore their abilities to *augment* human capabilities.
- Rather than adopt a purely technological view of *deploying* technologies, we can cultivate a broader view of *designing systems* of human-computer collaboration. Malone calls this approach “supermind-centered design.”<sup>8</sup>
- Rather than approach AI only as a technology for reducing *costs*, we can also consider its potential for achieving the mutually reinforcing goals of creating more *value* for customers and work that provides more *meaning* for employees.

Compared with the economic logic of scalable growth, the superminds view may strike some as Pollyannaish wishful thinking. Yet it is anything but. Two complementary points—one scientific, one societal—are worth keeping in mind.

First, the superminds view is based on a contemporary, rather than decades-old, scientific understanding of the comparative strengths and limitations of human and machine intelligence. In contrast, much AI-related thought leadership in the business press has arguably been influenced by an understanding of AI rooted in the scientific

zeitgeist of the 1950s and the subsequent decades of science-fiction movies that it inspired.<sup>9</sup>

## Human and machine capabilities are most productively harnessed by designing *systems* in which humans and machines function collaboratively in ways that complement each other’s strengths and counterbalance each other’s limitations.

Second, the post-COVID world is likely to see increasing calls for new social contracts and institutional arrangements of the sort articulated by the Business Roundtable in August 2019.<sup>10</sup> In addition to being more scientifically grounded, a human-centered approach to AI in the future of work will better comport with the societal realities of the post-COVID world. A recent essay by *New America* chief executive Anne-Marie Slaughter conveys today’s moment of opportunity:

The coronavirus, and its economic and social fallout, is a time machine to the future. Changes that many of us predicted would happen over decades are instead taking place in the span of weeks. The future of work is here [and it’s] an opportunity to make the changes we knew we were going to have to make eventually.<sup>11</sup>

To start, let us ground the discussion in the relevant lessons of both computer and cognitive science.

## WHY DEEP LEARNING IS DIFFERENT FROM DEEP UNDERSTANDING

The view that AI will eventually be able to replace people reflects the aspiration—explicitly articulated by the field’s founders in the 1950s—to implement human cognition in machine form.<sup>12</sup> Since then, it has become common for major AI milestones to be framed as machine intelligence taking another step on a path to achieving full human intelligence. For example, the chess grandmaster Garry Kasparov’s defeat by IBM’s Deep Blue computer was popularly discussed as “the brain’s last stand.”<sup>13</sup> In the midst of his defeat by IBM Watson, the *Jeopardy* quiz show champion Ken Jennings joked, “I for one welcome my new computer overlords.”<sup>14</sup> More recently, a *Financial Times* profile of DeepMind CEO Demis Hassabis, published shortly after AlphaGo’s defeat of Go champion Lee Sedol, stated: “At DeepMind, engineers have created programs based on neural networks, modeled on the human brain ... The intelligence is general, not specific. This AI ‘thinks’ like humans do.”<sup>15</sup>

But the truth is considerably more prosaic than this decades-old narrative suggests. It is indeed true that powerful machine learning techniques such as deep learning neural networks and reinforcement learning are inspired by brain and cognitive science. But it does not follow that the resulting AI technologies understand or think in humanlike ways.

So-called “second wave” AI applications essentially result from large-scale statistical inference on massive data sets. This makes them powerful—and often economically game-changing—tools for performing narrow tasks in sufficiently controlled environments. But such AIs possess no common sense, conceptual understanding, awareness of other minds, notions of cause and effect, or intuitive understanding of physics.

What’s more, and even more crucially, these AI applications are reliable and trustworthy only to the extent that they are trained on data that adequately represents the scenarios in which they are to be deployed. If the data is insufficient or the world has changed in relevant ways, the technology cannot necessarily be trusted. For example, a machine translation algorithm would need to be exposed to many human-translated examples of a new bit of slang to hopefully get it right.<sup>16</sup> Similarly, a facial recognition algorithm trained only on images of light-skinned faces might fail to recognize dark-skinned individuals at all.<sup>17</sup>

In contrast, human intelligence is characterized by the ability to learn concepts from few examples, enabling them to function in unfamiliar or rapidly changing environments—essentially the opposite of brute-force pattern recognition learned from massive volumes of (human-)curated data. Think of the human ability to rapidly learn new slang words, work in physical environments that aren’t standardized, or navigate cars through unfamiliar surroundings. Even more telling is a toddler’s ability to learn language from a relative handful of examples.<sup>18</sup> In each case, human intelligence succeeds where today’s “second wave” AI fails because it relies on concepts, hypothesis formation, and causal understanding rather than pattern-matching against massive historical data sets.

It is therefore best to view AI technologies as focused, narrow applications that do not possess the flexibility of human thought. Such technologies will increasingly yield economic efficiencies, business innovations, and improved lives. Yet the old idea that “general” AI would mimic human cognition has, in practice, given way to today’s multitude of practical, narrow AIs that operate very differently from the human mind. Their ability to generally replace human workers is far from clear.

## Why humans are underrated

A key theme that has emerged from decades of work in AI and cognitive science serves as a useful touchstone for evaluating the relative strengths and limitations of human and computer capabilities in various future of work scenarios. This theme is known as “the AI paradox.”<sup>19</sup>

It is hardly news that it is often comparatively easy to automate a multitude of tasks that humans find difficult, such as memorizing facts and recalling information, accurately and consistently weighing risk factors, rapidly performing repetitive tasks, proving theorems, performing statistical procedures, or playing chess and Go. What’s seemingly paradoxical is that the inverse also holds true: Things that come naturally to most people—using common sense, understanding context, navigating unfamiliar landscapes, manipulating objects in uncontrolled environments, picking up slang, understanding human sentiment and emotions—are often the hardest to implement in machines.

The renowned Berkeley cognitive scientist Alison Gopnik states, “It turns out to be much easier to simulate the reasoning of a highly trained adult expert than to mimic the ordinary learning of every baby.”<sup>20</sup> The Harvard cognitive scientist Steven Pinker comments that the main lesson from decades of AI research is that “Difficult problems are easy, and the easy problems are difficult.”<sup>21</sup>

Far from being substitutes for each other, human and machine intelligence therefore turn out to be fundamentally *complementary* in nature. This basic observation turns the substitution view of AI on its head. In organizational psychology, what Scott Page calls a “diversity bonus” results from forming teams composed of different kinds of

thinkers. Heterogeneous teams outperform homogenous ones at solving problems, making predictions, and innovating solutions.<sup>22</sup> The heterogeneity of human and machine intelligences motivates the search for “diversity bonuses” resulting from well-designed teams of human and machine collaborators.

## Difficult problems are easy, and the easy problems are difficult.

A “twist ending” to an AI breakthrough typically used to illustrate the substitution view—Deep Blue’s defeat of the chess grandmaster Garry Kasparov—vividly illustrates the largely untapped potential of the human-machine superminds approach. After his defeat, Kasparov helped create a new game called “advanced chess” in which teams of humans using computer chess programs competed against other such teams. In 2005, a global advanced chess tournament called “freestyle chess” attracted grandmaster players using some of the most powerful computers of the time. The competition ended in an upset victory: Two amateur chess players using three ordinary laptops, each running a different chess program, beat their grandmaster opponents using supercomputers.

Writing in 2010, Kasparov commented that the winners’ “skill at manipulating and ‘coaching’ their computers to look very deeply into positions effectively counteracted the superior chess understanding of their grandmaster opponents and the greater computational power of other participants.” He went on to state what has come to be known as “Kasparov’s Law”:

Weak human + machine + *better process*  
was superior to a strong computer alone  
and, more remarkably, superior to a strong

human + machine + inferior process ...  
Human strategic guidance combined with  
the tactical acuity of a computer was  
overwhelming.<sup>23</sup>

In Thomas Malone’s vernacular, the system of two human players and three computer chess programs formed a *human-computer collective intelligence*—a supermind—that proved more powerful than competing group intelligences boasting stronger human and machine *components*, but inferior supermind *design*.

Though widespread, such phenomena are often hidden in plain sight and obscured by the substitution view of AI. Nonetheless, the evidence is steadily gathering that smart technologies are most effective and trustworthy when deployed in the context of well-designed systems of human-machine collaboration.

We illustrate different modes of collaboration<sup>24</sup>—and the various types of superminds that result—through a sequence of case studies below.

## The best way to predict the future of work is to invent it

### CHATBOTS AND CUSTOMER SERVICE

Call center operators handle billions of customer requests per year—changing flights, refunding purchases, reviewing insurance claims, and so on. To handle the flood of queries, organizations commonly implement chatbots to handle simple queries and escalate more complex ones to human agents.<sup>25</sup> A common refrain, echoing the substitution view, is that human call center operators remain employed to handle tasks beyond the capabilities of today’s chatbots, but that these

jobs will increasingly go by the wayside as chatbots become more sophisticated.

While we do not hazard a prediction of what *will* happen, we believe that call centers offer an excellent example of the surplus value, as well as more intrinsically meaningful work, that *can* be enabled by the superminds approach. In this approach, chatbots and other AI tools function as assistants to humans who increasingly function as problem-solvers. Chatbots offer uniformity and speed while handling massive volumes of routine queries (“Is my flight on time?”) without getting sick, tired, or burned out. In contrast, humans possess the common sense, humor, empathy, and contextual awareness needed to handle lower volumes of less routine or more open-ended tasks at which machines flounder (“My flight was canceled and I’m desperate. What do I do now?”). In addition, algorithms can further assist human agents by summarizing previous interactions, suggesting potential solutions, or identifying otherwise hidden customer needs.

This logic has recently been employed by a major health care provider to better deal with the COVID crisis. A chatbot presents patients with a sequence of questions from the US Centers for Disease Control and Prevention and in-house experts. The AI bot alleviates high volumes of hotline traffic, thereby enabling stretched health care workers to better focus on the most pressing cases.<sup>26</sup>

If this is done well, customers can benefit from more efficient, personalized service, while call center operators have the opportunity to perform less repetitive, more meaningful work involving problem-solving, engaging with the customer, and surfacing new opportunities. In contrast, relying excessively on virtual agents that are devoid of common sense, contextual awareness, genuine

empathy, or the ability to handle unexpected situations (consider the massive number of unexpected situations created by the COVID crisis) poses the risk of alienating customers.

Even if one grants the desirability of this “superminds” scenario, however, will AI technologies not inevitably decrease the number of such human jobs? Perhaps surprisingly, this is not a foregone conclusion. To illustrate, recall what happened to the demand for bank tellers after the introduction of automated teller machines (ATMs). Intuitively, one might think that ATMs dramatically reduced the need for human tellers. But the demand for tellers in fact *increased* after the introduction of ATMs: The technology made it economical for banks to open numerous smaller branches, each staffed with human tellers operating in more high-value customer service, less transactional roles.<sup>27</sup> Analogously, a recent

Bloomberg report told of a company that hired more call center operators to handle the increased volume of complex customer queries after its sales went up thanks to the introduction of chatbots.<sup>28</sup>

A further point is that the introduction of new technologies can give rise to entirely new job categories. In the case of call centers, *chatbot designers* write and continually revise the scripts that the chatbots use to handle routine customer interactions.<sup>29</sup>

This is not to minimize the threat of technological unemployment in a field that employs millions of people. We point out only that using technology to automate simple tasks need not inevitably lead to unemployment. As the ATM story illustrates, characteristically human skills can become *more* valuable when the introduction of a technology increases the number of nonautomatable tasks.

**Characteristically human skills can become *more* valuable when the introduction of a technology increases the number of nonautomatable tasks.**

## RADIOLOGISTS AND “DEEP MEDICINE”

Radiology is another field commonly assumed to be threatened by technological unemployment. Much of radiology involves interpreting medical images—a task at which deep learning algorithms excel. It is therefore natural to anticipate that much of the work currently done by radiologists will be displaced.<sup>30</sup> In a 2017 tweet publicizing a recent paper, Andrew Ng asked, “Should radiologists be worried about their jobs? Breaking news: We can now diagnose pneumonia from chest X-rays better than radiologists.”<sup>31</sup> A year earlier, the deep learning pioneer Geoffrey Hinton declared that it’s “quite obvious that we should stop training radiologists.”<sup>32</sup>

But further reflection reveals a “superminds” logic strikingly analogous to the scenario just discussed in the very different realm of call centers. In his recent book *Deep Medicine*, Eric Topol quotes a number of experts who discuss radiology algorithms as *assistants* to expert radiologists.<sup>33</sup> The Penn Medicine radiology professor Nick Bryan predicts that “within 10 years, no medical imaging study will be reviewed by a radiologist until it has been pre-analyzed by a machine.” Writing with Michael Recht, Bryan states that:

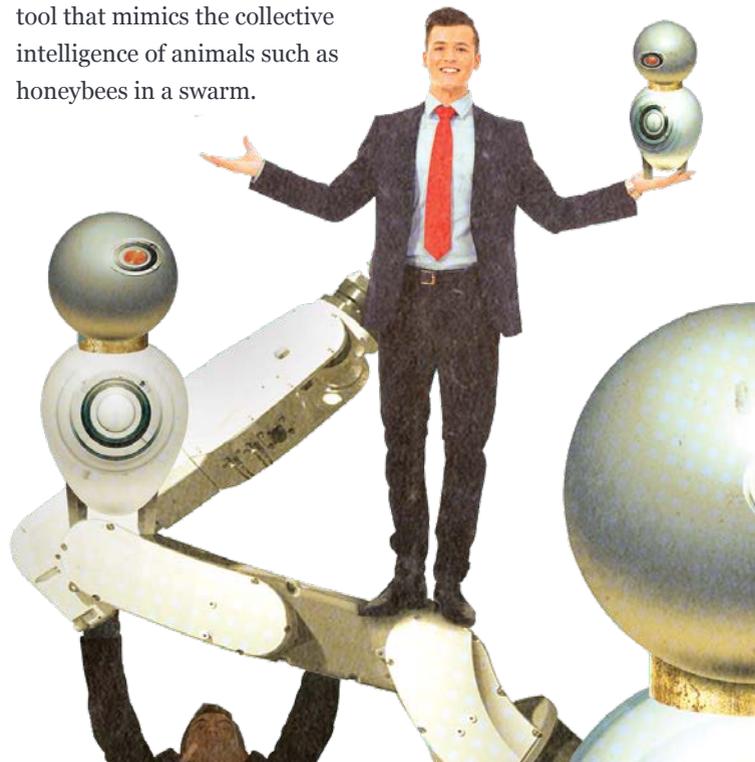
We believe that machine learning and AI will enhance both the value and the professional satisfaction of radiologists by allowing us to spend more time performing functions that add value and influence patient care, and less time doing rote tasks that we neither enjoy nor perform as well as machines.<sup>34</sup>

The deep learning pioneer Yann LeCun articulates a consistent idea, stating that algorithms can automate simple cases and enable radiologists to avoid errors that arise from boredom, inattention,

or fatigue. Unlike Ng and Hinton, LeCun does not anticipate a reduction in the demand for radiologists.<sup>35</sup>

Using AI to automate voluminous and error-prone tasks so that doctors can spend more time providing personalized, high-value care to patients is the central theme of Topol’s book. In the specific case of radiologists, Topol anticipates that these value-adding tasks will include explaining probabilistic outputs of algorithms both to patients and to other medical professionals. For Topol, the “renaissance radiologists” of the future will act less as technicians and more as “real doctors” (Topol’s phrase), and also serve as “master explainers” who display the solid grasp of data science and statistical thinking needed to effectively communicate risks and results to patients.

This value-adding scenario, closely analogous to the chatbot and ATM scenarios, involves the deployment of algorithms as physician *assistants*. But other human-machine arrangements are possible. A recent study combined human and algorithmic diagnoses using a “swarm” tool that mimics the collective intelligence of animals such as honeybees in a swarm.

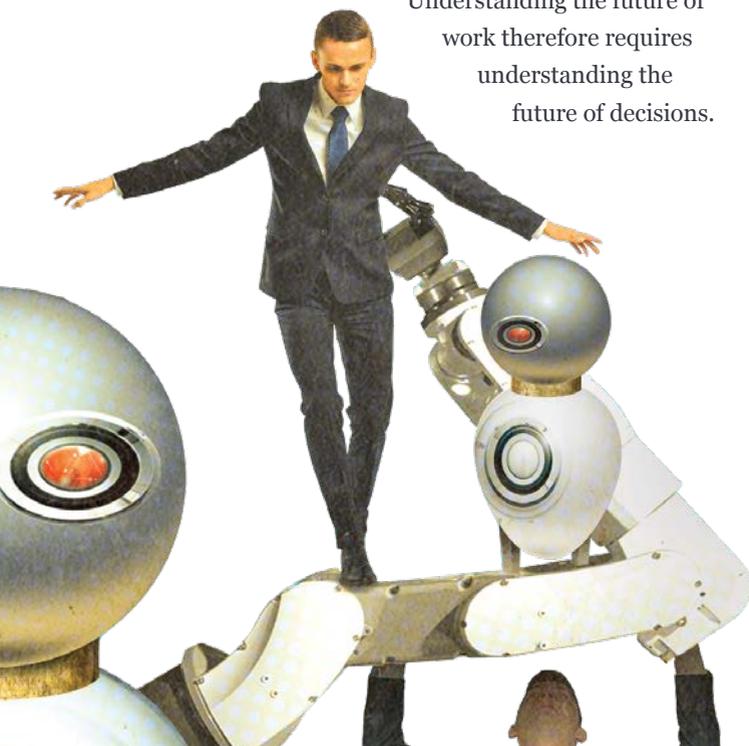


(Previous studies have suggested that honeybee swarms make decisions through a process that is similar to neurological brains.<sup>36</sup>) The investigators found that the hybrid human-machine system—which teamed 13 radiologists with two deep learning AI algorithms—outperformed both the radiologists and the AIs making diagnoses in isolation. Paraphrasing Kasparov’s law, humans + machines + a better process of working together (the swarm intelligence tool) outperforms the inferior process of either humans or machines working alone.<sup>37</sup>

## MACHINE PREDICTIONS AND HUMAN DECISIONS

Using the mechanism of swarm intelligence to create a human-machine collective intelligence possesses the thought-provoking appeal of good science fiction. But more straightforward forms of human-machine partnerships for making better judgments and decisions have been around for decades—and will become increasingly important in the future. The AI pioneer and proto-behavioral economist Herbert Simon wrote that “decision-making is the heart of administration.”<sup>38</sup>

Understanding the future of work therefore requires understanding the future of decisions.



Algorithms are increasingly used to improve economically or societally weighty decisions in such domains as hiring, lending, insurance underwriting, jurisprudence, and public sector casework. Similar to the widespread suggestion of algorithms threatening to put radiologists out of work, the use of algorithms to improve expert decision-making is often framed as an application of machine learning to automate decisions.

In fact, the use of data to improve decisions has as much to do with human psychology and ethics as it does statistics and computer science. Once again, it pays to remember the AI paradox and consider the relative strengths and weaknesses of human and machine intelligence.

The systematic shortcomings of human decision-making—and corresponding relative strengths in algorithmic prediction—have been much discussed in recent years thanks to the pioneering work of Simon’s behavioral science successors Daniel Kahneman and Amos Tversky. Two major sorts of errors plague human decisions:

- **Bias.** Herbert Simon was awarded the Nobel Prize in economics partly for his realization that human-bounded cognition is such that we must rely on heuristics (mental rules of thumb) to quickly make decisions without getting bogged down in analysis paralysis. Kahneman, Tversky, and their collaborators and successors demonstrated that these heuristics are often systematically biased. For example, we confuse ease of imagining a scenario with the likelihood of its happening (the availability heuristic); we cherry-pick evidence that comports with our prior beliefs (confirmation bias) or emotional attachments (the affect heuristic); we ascribe unrelated capabilities to people who possess specific traits we admire (the halo effect); and

we make decisions based on stereotypes rather than careful assessments of evidence (the representativeness heuristic). And another bias—overconfidence bias—ironically blinds us to such shortcomings.

- **Noise.** Completely extraneous factors, such as becoming tired or distracted, routinely affect decisions. For example, when shown the same biopsy results twice, pathologists produced severity assessments that were only 0.61 correlated. (Perfect consistency would result in a correlation of 1.0.)<sup>39</sup> Or simply think about whether you’d prefer to be interviewed or considered for promotion at the end of the day after a very strong job candidate, or closer to the beginning of the day after a very weak candidate.

Regarding noise, algorithms have a clear advantage. Unlike humans, algorithms can make limitless predictions or recommendations without getting tired or distracted by unrelated factors. Indeed, Kahneman—who is currently writing a book about noise—suggests that noise might be a more serious culprit than bias in causing decision traps, and views this as a major argument in favor of algorithmic decision-making.<sup>40</sup>

Bias is the more subtle issue. It is well known that training predictive algorithms on data sets that reflect human or societal biases can encode, and potentially amplify, those biases. For example, using historical data to build an algorithm to predict who should be made a job offer might well be biased against females or minorities if past decisions reflected such biases.<sup>41</sup> Analogously, an algorithm used to target health care “super-utilizers” in order to offer preventative concierge

health services might be biased against minorities who have historically lacked access to health care.<sup>42</sup>

As a result, the topic of machine predictions and human decisions is often implicitly framed as a debate between AI boosters arguing for the superiority of algorithmic to human intelligence on the one side, and AI skeptics warning of “weapons of math destruction” on the other. Adopting a superminds rather than a substitution approach can help people move beyond such unproductive debates.

## Unlike humans, algorithms can make limitless predictions or recommendations without getting tired or distracted by unrelated factors.

One of us (Jim Guszczka) has learned from firsthand experience how predictive algorithms can be productively used as inputs into, not replacements for, human decisions. Many years ago, Deloitte’s Data Science practice pioneered the application of predictive algorithms to help insurance underwriters better select business insurance risks (for example, workers’ compensation or commercial general liability insurance) and price the necessary contracts.

Crucially, the predictive algorithms were designed to meet the end-user underwriters halfway, and the underwriters were also properly trained so that they could meet the algorithms halfway. Black-box machine learning models were typically used only as interim data exploration tools or benchmarks for the more interpretable and easily documented linear models that were usually put

into production. Furthermore, algorithmic outputs were complemented with natural language messages designed to explain to the end user “why” the algorithmic prediction was what it was for a specific case.<sup>43</sup> These are all aspects of what might be called a “human-centered design” approach to AI.<sup>44</sup>

In addition, the end users were given clear training to help them understand when to trust a machine prediction, when to complement it with other information, and when to ignore it altogether. After all, an algorithm can only weigh the inputs presented to it. It cannot judge the accuracy or completeness of those inputs in any specific case. Nor can it use common sense to evaluate context and judge how, or if, the prediction should inform the ultimate decision.

Such considerations, often buried by discussions that emphasize big data and the latest machine learning methods, become all the more pressing in the wake of such world-altering events as the COVID crisis.<sup>45</sup> In such times, human judgment is more important than ever to assess the adequacy of algorithms trained on historical data that might be unrepresentative of the future. Recall that, unlike humans, algorithms possess neither the common sense nor the conceptual understanding needed to handle unfamiliar environments, edge cases, ethical considerations, or changing situations.

Another point is ethical in nature. Most people simply would not want to see decisions in certain domains—such as hiring, university admissions, public sector caseworker decisions, or judicial decisions—meted out by machines incapable of judgment. Yet at the same time, electing *not* to use

algorithms in such scenarios also has ethical implications. Unlike human decisions, machine predictions are consistent over time, and the statistical assumptions and ethical judgments made in algorithm design can be clearly documented. Machine predictions can therefore be systematically audited, debated, and improved in ways that human decisions cannot.<sup>46</sup>

## Human judgment is more important than ever to assess the adequacy of algorithms trained on historical data that might be unrepresentative of the future.

Indeed, the distinguished behavioral economist Sendhil Mullainathan points out that the applications in which people worry most about algorithmic bias are also the very situations in which algorithms—if properly constructed, implemented, and audited—also have the greatest potential to reduce the effects of implicit human biases.<sup>47</sup>

The above account provides a way of understanding the increasingly popular “human-centered AI” tagline: Algorithms are designed not to replace people but rather to extend their capabilities. Just as eyeglasses help myopic eyes see better, algorithms can be designed to help biased and bounded human minds make better judgments and decisions. This is achieved through a blend of statistics and human-centered design. The goal is not merely to optimize an algorithm in a technical statistical sense, but rather to optimize (in a broader sense) a system of humans working with algorithms.<sup>48</sup> In Malone’s vernacular, this is “supermind design thinking.”

## CAREGIVING

New America's Anne-Marie Slaughter comments:

Many of the jobs of the future should also be in caregiving, broadly defined to include not only the physical care of the very old and very young, but also education, coaching, mentoring, and advising. [The COVID] crisis is a reminder of just how indispensable these workers are.<sup>49</sup>

In a well-known essay about health coaches, the prominent medical researcher and author Atul Gawande provides an illuminating example of Slaughter's point. Gawande describes the impact of a health coach (Jayshree) working with a patient (Vibha) with multiple serious comorbidities and a poor track record of improving her diet, exercise, and medical compliance behaviors:

"I didn't think I would live this long," Vibha said through [her husband] Bharat, who translated her Gujarati for me. "I didn't want to live." I asked her what had made her better. The couple credited exercise, dietary changes, medication adjustments, and strict monitoring of her diabetes. But surely she had been encouraged to do these things after her first two heart attacks. What made the difference this time? "Jayshree," Vibha said, naming the health coach from Dunkin' Donuts, who also speaks Gujarati. "Jayshree pushes her, and she listens to her only and not to me," Bharat said. "Why do you listen to Jayshree?" I asked Vibha. "Because she talks like my mother," she said.<sup>50</sup>

The skills of caregivers such as Jayshree are at the opposite end of the pay and education spectra from such fields as radiology. And the AI paradox

suggests that such skills are unlikely to be implemented in machine form anytime soon.

Even so, AI can perhaps play a role in composing purely human superminds such as the one Gawande describes. In Gawande's example, the value wasn't created by generally "human" contact, but rather by the sympathetic engagement of a *specific* human—in this case one, with a similar language and cultural background. AI algorithms have long been used to match friends and romantic partners based on cultural and attitudinal similarities. Such matching could also be explored to improve the quality of various forms of caregiving in fields such as health care, education, customer service, insurance claim adjusting, personal finance, and public sector casework.<sup>51</sup> This illustrates another facet of Malone's superminds concept: Algorithms can serve not only as human collaborators, but also as human connectors.

## Start with why

As Neils Bohr and Yogi Berra each said, it is very hard to predict—especially about the future. This essay is not a series of predictions, but a call to action. Realizing the full benefits of AI technologies will require graduating from a narrow "substitution" focus on automating tasks to a broader "superminds" focus on designing and operationalizing systems of human-machine collaboration.

The superminds view has important implications for workers, business leaders, and societies. Workers and leaders alike must remember that jobs are not mere bundles of skills, and nor are they static. They can and should be creatively reimaged to make the most of new technologies

in ways that simultaneously create more value for customers and more meaningful work for people.<sup>52</sup>

To do this well, it is best to start with first principles. What is the ultimate goal of the job for which the smart technology is intended? Is the purpose of a call center to process calls or to help cultivate enthusiastic, high-lifetime-value customers? Is the purpose of a radiologist to flag problematic tumors, or to participate in the curing, counseling, and comforting of a patient? Is the purpose of a decision-maker to make predictions, or to make wise and informed judgments? Is the purpose of a store clerk to ring up purchases, or to enhance customers' shopping experiences and help them make smart purchases? Once such ultimate goals have been articulated and possibly reframed, we can go about the business of redesigning jobs in ways that make the most of the new possibilities afforded by human-machine superminds.

## Workers and leaders alike must remember that jobs can and should be creatively reimaged to make the most of new technologies in ways that simultaneously create more value for customers and more meaningful work for people.

An analogy from MIT labor economist David Autor conveys the economic logic of why characteristically human skills will remain valued in the highly computerized workplaces of the future. In 1986, the space shuttle Challenger blew up, killing

its entire crew. A highly complex piece of machinery with many interlocking parts and dependencies, the Challenger's demise was due to the failure of a single part—the O-ring. From an economist's perspective, the marginal utility of making this single part more resilient would have been virtually infinite. Autor states that by analogy:

In much of the work that we do, we are the O-rings ... As our tools improve, technology magnifies our leverage and increases the importance of our expertise, judgment, and creativity.<sup>53</sup>

In discussing the logic of human-machine superminds, we do not mean to suggest that achieving them will be easy. To the contrary, such forces as status quo bias, risk aversion, short-term economic incentives, and organizational friction will have to be overcome. Still, the need to overcome such challenges is common to many forms of innovation.

A further challenge relates to the AI paradox: Organizations must learn to better measure, manage, and reward the intangible skills that come naturally to humans but at which machines flounder. Examples include empathy for a call center operator or caregiver; scientific judgment for a data scientist; common sense and alertness for a taxi driver or factory worker; and so

on. Such characteristically human—and often under-rewarded—skills will become more, not less, important in the highly computerized workplaces of the future.

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## PAIRING HUMANS AND MACHINES TO FORM SUPERMINDS: THRIVING IN A CHANGING WORLD

By Joe Ucuzoglu, CEO, Deloitte US



The unique capabilities of humans matter now more than ever, even in the face of rapid technological progress. In the C-suite and boardrooms, a range of complex topics dominate the agenda: from understanding the practical implications of AI, cloud, and all things digital, to questions of purpose, inclusion, shareholder primacy versus stakeholder capitalism, trust in institutions, and rising populism—and now, the challenges of a global pandemic. In all of these areas, organizations must navigate an unprecedented pace of change while keeping human capabilities and values front and center.

We know from recent years of technological advancement that machines are typically far better than people at looking at huge data sets and making connections. But data is all about the past. What is being created here in the Fourth Industrial Revolution—and in the era of COVID-19—is a future for which past data can be an unreliable guide. Pablo Picasso once said, “Computers are useless. All they can do is provide us with the answers.” The key is seeing the right questions, the new questions—and that’s where humans excel.

What’s more, the importance of asking and answering innovative questions extends up and down entire organizations. It’s not just for C-suites and boardrooms, as Jim Guszczka and Jeff Schwartz share in their examples. It’s about effectively designing systems in which two kinds of intelligence, human and machine, work together in complementary balance, forming *superminds*.

Embracing the concept of superminds and looking holistically at systems of human-machine collaboration provides a way forward for executives. The question is, “What next?” The adjustments all of us have had to make in light of COVID-19 show that we are capable of fast, massive shifts when required, and innovating new ways of working with technology. Eventually, this pandemic will subside, but the currents of digital transformation that have been accelerated out of necessity over the past few months are likely to play out for the rest of our working lives.

How will your organizations become a master of rapid experimentation and learning, of developing and rewarding essential human skills, and of aligning AI-augmented work with human potential and aspirations? ●

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**James Guszczka**, Deloitte Services LP, is Deloitte's US chief data scientist. He lives in Santa Monica, California.

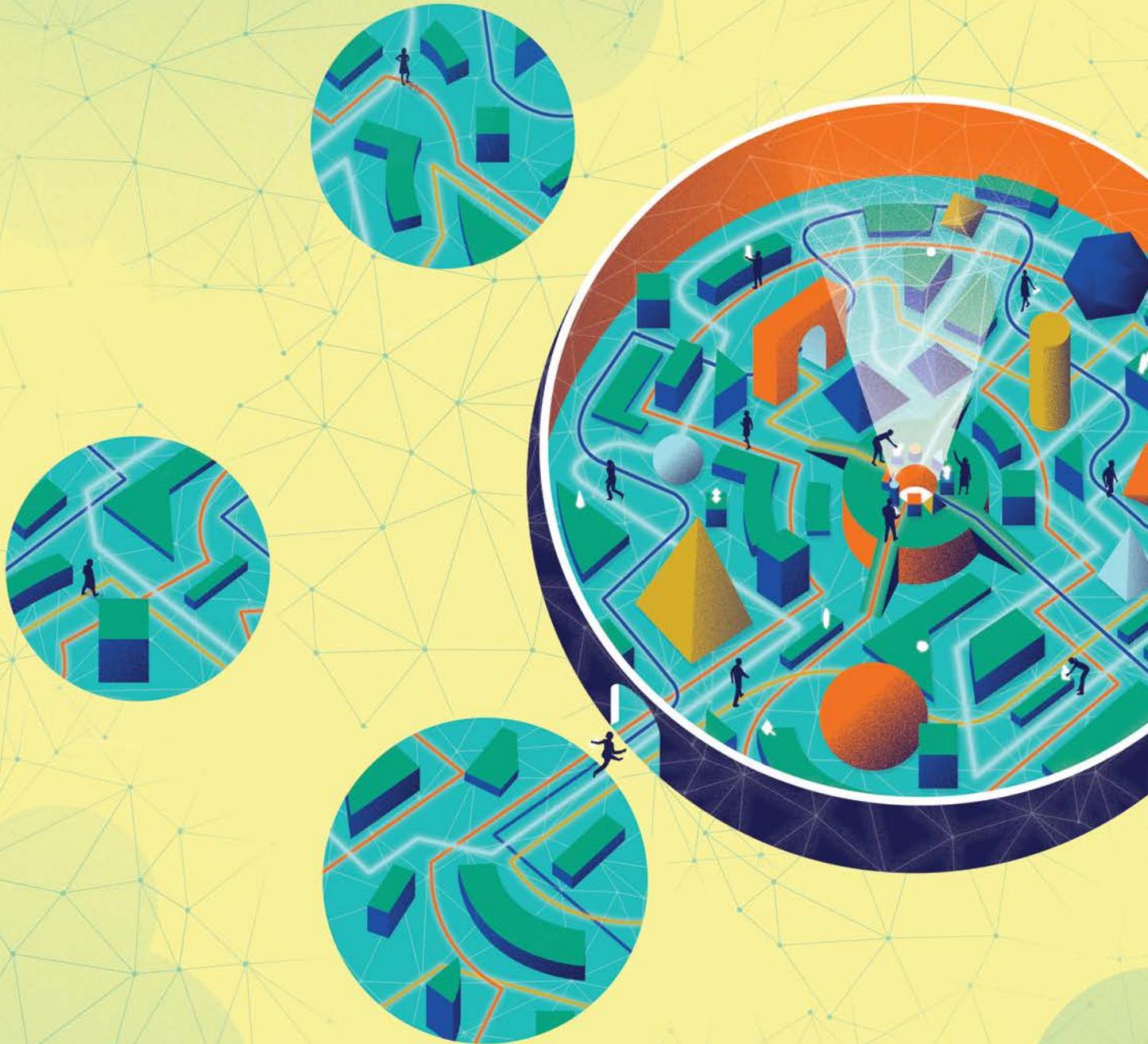
**Jeff Schwartz**, a principal with Deloitte Consulting LLP, is the US leader for the Future of Work and the US leader of Deloitte Catalyst, Tel Aviv. He is based in New York City.



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**FUTURE OF WORK**

# Opportunity marketplaces

**ALIGNING WORKFORCE INVESTMENT  
AND VALUE CREATION IN THE  
DIGITAL ENTERPRISE**

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MICHAEL SCHRAGE, JEFF SCHWARTZ, ROBIN JONES,  
DAVID KIRON, AND NATASHA BUCKLEY

ART BY NEIL WEBB

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*This article is excerpted from a full report published by MIT Sloan Management Review and Deloitte Insights in June 2020.*

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In response to unrelenting digital disruption, many leaders are rethinking how they value and invest in their workforces. Across the business landscape, corporate leaders are seeking to develop more flexible, adaptive, and valuable workers.

Our global research study directly addresses this challenge. Based on a survey of nearly 3,900 respondents and 18 executive interviews, we find that the most effective approaches to achieving a higher-value workforce have a common core: opportunity.

Targeted investment in opportunity is fast becoming the central organizing principle for making more people more valuable in more organizations. Our global executive survey and interviews identify the design of *opportunity marketplaces* as perhaps *the* key leadership challenge for most organizations seeking to ethically maximize human capital returns.

We see opportunity marketplaces as systems, digital platforms, and virtual places where organizations provide—and workers find—the opportunities most relevant to their mutual benefit and success. In an effective marketplace, the enterprise offers its workers defined options for professional development, mentorship, project participation, and networking, among others. Empowered workers, in turn, can choose to pursue those opportunities they most value. Vibrant, robust, and inclusive opportunity marketplaces strategically align both individual and enterprise aspirations. Investment in greater workforce *opportunity* is seen—and understood—as an investment in greater workforce *value creation*.

In our first year researching the future of the workforce, *MIT Sloan Management Review* and Deloitte present this report highlighting the urgency and importance of this approach. We find that many leaders and workers alike are not satisfied with corporate investments in their development. Seventy-four percent of respondents believe that developing worker skills and capabilities is important to their organization's strategy, but only 34 percent are happy with their organization's investment in them. Nearly one-half of all workers surveyed are prepared to leave their organization if offered a buyout or severance package.

The corrective, our research shows, goes beyond a greater emphasis on workforce restructuring, retraining, reskilling, and “rightsizing” efforts. For many workers, more skills—and even better experiences—without more opportunity is insufficient. If workers don't value the opportunities they're offered—if those opportunities don't speak to their passion, potential, and purpose, for example—they can and will likely leave. The willingness of many newly developed, higher-skilled talent to walk out the door can intensify the workforce challenge facing many leaders. To escape this trap, leaders should move past mindsets that prioritize controlling costs over empowering people.

One of the most significant research takeaways for top management is that opportunity marketplaces both demand and elicit *agency*—the perceived ability to influence one’s future—and fundamentally flip a perennial top talent and workforce management question. Where executives once asked, “How can we make better and smarter investments in people?,” opportunity marketplaces prompt executives to ask, “How can we support people in making better, smarter investments in themselves?” This flip directly challenges command-and-control leadership styles and may threaten executives who see digital transformation as a platform to strengthen enterprise oversight.

This emphasis on opportunity marketplaces reflects Nobel Prize-winning research on human capital development, behavioral economics, game theory, and market design.<sup>1</sup> Our surveyed leaders and organizations assert that, over time, an opportunity marketplace design sensibility best merges ethical and economic imperatives to maximize enterprise productivity and value. The message is clear: One of the surest ways for leaders to create better opportunities for their organizations is to create better opportunities for their people.

## Workers and management, disconnected and misaligned

Organizations have made great progress in developing digital strategies leveraging social, mobile, and cloud. Explosive growth in AI, data, and analytics, however, is driving a new round of digital business disruption. These disruptions often demand new approaches to managing, empowering, and aligning workers to desired strategic outcomes. Yet there is no clear or emerging consensus—no best practice that a majority of managers embrace.

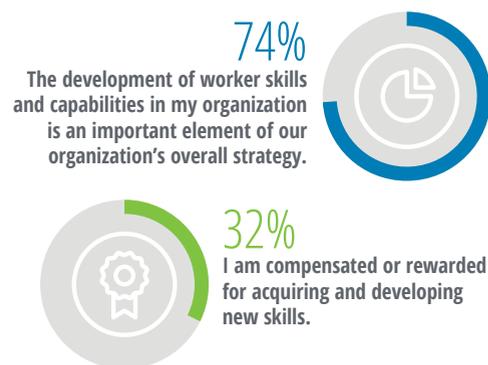
Our research reveals that to a striking degree, many workers are dissatisfied with their organizations’ investments in their professional development. Many feel undervalued as assets and as potential contributors to future value creation. These findings suggest a serious misalignment between the workforce and organizational strategy.

In our global survey, a majority of respondents, including executives, perceive a lack of investment in their development.

- Seventy-four percent of respondents believe that the development of new skills and capabilities is strategically important in their organization, but less than one-third (32 percent) say they are rewarded for developing new skills (figure 1).
- Less than half of respondents (47 percent) think that their company is making a significant investment in their professional development, and only 34 percent are happy with their organization’s investment in improving their skills and performance.

FIGURE 1

### Development is valued, but employees lack incentives



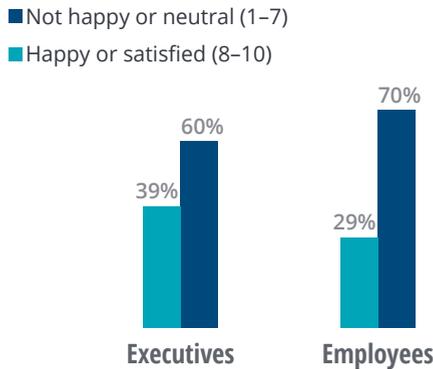
Source: 2020 Deloitte-MIT Sloan Management Review future of the workforce global survey.

- Executives are dissatisfied as well: Less than 40 percent of executives are happy with their organization’s investment in their development (figure 2).

FIGURE 2

### Dissatisfaction with professional development investments

I am happy with my organization’s investment in improving my skills and performance, scale 1–10



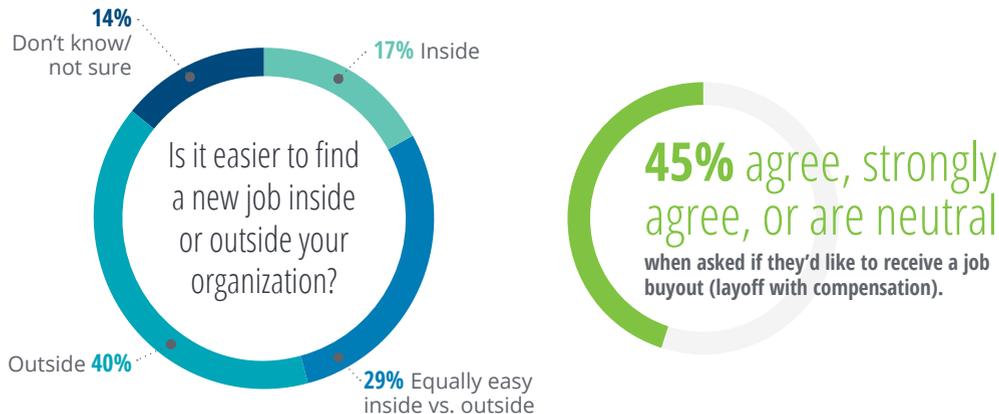
Source: 2020 Deloitte-MIT Sloan Management Review future of the workforce global survey.

Given these findings, it is unsurprising that many workers feel detached from their organizations and that many believe their skills would be better appreciated elsewhere. Forty-five percent of respondents would like to receive an employee buyout (a voluntary severance package) or are neutral on the question. More than twice as many respondents say it is easier to get a new job outside their organization (40 percent) than within it (17 percent) (figure 3).

Given their perceptions of underinvestment, it’s intriguing that a strong majority of respondents (84 percent) maintain that they continue to learn valuable skills and have valuable experiences in their current job. A similarly strong majority (82 percent) are confident in their ability to get another job inside or outside their organization based on the skills and experience they’re gaining from their current position. We infer that they enjoy this confidence in spite of—not because of—their employers. Less than half of respondents (41 percent) recognize that they have the skills they need to thrive professionally for a maximum of four years (figure 4).

FIGURE 3

### To workers, opportunities abound elsewhere



Source: 2020 Deloitte-MIT Sloan Management Review future of the workforce global survey.

FIGURE 4

## Workers reveal mixed feelings about their skills



Source: 2020 Deloitte-MIT Sloan Management Review future of the workforce global survey.

These contradictory responses raise the question of whether the broad dissatisfaction surfaced by our survey is rooted in perception or in reality. Different organizations obviously have different values when it comes to employee development: Some perceive investment in employees in primarily economic and transactional terms, while others balance economic factors with ethical and cultural considerations. Still others haven't given the question much deliberate thought at all. Several of our interviewees, however, have observed general patterns in how top management views the workforce. Their observations affirm our respondents' general view that organizations are taking transactional and cost-efficiency approaches to workforce management.

Thomas Kochan's perspective validates those respondents who feel that their workplaces aren't interested in their long-term development. "Executives don't see the full value of investing in the workforce for the long run," says Kochan, codirector of MIT Sloan School of Management's Institute for Work and Employment Research. He describes that investment as "being able to drive productivity improvements by having good jobs that pay good wages and having workers who are well-trained ahead of any investments in technology, so that they can add value to the

process of both designing and implementing the technology and then continuing that innovation process." He continues, "Labor is still too often viewed as a cost."

Oren Cass, author of *The Once and Future Worker* and executive director of American Compass, makes a related point. "The business community takes it for granted that labor is just an input like any other and that, as they design their business models and processes and practices, they are entitled to assume there is a market that will supply to them whatever labor they want, just like they can count on the market to supply to them whatever services and widgets and other things they might want," Cass says. "I think that is both economically and practically wrong and philosophically and socially wrong."

## Opportunity corrects the disconnect

Leading enterprises take deliberate steps to invest in and transform their workforces in ways that are mutually beneficial. They invest not just in retraining or upskilling workers, but in providing opportunities for professional development and achievement. Our quantitative and qualitative data

suggests that these organizations don't just see workers as an operational means to an end, but as assets worth cultivating.

Opportunity-centric approaches represent a conscious shift away from transactional commitments, signaling more employee-centered approaches to value creation. Moreover, they don't require workers to leave their whole selves behind when they walk through the office door. Our survey results suggest that workers whose organizations are investing in them in these ways are more satisfied with their jobs. Respondents from these companies are also more likely to report their organization outperforms its peers (figure 5).

A deeper data dive uncovers a complex link between employee investment, job satisfaction, and organizational performance. Leadership vision, communication, and action can significantly contribute to both worker satisfaction and organizational performance. The importance of “tone at the top”—with senior executives explicitly

FIGURE 5

### Worker satisfaction with organizational investment



Source: 2020 Deloitte-MIT Sloan Management Review future of the workforce global survey.

supporting the virtues and value of opportunity—cannot be overemphasized. A cluster analysis of our survey data shows that Promoters, those respondents most satisfied with their organization's investment in their professional development, feel more attached to their organizations and more supported by a leadership vision for how employees will contribute value.

**85% of Promoters** agree or strongly agree that their leaders have a vision for how employees will contribute value in the next five years, versus **38% of Detractors**.

Leaders at Promoters' companies not only more frequently discuss capability improvement than leaders at other companies but are far more likely to offer opportunities to further build worker capabilities. These findings are not primarily a function of Promoters being high performers; the majority of both Promoters and Detractors (those respondents least satisfied with their organization's investment in their professional development) describe themselves as high performers.

- **Promoters are more than 3x** as likely as Detractors to work in organizations where leaders have discussed improving capabilities in the past month.
- **61% of Promoters** have been trained on using a new technology or digital service in the past six months, compared with **18% of Detractors**.

There is also a clear difference between Promoters' and Detractors' perceptions of internal opportunity. Compared with Detractors, more than twice as many Promoters (69 percent versus 32 percent) agree that it's just as easy or easier to get a job inside their organization as outside it, while more than half of Detractors say it's easier to get a job outside their organization. Opportunity shortfalls tend to invite low morale, low productivity, and attrition.

## LOOKING THROUGH THE OPPORTUNITY LENS

Meeting an enterprise's need for new skills is different and distinct from enabling opportunities for workers to have new experiences and learn from them, develop and apply valued skills, and move seamlessly and friction-free to new roles in the organization. Executives we spoke with consistently asserted that they felt the best way to accomplish the former was by committing to the latter. They emphasize the importance of providing opportunities so that workers can develop in ways that both they and the company value.

Schneider Electric, for example, maintains a continually updated system of reference that catalogs the skills necessary for each job organizationwide. The company also methodically seeks input from employees about which skills they're most interested in acquiring. "Available analytics could tell us what skills are in demand, what skills employees want to learn, and what skills are the ones that are withering away and not being used anymore," says Andrew Saïdy, Schneider's vice president of talent digitization. The workforce opportunities Schneider offers will be increasingly informed by that data.

A payroll company we spoke with explicitly and systematically offers new opportunities to workers

as a way to better create value for individuals and the organization. "The No. 1 thing that we're doing is cultivating a mutual dependency, making sure that we are putting them in a position where they are able to stay on that technological cutting edge," says one executive. "If we don't, our people will leave. They recognize, more so than ever before, they're investing in themselves. And I believe they are taking more control and more accountability for their own development."

HR software and services company Ceridian also values mobility and development, but Chief People and Culture Officer Lisa Sterling notes that employees must accept greater responsibility for their careers and take the initiative to invest in them. "We have to provide opportunities for people to be invested in," she says, "but people have to take the initiative themselves to seek out and prove their worthiness for that investment."

That's agency. If workers believe that opportunities are genuine, valuable, trustworthy, and accessible, they will likely feel empowered to pursue them. Psychological safety is critical for workers to both perceive and take advantage of opportunities.<sup>2</sup> According to Nobel laureate Amartya Sen, agency is essential to human flourishing and depends on the ability to achieve goals that one has reason to value.<sup>3</sup> Effective strategies for reskilling, retention, and mobility reconcile the values of leaders and their workers.

Our research highlights three key factors that can enable opportunity-centric enterprise success:

- A clear leadership vision for how the human workforce will create value.
- A cultural shift recognizing and rewarding individual initiative and agency.

- Access to tools and resources to boost competencies, self-investment, and shared development interests.

### LEADERSHIP COMMITMENT TO BUILDING OPPORTUNITY

Leadership is crucial to ensuring a healthy flow of talent across an enterprise, says Ceridian's Sterling. In the past, some leaders at Ceridian were reluctant to encourage workers to take their skills to other parts of the organization. Now, she says, leaders understand that "we actually drive greater productivity from people in their current roles when they can do other things that they're passionate about and excel at." Exercising agency around opportunity can unlock economic value and human potential.

At Henry Ford Health System, Sarah Sheffer, director of strategic workforce planning, has a directive to help leaders: "Start to think not just, 'Somebody has left; I have an open seat and need this position filled ASAP,' but rather, 'How can we start thinking about skills of the future? What will this person's job look like in the next year or two years or three years?' It's a leadership mindset that needs to shift."

Marriott International, the multinational hospitality company, discovered that leadership by

example matters enormously. Workers are more likely to take advantage of learning opportunities when their leaders take training themselves. At properties where the general manager (GM) completed a particular training curriculum on the company's new just-in-time Digital Learning Platform, observes Global Chief HR Officer Ty Breland, over 80 percent of staff followed suit. When the GM failed to complete the training, in contrast, less than a third of staff typically completed it.

More significantly, the properties where GMs and staff successfully completed training proved more competitive than their undertrained cohorts. "Those properties with GMs that lean in and invest in their people, and really help them with their development, those properties outperform," Breland says.

### CULTURE CHANGE THAT EMPOWERS WORKERS

When DBS Bank launched a digital curriculum to retrain more than 20,000 employees, the culturally sensitive company wanted to ensure that every employee understood, embraced, and embodied the changes in addition to building new digital capabilities and competencies.

"We embarked on an organizationwide cultural intervention to equip and enable every single individual to be comfortable with new digital skills," says Ying Yuan Ng, DBS's chief learning officer and group COO, human resources. The curriculum's dual purpose is clearly understood: to benefit the bank's bottom line and demonstrate to employees that digital disruption creates new opportunities for them. "We want our employees to know that 'DBS supports me in transforming myself both as an employee and an individual,'" Ng explains. "We invest heavily in our people. Our philosophy is to leave no one behind."



## ACCESS TO PERFORMANCE IMPROVEMENT RESOURCES

Performance management techniques may foster agency and unlock new business opportunities, but they can also undermine workers' sense of agency and subvert business results. A recent Domino's pilot illustrates this tension. In 2019, the company piloted a "pizza checker," which uses AI-enabled in-store cameras to monitor the quality of every pie created at a specific shop. The intention was to share data with workers to improve their pizza-making skills and overall performance. Donald Meij, group CEO and managing director, acknowledges that employees initially had a "deep-seated fear" that the company's intention was to cut jobs and implement surveillance. But his team persuaded employees that the monitoring was an opportunity for them "to feel better about their jobs because they can execute better," explains Meij. In fact, Domino's stores with pizza-checker technology significantly improved their customer ratings. As a result, Meij says, "there was pride in the business at a different level from what we had before."

One Massachusetts-based private employer uses a microcredential created by Southern New Hampshire University (SNHU) to improve the performance of nonclinical front-line health care workers. "These are entry-level, hourly employees," SNHU President Paul LeBlanc explains. "Seventy percent of your interactions with health care systems is with that workforce, but it's the group with the highest turnover rate and the lowest patient satisfaction rate. This organization knew that it needed that group to be better, and it wanted a strategy to help develop and retain them. We developed a microcredential that stacks into an associate's pathway in the Health Administration discipline. The organization likes it so much, it's rolled it out across its system." LeBlanc says that by enabling

people to learn quickly and thus move into better positions more quickly, "microcredentials unlock more opportunity."



## A new frontier for human capital management: Opportunity marketplaces

Organizations differ in how systematically they create and allocate opportunity. More systematic approaches use opportunity marketplaces to enable opportunity creation, communication, and use. These markets have a structure and purpose that encourage and allow workers to exchange their labor for opportunity, not just for price. Well-designed opportunity marketplaces align employee capabilities and ambitions with the company's operational and strategic aspirations.

### WHAT IS AN OPPORTUNITY MARKETPLACE?

Opportunity marketplaces facilitate successful exchanges between organizations and their workers around defined opportunities for professional development, training, mentorship, project participation, networking, promotion, diversity, and inclusion. Defining how and why specific resources, such as training, compensation, and tasks, are converted into opportunities to provide the mechanisms and rationale for a given opportunity marketplace becomes key.

Effective opportunity marketplaces require that individual initiative and clearly articulated strategic enterprise priorities align with and reinforce each other. They consequently bring an increase in personal agency and more expansive views of opportunity, from the perspectives of employees and employers alike. These markets

empower workers to evaluate, choose, and act on opportunities; they incent people to better invest in themselves. In turn, opportunity marketplaces can provide an enterprise with actionable data and analytics about which internal opportunities their people value. Successful opportunity marketplaces facilitate a fair exchange that benefits both workers

and the organization (see sidebar, “Schneider Electric creates an opportunity marketplace”). The organization as a whole becomes more efficient, valuable, and productive.

Opportunity marketplaces, like any fairly designed market, are about mutual gain.

### **SCHNEIDER ELECTRIC CREATES AN OPPORTUNITY MARKETPLACE**

Schneider Electric’s Andrew Saily is well aware that most people don’t understand his job title. The vice president of talent digitization at the global energy management company explains his role this way: “I help generate revenues by launching technologies that ensure our employees work more efficiently, they remain with Schneider, and their engagement levels go up.”

The French multinational, founded in 1836 as Schneider & Cie, employs a 135,000-person workforce and has a presence in more than 100 countries (with more employees in the United States than anywhere else). It’s a legacy company, but it was compelled to disrupt legacy personnel practices when analytics revealed that nearly half the employees who left the organization did so because they felt they had no sufficient visibility to future growth opportunities.

At Schneider, the hard- and soft-dollar costs of attrition led the company, in 2018, to launch its “open talent market,” which uses AI to match employees with short-term projects, stretch assignments, side gigs, full-time roles, and mentors. As Schneider HR Vice President Amy deCastro explains, “We are creating an internal market that wasn’t there before, and it’s a market that employees can take advantage of instead of going out into the external market.”

Analytics drive the opportunity offerings in Schneider’s internal market, an AI-powered platform created by HR tech startup Gloat. This opportunity marketplace, in turn, generates a wealth of data for Schneider about its employees’ skills and interests, ensuring explicit and measurable alignment between internal opportunities and Schneider’s broader strategic aspirations. It also primes employees to fulfill the priority of better meeting and exceeding client expectations.

Importantly, the platform’s analytics aren’t used to dictate career paths but to enable agency and choice: Employees are expected to take the initiative. “We’ve always told our employees that they own their careers, that they are in the driver’s seat,” Saily says. With its opportunity marketplace, Schneider’s workplace culture has become more dynamic and responsive so that employees find it easier to invest in themselves. This commitment goes beyond retraining and upskilling: Schneider’s opportunity market can guide talent to projects aligned with their own sense of purpose and goals.

Although precise data is not yet available, Saily says attrition has decreased in areas where the opportunity market has been launched. A vice president of talent digitization might indeed be an unusual organizational role, but when “talent digitization” represents a strategic investment in human capital, it has a compelling rationale. Saily sees that rationale this way: “If you’re doing your day-to-day job and you’re not doing anything else, you’re not acquiring new experiences. Our purpose is to create new opportunities for employees to acquire new experiences and skills.”

## ENHANCING WORKER AGENCY CAN BUILD VALUE

Opportunity marketplaces function properly when workers want to pursue new endeavors and are empowered to succeed. With a strong sense of agency, workers take the initiative to pursue opportunities that they and the organization deem valuable. Without worker agency, opportunities can go unclaimed or become a source of frustration for workers (and the enterprise). Opportunity marketplaces coordinate an organization's provision of valuable opportunities with the worker's choice to pursue meaningful goals.

What does this look like in practice? Facilitating supportive and targeted just-in-time training at Marriott International can change associates' willingness and ability to invest in themselves. Offering "what they need, when they need it, how they need it," observes Marriott's Breland, is deliberately framed as an opportunity for associates to improve job performance by quickly getting up to speed on the hospitality provider's growing portfolio of digital innovations, such as mobile check-in and digital concierge services. "That's our goal," Breland says. "We want our associates to feel confident when they're engaging in a task, an interaction, or with a customer."

Offering greater access to the latest digital/technological advances at one HR software company is designed to motivate workers to build their capabilities and helps the company retain people with the skills it values. "We're able to do two things," says one of their corporate vice presidents. "We afford our folks an opportunity to learn about the latest techniques, the latest frameworks, the latest development movements, and also reinforce to them that, yes, we're keeping them on the cutting edge."

## ALIGNING WORKERS WITH STRATEGY

Rich and vibrant opportunity marketplaces don't just encourage high performers to keep their skills and knowledge within the organization; they can also improve contributions from "average" workers. Ceridian's Sterling has seen opportunities for mobility transform average workers into exceptional ones. "Some of those people who may be doing average work become exceptional as other opportunities come into play and they are recast within the organization," she says. Opportunity marketplaces can empower both talented and typical performers, increasing the overall value of human capital and improving value creation in the enterprise.

Cass emphatically asserts that the choice between investing in the workforce and returning shareholder value is a "false dichotomy." Opportunity marketplaces, like any fairly designed market, are about mutual gain. To ensure that these gains advance strategic value creation, our research indicates that leaders from across the organization (HR, CEO, CFO, chief strategy officer, and senior business unit leaders) link opportunity with strategy, operations, and people. They champion opportunity as the most effective and ethical way to invest both in their people's future development and in the companies' strategic success. Leaders forge links between the values the organization espouses and the internal opportunities it supports. Schneider Electric, for example, essentially created an internal gig economy to increase engagement, decrease attrition, and encourage continuous education and mentorship.

## THE AGENCY-OPPORTUNITY CONNECTION

A healthy relationship between agency and opportunity is fundamental to any functioning

opportunity marketplace. An integrated 2x2 framework shows how organizations and their leaders might describe their own opportunity marketplace cultures (figure 6). The vertical y-axis represents worker/individual agency: Does the employee have the ability to see, explore, select, and act upon a desirable opportunity? The horizontal x-axis describes the breadth, depth, and vibrancy of opportunities such as training, education, projects, and jobs. Different organizations will have different opportunity profiles, depending on their competencies, capabilities, strategies, and values.

The desirable upper-right quadrant features workers largely with the freedom, autonomy, and motivation to invest in themselves. They have access to a broad portfolio of opportunities across an organization that clearly understands the motivational and developmental power of opportunity. These companies take mentoring and coaching as seriously as they take transparency

and internal mobility. Leadership tends to treat workers as whole people with lives outside work, not just as “minds and hands.” Both high-level and average performers appreciate that internal opportunities may reliably lead to better professional development outcomes than external job searches. Empowered workers bid, like consumers, on supplied opportunities that they, and their employers, value.

The lower-left quadrant features workers with little agency and companies with shallow, sparse, and/or opaque opportunity marketplaces. Organizations in this quadrant struggle to attract and retain new talent and fill skills gaps. Many workers are not motivated to pursue (or “buy”) what little opportunity their enterprise has to offer. Workers here are typically assigned and/or told what to do; indifference is more rational than taking initiative. Our research indicates that companies in this quadrant mandate reskilling/upskilling.

FIGURE 6

## The worker agency-organizational opportunity model

Worker outcomes: ○ Satisfaction   ◇ Motivation to perform   □ Alignment with strategy

	Weak opportunity	Strong opportunity
High agency	<ul style="list-style-type: none"> <li>○ Dissatisfied/frustrated</li> <li>◇ Limited performance options</li> <li>□ Poor alignment</li> </ul>	<ul style="list-style-type: none"> <li>○ Satisfied</li> <li>◇ Empowered to perform</li> <li>□ Strong alignment</li> </ul>
Low agency	<ul style="list-style-type: none"> <li>○ Indifferent/low motivation</li> <li>◇ Minimum performance</li> <li>□ Poor alignment</li> </ul>	<ul style="list-style-type: none"> <li>○ Frustrated/confused</li> <li>◇ Highly variable performance</li> <li>□ Poor alignment</li> </ul>

Source: 2020 Deloitte-MIT Sloan Management Review future of the workforce global survey.

Performance management is often decoupled from leadership and development sensibilities.

To advance toward the upper-right quadrant, executives accustomed to imposing plans may need to sacrifice control for influence; workers accustomed to compliance-based reviews and rankings are, paradoxically—even perversely—told that they must take greater initiative. Opportunity marketplaces represent true cultural and structural workforce disruption for these organizations.

The lower-right quadrant has workers with little agency but companies with richer and more extensive opportunities. Employees consider what internal options are worth pursuing, but they likely rely on their supervisor, HR, an internal champion, and/or a formal approval process to take advantage of them. Workers take little initiative or have little motivation to acquire offered opportunities, even if opportunities are plentiful. Top management here prioritizes top-down planning over worker empowerment. Deciding whether to hire from within or recruit new talent is a constant concern and thorny operational trade-off.

To advance, these companies confront the challenge of empowering their people. “We’re a pretty big organization,” says Henry Ford’s Sheffer. “We tend to get very siloed in our area of focus and deal with the same people on a regular basis. When we need to branch out and find someone who might have special expertise, we like to try to look internally first and then offer it as an opportunity for somebody to flex that strength. Or if it’s a development opportunity, perhaps that individual—or that person’s leader—could help guide them to different projects or initiatives that would allow them to grow.”

The upper-left quadrant features employees with greater agency but limited options. Career options tend to be prescribed paths; the most talented and capable workers tend to look outside for opportunities. Silos rule. Limited internal mobility and increasing skills gaps lead to higher attrition, especially among high performers. Opportunity scarcity challenges typical workers: Complacency often sets in. Breaking dull routines, rather than seeking out uplifting professional development or increasing personal productivity, becomes a motivator. (Based on our survey responses and interviews, we infer that acculturation to low-opportunity environments is a workplace demotivator; it’s akin to being in a store that has little worth buying.)

## Limited internal mobility and increasing skills gaps lead to higher attrition, especially among high performers.

### CREATING NEW DATA-DRIVEN EFFICIENCIES

Opportunity marketplace data and analytics have the power to reveal what opportunities are most appealing, desirable, undervalued, and/or misunderstood. With opportunity metadata (i.e., meaningful tags applied to opportunities), leaders and managers may find identifying talent easier. Workers can get more-personalized recommendations about what opportunities are best for them, including training, development, projects, mentoring, and coaching.

**Opportunity marketplace data and analytics have the power to reveal what opportunities are most appealing, desirable, undervalued, and/or misunderstood.**

This “appification” of opportunity marketplaces, where users peruse job opportunities like they would movie or shopping choices, has enormous repercussions for how leaders develop opportunities and present their strategies and cultural perspectives. Opportunity marketplace data could powerfully shape human capital analytics. The ability to track opportunities that excite interest and those that fail to meet expectations lets leaders dig deeper: Are opportunities ignored because they are poorly defined, or because their managers and teams have poor reputations? Are talented workers more interested in acquiring new skills, new roles, or new challenges? Which experiences, groups, teams, or functions are consistently sought after by the best talent?

Informed by enterprise data and analytics, opportunity marketplaces can offer actionable advice and recommendations to employees and management alike: “Workers like you considered these opportunities” or “Workers who explored opportunity x also looked at opportunity y.” Effective opportunity marketplace design, in other words, can help ensure efficient matches between individual and organizational preferences and priorities. Depending on market regulation and design, opportunity metadata can link to references, reviews, and relevant performance analytics. This data-driven opportunity marketplace sensibility goes far beyond digital job listings, course catalogs, and/or “employees you may know.” It brings a customer-centric sensibility to managing the workforce. Much as digitalization enhances *customer* choices and opportunities, digitalization can—and should—productively enhance *workforce* choices and career opportunities.

## Creating an opportunity marketplace in your organization

Identifying your starting place is an essential first step toward creating an opportunity marketplace. Traditional “engagement indices” or “morale surveys” are typically insufficient proxies for both opportunity and agency.

1. **Consider developing your own opportunity index<sup>4</sup>** to determine the health of opportunity and agency in your organization. The following questions provide a template for how to understand workers’ and managers’ perceptions of opportunity and agency.
  - Are your workers satisfied with available internal opportunities for job and work assignments, mobility, personal growth, skills development, and promotion?
  - Are your workers satisfied with their ability to act on these available opportunities? Do your processes and culture encourage or discourage opportunity and mobility?
  - Are you satisfied that your manager’s mindset, incentives, and performance indicators encourage and support opportunities, growth, and mobility?
2. **Create processes to identify opportunities** for your opportunity marketplaces. Forecast your talent needs and use opportunity-index data to inform what opportunities are created, to whom they are offered, and how. Identify who will manage your opportunity marketplaces, and ensure

that your senior team agrees on how these markets are to be governed. Ensure that your organizational culture supports the operation of these markets. For example, cultivate cultural norms that reward managers for supporting the free flow of talent across the enterprise rather than norms that reward managers for hoarding talent.

- 3. Address how different workforce demographics value opportunity.** Today's workforce comprises multiple generations of workers. Each generation may value a given opportunity in different ways. Recent data suggests that "unlike their millennial predecessors, Gen Z [workers] ... actually want to make a long-term commitment to your company. So your company better be prepared to give this upcoming generation the stability and opportunity of accessible internal mobility."<sup>5</sup> Will older workers with retirement in their sights feel as strongly about seizing opportunity as younger workers? Some may actually want to extend their careers for the opportunity to gain new skills. Other older workers may want to extend working, but in

a modified way, with more flexibility or choice to define what the job looks like. Demographic factors merit consideration.

Embracing opportunity marketplaces represents a truly fundamental shift in how most organizations can maximize returns on human capital investment. It recognizes the workforce as a uniquely *human* resource. It demands a shift in core workforce management practices such as workforce planning and deployment, and performance management and development. Leaders accustomed to compliance and control should lead through influence and create options for workers, in much the same way that companies attract and create options for customers. Practices that support workers' growth within the company and the promotion of top talent should be driven by opportunity rather than prescribed career paths. With this opportunity approach, organizations and their people are better able to recognize that their mutual success depends on ever-smarter investment in themselves and each other. ●

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*Read the full article, Opportunity marketplaces: Aligning workforce investment and value creation in the enterprise, on [www.deloitte.com/insights](http://www.deloitte.com/insights).*

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**MICHAEL SCHRAGE** is a research fellow at the MIT Sloan School of Management’s Initiative on the Digital Economy. He is based in New York City.

**JEFF SCHWARTZ**, a principal with Deloitte Consulting LLP, is the US leader for the Future of Work and the US leader of Deloitte Catalyst, Tel Aviv. He is based in New York City.

**ROBIN JONES** is a principal with Deloitte Consulting LLP specializing in organization and workforce transformation consulting. He is based in New York City.

**DAVID KIRON** is the editorial director of *MIT Sloan Management Review*. He is based in Boston.

**NATASHA BUCKLEY**, Deloitte Services LP, is a senior manager with Deloitte’s Center for Integrated Research. She is based in Boston.

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AccuHealth's kits consist of sensors and tablets that guide patients through biometric data collection (blood pressure, glucose levels, weight, and other indicators) and quick survey questions. The kits can be customized for different conditions (diabetes, hypertension, chronic obstructive pulmonary disease, and even post-acute care) and use on-market clinically validated devices.

Unlike traditional approaches, AccuHealth performs real-time remote monitoring, using its AI to stratify patients so that the company's health coaches can prioritize high-risk patients and those in immediate need of intervention. Trained on deidentified records of 2.4 million Chilean patients,<sup>2</sup> AccuHealth's algorithm segments patients based on health trends and psychological and sociological profiles to identify high-risk patients. This can enable health coaches to concentrate on those for whom the impact of monitoring is likely greatest, decreasing the cost and effort involved in managing populations.

AccuHealth reports that its solution has led to a 32 percent reduction in inpatient visits and a 15 percent reduction in emergency visits in a payer's population. Additionally, it has led to a 41 percent decrease in costs associated with medical leaves, a major expenditure for payers in Chile. On average, private payers see a 35 percent savings from the AccuHealth solution.<sup>3</sup>

As similar technologies gain traction among patients and caregivers, they are moving the health care industry as a whole from a focus on curing illness to a focus on prevention and well-being. We envision a future of health, enabled by technology, in which care will be organized based on consumers' needs as opposed to health care organizations' needs, and most care delivery takes place outside of health care facilities—in people's homes, work, school, and in the community. ●

**To learn more, read the full report, *Digital health technology: Global case studies of health care transformation*, on [www.deloitte.com/insights/digital-health-technology](http://www.deloitte.com/insights/digital-health-technology).**



**HEALTH CARE TRANSFORMED**

# Patient engagement 2.0

**HOW LIFE SCIENCES COMPANIES CAN TAKE  
PATIENT ENGAGEMENT TO THE NEXT LEVEL**

MARK LUSH, CHRISTOPHER ZANT, SHERILYN NOTTE  
TUTHILL, AND ALICIA SADDOCK

ART BY ROCCO BAVIERA

In our 2016 article *Patient engagement strategies in a digital environment*, we described life sciences companies' essential opportunity to make a meaningful impact on patients' lives by engaging more closely with them.<sup>1</sup> At that time, various technologies were being launched to help make patient engagement more holistic and seamless across the spectrum of emergent tools, including patient services platforms, wearable monitoring devices, mobile wellness apps, and the like.

Many life sciences companies were embarking on transforming their organizations, people, processes, and platforms to strengthen patient engagement with a focus on optimizing therapy adherence and patient health outcomes.

Four years later, the pursuit of a seamless, meaningful patient experience still remains a top priority for all participants in the health care delivery ecosystem, including life sciences companies, health care providers, health care payers, and others. With this mission remaining steadfast, additional considerations related to patient marketing, patient data and security, global operations, organizational impacts, and other factors are driving further evolution in patient engagement strategies, even as they become more critical.

The 2016 focus on traditional “patient services”—including capabilities for patient enrollment, patient education, financial assistance, patient therapy, and clinical programs—has evolved to encompass a broader scope of services to engage patients in new ways. In four years of ongoing societal and cultural consumerization, patients have increasingly come to expect cohesive digital solutions that protect the data they provide and use it responsibly to optimize their health outcomes. Gone are the days of settling for stand-alone patient services programs, operating in

well-intentioned silos, yet detached from patient marketing campaigns and communications. Companies and brands are now focusing on human experience and patient-centricity in an integrated fashion,<sup>2</sup> aiming to execute patient marketing, communications, and support services with a continuous, informed, and humanistic approach—one that senses and responds to patients' and their families' needs in all the moments that matter across the journey from diagnosis and therapy to recovery and wellness.

Now that patient data can be collected in new ways across both well-known channels (such as doctor visits, patient calls, and email) as well as omnichannel connected and wearable devices, updated standards for securely managing this information are also at the forefront of life sciences companies' strategies for interacting with patients. Patient privacy and other regulatory requirements for managing patient health information (PHI)—such as Europe's General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA), or regulations for products being classified as “software as a medical device” (SaMD)—were once viewed as “nonstarters” for innovative programs and devices. Today, however, such regulations are now more clearly understood, and leading life sciences companies are planning for them as part of their product launch, marketing, and engagement strategies.

As more solutions across the patient life cycle are created both in the United States and globally, the question for life sciences companies is shifting from “How do we stand up basic patient engagement capabilities, primarily to serve our patients’ needs after they have been diagnosed?” to “How can we create a holistic patient engagement capability that seamlessly combines communications, marketing, and education with services to support onboarding, therapy, financial assistance, clinical trials, and optimal adherence-based outcomes, all supported by enabling technologies, secure data, and a unique experience personalized to meet each patient need?” We believe this latter question is more relevant than ever, requiring a deeper evaluation of how to achieve a “patient engagement 2.0” capability.

## Market trends shaping the landscape

In 2016, we presented a patient services maturity model that highlighted “table stakes” patient engagement offerings, including educational materials, access to providers, startup assistance, and reimbursement support. Now, these services are essentially the norm. Life sciences companies have increased their investment in patient-facing programs to accompany new product launches and to bolster both existing products and products facing end-of-life patient protection. As the market continues to experience pricing pressures and patients become more informed and open to changing therapies, pharmaceutical companies are continuing to invest in creating a differentiated patient experience; for example, transitioning from all-in-one “brochureware” websites to interactive,

omnichannel brand-level experiences that drive improved patient education, onboarding, and adherence to maximize therapy efficacy.

## How can we create a holistic patient engagement capability ... supported by enabling technologies, secure data, and a unique experience personalized to meet each patient need?

Also, in 2016, we observed the opportunity for leading life sciences companies to step into the void by establishing self-owned patient engagement capabilities. These patient engagement offerings have become more robust and innovative. Indeed, in addition to pharmaceutical companies, health systems, providers, and payers are also vying to get patients to engage with their own platforms, tools, and systems, typically leveraged from leading enterprise cloud-based platform companies. This, however, can create issues. Today, patients being prescribed a new drug may be asked to enroll in their health care provider’s (HCP’s) hospital or clinic patient engagement system, the life science company’s patient engagement program, *and* a wellness application from their health insurance company, leading to a potentially overwhelming and conflicting patient experience despite the best intentions by all participants. The opportunity here, though potentially complex, is to coordinate these diverse engagement tactics into a seamless orchestration of touchpoints with the patient with the unified purpose of supporting optimal health outcomes.

Adding to this influx of patient engagement offerings, which many companies are offering at the brand level for larger, “blockbuster” drugs,

life sciences companies are now also developing patient engagement programs that are not product-specific, but tailored to a specific therapeutic area to increase disease awareness and provide support to patients before they are prescribed therapy or even diagnosed. Examples include AbbVie's "SpeakENDO" program to encourage women to seek treatment for endometriosis, the Amgen/Novartis "#SpeakYourMigraine" program to help migraine sufferers seek important information and assistance, and Novartis's "Eyelove" program to raise awareness for chronic dry eye. These programs make support materials available to any patient, although they do still have a marketing lens, as the companies offer branded treatments for these conditions. The next step that we see some companies exploring is the formation of partnerships with advocacy groups with the goal of bringing a single solution to an entire disease state population, regardless of what drug they are prescribed. However, such programs are still in the exploratory phase, as they are driving companies to develop new and nontraditional reimbursement models to fund them.

The idea of life sciences companies offering solutions broadly to benefit an entire patient population, rather than only to those patients prescribed their brand, reflects the industry's continued shift to value-based care, which provides reimbursement based on improvement in patient outcomes. As part of this shift, companies have needed to expand their organizational capabilities to collect and analyze real-world data for regulators and payers (that is, data from a variety of postmarketing sources such as electronic health records, disease registries, and at-home patient-reported data). Managing the life cycle of these new sources of data, which have historically been siloed, will require increased

transparency, advanced analytics, and better linkages between clinical data and real-world data.

## Demand and supply: The convergence of omnichannel patient marketing and patient services

We mentioned above that life sciences companies are pursuing a more holistic array of patient engagement capabilities. In particular, *patient marketing and communications* now play a key role in helping patients, their families, and care providers better understand how a given drug therapy is relevant. This is the front-end, "demand side" of the patient engagement experience that has emerged in recent years: Companies are using enterprise marketing technology platforms to engage, educate, and onboard patients much earlier in the disease life cycle in an effort to drive better health outcomes. These "martech" platforms provide key omnichannel capabilities for communicating with patients, families, and providers, including email, SMS/text, and mobile/wearable device integration. Through such platforms, life sciences companies can enable and deliver product information, HCP collaboration, therapy scheduling, dosage reminders, financial assistance, and other activities.

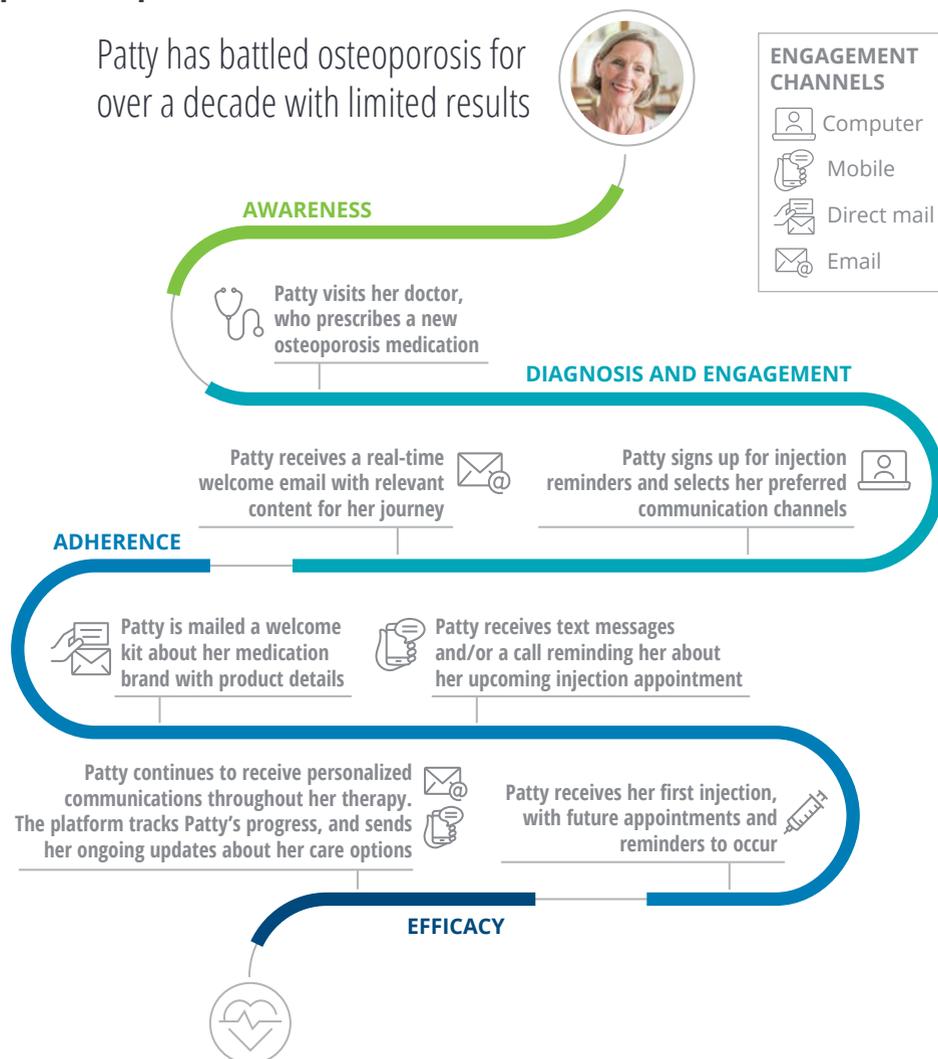
Importantly, these capabilities equip life sciences companies with more relevant and timely patient data, helping them to better understand unique patient needs (such as their channel preferences or behavioral tendencies). Better data can help companies integrate patient marketing efforts with the "supply side" of patient engagement—the ability to provide patient services capabilities such as therapy administration, appointment reminders, financial assistance, and clinical programs at the quality and scale needed to meet

the demand created by patient communications and marketing. Through such experience- and data-driven platforms, companies are aiming to “hyper-target” patients based on disease state or other relevant data, then rapidly respond through the patient’s preferred channel to provide timely communications that aid the care process.

The patient journey illustrated in figure 1 illustrates the growing convergence and cohesion of demand-side patient marketing and supply-side patient services to enable a more holistic patient experience.

FIGURE 1

## Patient marketing and patient services are converging to deliver a more holistic patient experience



Source: Deloitte analysis.

Platforms such as these are allowing life sciences companies to continually improve their interactions with patients and their care network through ongoing insights and testing. As life sciences companies aim to share more of their patient marketing and services insights with care providers to improve patient care, this continuous learning cycle allows providers to gain greater insight into the patient's needs, interact on a more relevant (not necessarily frequent) basis, and deliver more personalized care to optimize therapy adherence and efficacy.

Supported by these core patient platforms, additional opportunities to complement patient marketing and patient services capabilities include:

**Digital coaching.** Patients can receive interactive care directly from their mobile devices through apps that enable them to select and share information with their HCP and other care providers in a variety of areas, including medical, nutrition, fitness, and rehabilitation. Wellness coaches can provide fully integrated and personalized care plans based on patient needs, helping to increase patient accountability to drive adherence to treatment.

**Privatized health information.** Engagement platforms are offering patients more options when it comes to managing their privacy, allowing them to tailor what information they share with providers/caregivers and giving them the ability to manage personal goals in line with care plans. This provides a layer of protection for private health information, and it also affords patients greater control over how they mobilize their care ecosystem to support them through diagnosis, therapy, and recovery.

**Telehealth.** Providers can expand their offerings to include at-home care for patients to receive routine check-ups, as well as mobile-enabled hospice care with on-call capabilities that are aligned with therapeutic call centers and local partnerships. Through these offerings, patients could interact with providers in real time without waiting weeks for appointments, thereby accelerating therapy adherence and the overall healing process. Similarly, health care providers will be able to provide virtual care to mobility-impaired or remotely located patients. It is interesting to note that the COVID-19 pandemic, despite the societal trauma it has inflicted, may have enhanced the opportunity to expand telehealth by increasing patients' and providers' acceptance and adoption of telehealth capabilities such as videoconferencing and remote diagnostics and care, though the level of long-term adoption remains to be seen.

## Engagement platforms are offering patients more options when it comes to managing their privacy.

**Artificial intelligence.** Life sciences companies, health care providers, and health care payers should all seek to increase their investments in artificial intelligence (AI) and machine learning (ML) platforms. These technologies can leverage large patient data sets to identify key insights that can inform more relevant patient communications, enable better point-in-time care, execute improved clinical trial programs, and generate more efficient patient case management at higher volumes over time.

**Crisis detection and response.** Patient engagement platforms could help health professionals manage public health crises by

providing communications with key patients and the general public. For example, the Takeda Pharmaceutical Company, a leader in blood plasma-based therapies, is using patient engagement technology to help recovered COVID-19 patients register online and potentially donate blood plasma for ongoing research in pursuit of a COVID-19 vaccine. More generally, the COVID-19 pandemic crisis has pushed companies to use patient engagement capabilities to rapidly reimagine the care delivery process, condense the testing and drug approval processes, and expedite logistics to distribute care across geographies out of pure necessity for the general public welfare.

As a further encouragement to life sciences companies to put such capabilities in place, recent Deloitte Center for Health Solutions research provides evidence that patients are increasingly open to next-generation patient engagement channels, tools, and techniques involving virtual care, robotic surgery, AI, biosensors, and even drones to deliver prescriptions (figure 2).

What's more, our research also shows that the move to virtual services had already been welcomed by many patients worldwide prior to the pandemic (figure 3).

**Patients are increasingly open to next-generation patient engagement channels, tools, and techniques involving virtual care, robotic surgery, AI, biosensors, and even drones to deliver prescriptions.**

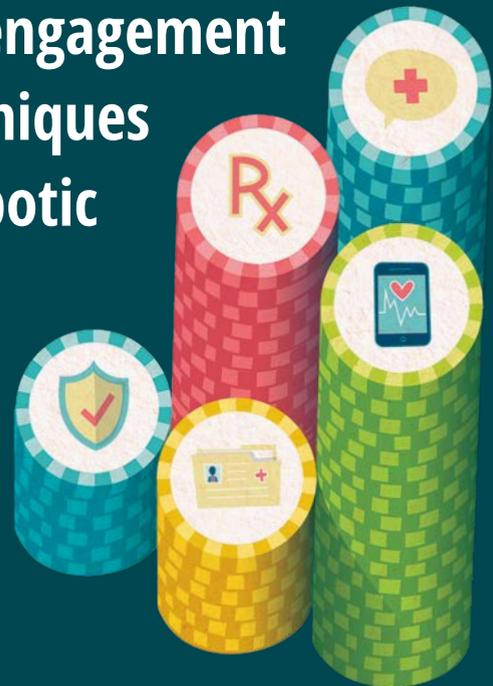
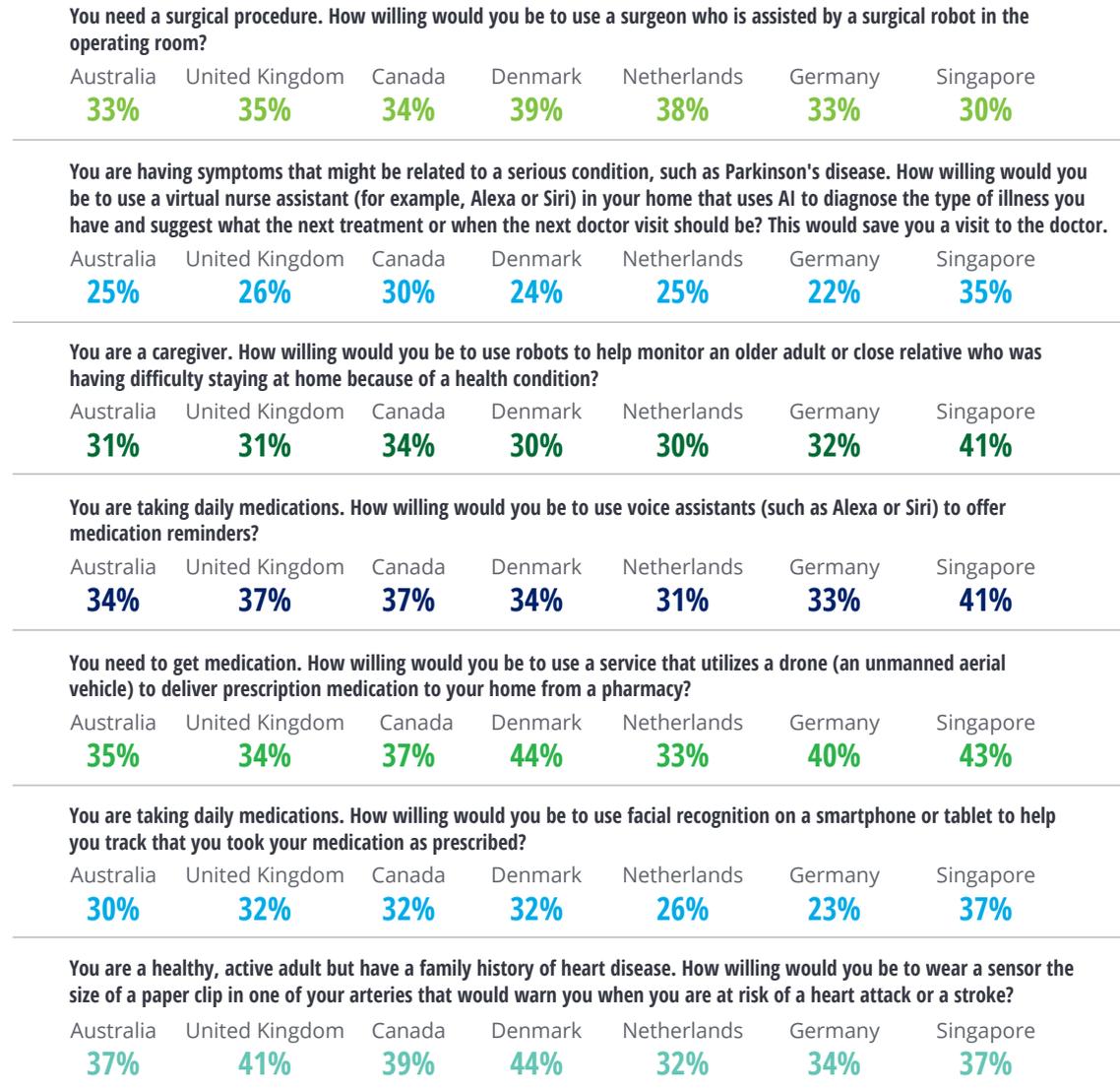


FIGURE 2

## Consumers are willing to try out emerging technologies such as robotics, AI, drones, and sensors to manage health conditions

Technology is changing the way health care is delivered. Imagine you found yourself in each of the following situations. How willing would you be to try the following?



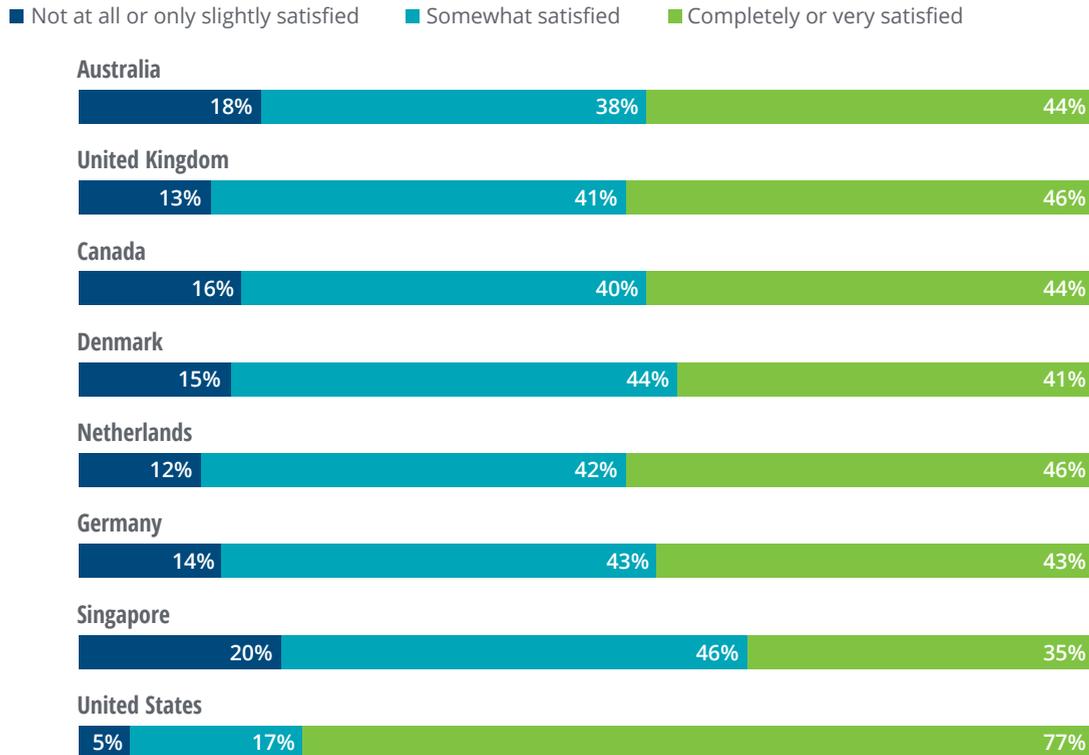
Note: Chart shows the percentage of respondents who answered 4 or 5 on a 5-point scale, where 1 is "not at all willing" and 5 is "extremely willing." The questions were not asked in the United States.

Source: David Betts and Leslie Korenda, *A consumer-centered future of health: Deloitte's 2019 global health care consumer survey finds evidence that the future is now*, Deloitte Insights, November 21, 2019.

FIGURE 3

## Patient satisfaction rates for virtual visits are high in many global markets

Overall, how satisfied were you with the care you received on your virtual visit/consultation?



Source: David Betts and Leslie Korenda, *A consumer-centered future of health: Deloitte's 2019 global health care consumer survey finds evidence that the future is now*, Deloitte Insights, November 21, 2019.

## The case for owning the underlying patient engagement platform

Historically, most life sciences companies have outsourced their patient platforms and data to third-party suppliers that specialize in patient-support operations. The challenge with this model, however, is that, based on our experience working with leading life sciences companies, these suppliers' processes, technology, data, and insights tend to lag behind the fast-moving, dynamic life sciences marketplace. As their goals and priorities for patient engagement shift, life sciences

companies with outsourced engagement platforms risk finding themselves mired in contract/service level agreement negotiations, aging supplier-owned technology, and a growing frustration about the way these suppliers are capturing and reporting patient data (such as data about patient marketing campaign effectiveness or patient service efficiency), which may not equip these companies with real-time, data-driven insights to enhance nimble tactical patient engagement or support strategic business decisions.

Given today's more mature patient engagement platforms and data management tools, consolidating

patient processes and data internally is not only achievable for life sciences companies, but can give them a key competitive advantage. As companies continue to invest in an all-encompassing approach to patient engagement, it is becoming more important to assimilate information quickly, understand patient behavior, and optimize how patients and surrounding care systems are educated, informed, onboarded, and serviced across a variety of digital and analog channels. In our view, to own the patient experience, a life sciences company should own the patient platforms and the patient data with appropriate consent to drive the real-time insights needed to provide an agile, relevant patient experience.

The leading model today of establishing a “single source of truth” for patient information and a consistent patient experience is to migrate all processes, data, and integrations to a consolidated company-owned patient engagement architecture and platforms consisting of:

- **Patient marketing technology platforms** to educate and engage patients early in the disease life cycle
- **Patient services platforms** to provide key patient program services and support
- **Patient master and consent platforms** to keep the data current, reliable, compliant, and appropriately used
- **Data management and integration platforms** to manage, distribute, and protect patient data

- **Third-party patient services plug-ins** for supplemental patient services such as copay card acceptance, Sharps kit fulfillment, or samples delivery
- **Wearable and mobile devices** that help patients, families, and care providers stay tightly connected and coordinated throughout the patient journey

**To own the patient experience, a life sciences company should own the patient platforms and the patient data with appropriate consent to drive the real-time insights needed to provide an agile, relevant patient experience.**

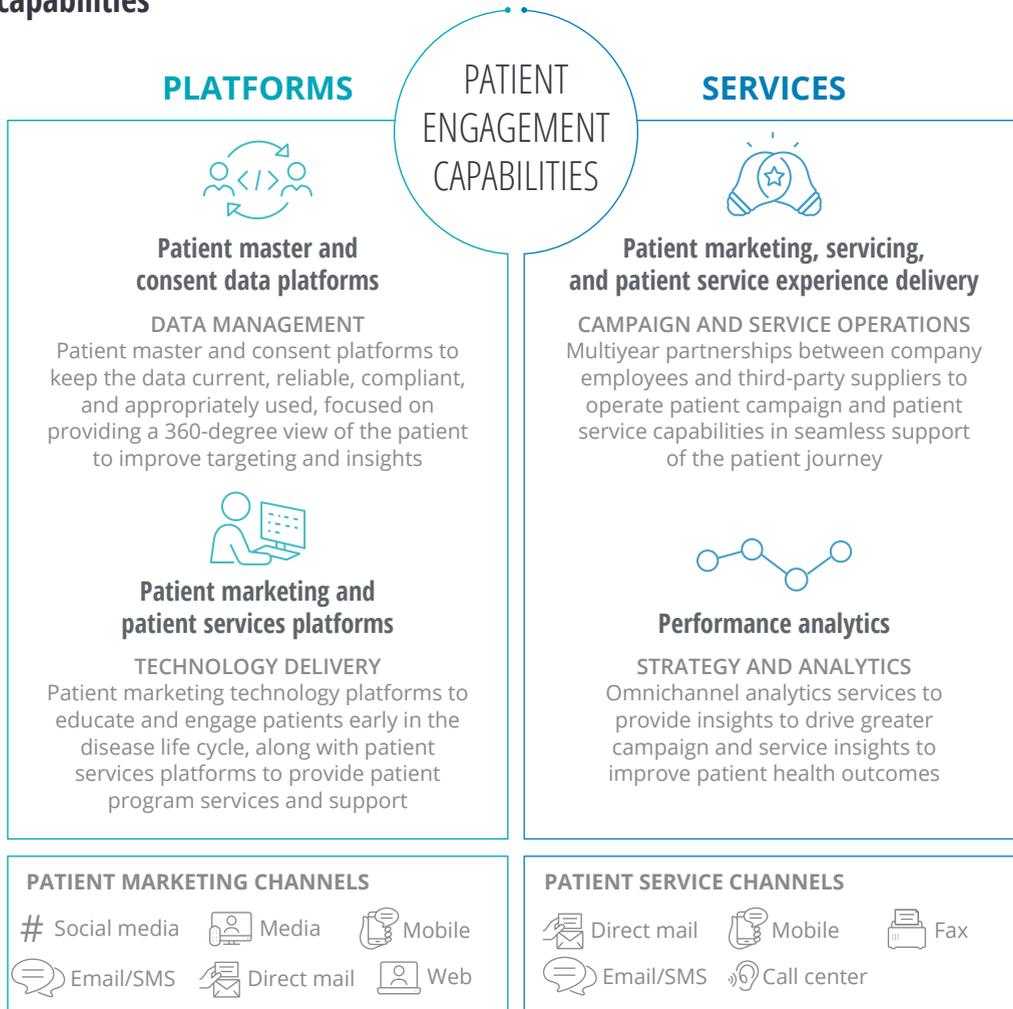
Figure 4 illustrates some of the key capabilities that an integrated patient marketing and service platform would need to deliver a seamless patient experience.

A life sciences company that owns its patient engagement platforms and data in-house, yet still contracts with third-party service providers (such as creative agencies, martech firms, and “hub” vendors) to perform the marketing and patient services activities on top of these company-owned platforms, can secure several potential advantages:

**Greater control over the patient and provider experience.** With an owned platform and effective governance mechanisms, companies can make improvements to processes more quickly, without having to wait for business leaders to organize and interpret data from disparate third-party supplier sources. This can drastically reduce the time needed to implement updates to

FIGURE 4

## An integrated patient marketing and service platform needs several key capabilities



Source: Deloitte analysis.

technology systems and processes. In addition, real-time access to consolidated patient data can allow for greater innovation and problem-solving to better address issues in patient therapy onboarding and adherence. And owning the data offers companies more flexibility to try innovative new partners when they are not beholden to incumbent providers based on “data jail” ownership.

**Greater agility through greater vendor collaboration and consolidation.** Bringing all suppliers that support the same patients and sites onto the same company-owned platform encourages cross-vendor collaboration, which can offer opportunities for cost savings and reinvestment as well as enhance visibility into the patient journey. This greater visibility into handoffs can allow users to view patients’ status in real time and take immediate action when needed.

**Greater operational efficiency.** Companies that own their platforms can enforce standardized processes across third-party providers. This enables companies to establish a uniform training program for users, which reduces overhead and increases patient engagement consistency. In addition, improved collaboration opportunities and better patient engagement operations can increase internal productivity. One company that has successfully implemented both patient marketing and patient services capabilities and platforms has realized a 27 percent increase in patient campaign effectiveness, a 33 percent reduction in patient campaign delivery costs, and

a 27 percent reduction in patient services contact center transaction costs.

**Accelerated program launches.** Owning an integrated patient platform can accelerate the time to market for new programs accompanying a product launch. Companies can quickly and seamlessly integrate new program content and designs onto an existing back-end platform, alleviating delays that can arise from the need to work with suppliers to stand up an entirely new system and program to accompany a product launch.

**Greater data empowerment.** An in-house integrated platform can give companies the

### MANAGING PATIENT DATA GLOBALLY PRESENTS NEW AND ONGOING CHALLENGES

The fact that the COVID-19 outbreak reached pandemic status in a matter of weeks inspired many companies to face head-on the challenges of implementing global, digital solutions, perhaps with less apprehension around regulations than in the past. Yet the deployment and execution of these solutions remain complex—and the complexity is growing exponentially as new regulations in different regimes proliferate.

To begin with, companies face the need for global content and regulatory approval, as well as the challenges of managing a coordinated patient and human experience across geographies. Some of these considerations are not necessarily new—after all, large pharmaceutical companies have created and maintained global campaigns for decades. But what is new and top of mind are the implications for implementing digital solutions with large and robust sets of patient platforms and data that share common technology platforms worldwide but are configured and leveraged to meet local market patient needs, regulatory constraints, and data compliance requirements. Regional guidelines are specific when it comes to digital solutions and the use of data for consent. What data is considered sensitive and personal? Where must data be stored, and how it must be encrypted? The penalties for violating these regulations (such as those imposed by GDPR in Europe), and the financial and reputational cost of data breaches, make it clear that these regulations must be carefully planned for and adhered to.

The technology challenges of managing data complexity are not specific to life sciences companies. Large technology players such as Adobe, Amazon, Facebook, Google, and Salesforce.com are working to make sure their platforms are viable and compliant for the most complex, regulated markets, including life sciences and health care. However, individual programs and implementations still require diligent discovery efforts to choose a platform that is appropriate for each provider's risk profile and the types of services a company seeks to offer to patients across geographies.

visibility into their data needed to comply with relevant laws such as GDPR and CCPA. It also can afford companies the flexibility to use different types of data to measure and motivate agents speaking with patients, as well as allow companies to use advanced analytics to predict trends and take appropriate action.

## Readying the workforce to support patient engagement

Life sciences companies focused on modernizing their technology and owning their patient engagement data must also consider the foundation for driving this transformation: their workforce. With more emphasis than ever before on creating an enhanced patient journey, it has become increasingly important for organizations to change the way they work to better serve patients across the care life cycle. Often, this may require a shift from a hierarchical, siloed structure to a more team-based environment where business and technology teams are organized together by capability (such as market access, patient operations, patient marketing, commercial information technology, and so on) and focus jointly on the end-to-end patient journey: from awareness through education, onboarding, adherence, and efficacy.

Agile methodologies are continuing to permeate many companies in how they deliver enterprise technology. However, we consider it essential to look beyond basic practices such as the standup or scrum team. To effectively *use* patient engagement technologies, life sciences organizations should further embrace

the agile-driven method of “product teams” designed to meet the demands of the rapidly changing health care landscape. This means breaking down silos and leveraging people with cross-functional capability, technology, and data skill sets who are eager to innovate, combined with leaders who have a future-driven mindset and are committed to change.

When considering how to bring an organization’s workforce along this journey, a few leading practices to consider are:

**Develop a cohesive patient engagement strategy, vision, and road map.** Define a clear vision and ambition for your future-state patient engagement organization that specifies how the above-mentioned product teams will work together to deliver and sustain patient engagement capabilities that are nimble enough to meet changing patient needs and expectations, and scalable enough to meet rising patient demands. Align your workforce goals to your patient engagement technology enablement road map to bring the entire organization along throughout the digital transformation journey.

**To effectively use patient engagement technologies, life sciences organizations should further embrace the agile-driven method of “product teams” designed to meet the demands of the rapidly changing health care landscape.**

**Coordinate with external vendors.** Consider how you might be able to use external agencies and vendors as an extension of your current workforce for activities such as martech operations, campaign

creation and delivery operations, patient services operations, patient data management, and patient insights creation. At the same time, it is important not to source outside workers for tasks that should be accomplished in-house. Evaluate your internal skill sets to understand any gaps and consider transferring and training workers to areas where resources may be scarcer or too cost-prohibitive to recruit and retain.

**Be thoughtful about resourcing and demand management.** In light of the many benefits that an integrated and common platform can help achieve, it is important to note that companies will need to appropriately resource in-house teams or strategic partners to stand up, manage, and improve their patient engagement platform on an ongoing basis. Demand management of business needs and expectations will also be essential to balance incoming projects with the platform support team's available bandwidth.

## Taking patient engagement forward

What are the opportunities for life sciences companies moving forward? Organizations exploring ways to take their patient engagement efforts to the next level can consider the following steps:

**Aim to deliver an integrated patient experience across all touchpoints.** Leading companies have taken their patient engagement activities far beyond core patient services to seamlessly integrate them with patient marketing and communications, patient insights generation, and myriad connected devices and wearables to help bring it all together in support of the patient journey.

### **Apply a global patient engagement investment lens while acting locally.**

Continue investment in enterprise patient marketing, patient services, and mobile/wearable device platforms, as they will play an increasing role in standardizing and scaling patient engagement strategies globally. At the same time, tailor actual patient engagement tactics to meet country-level market needs.

### **Own your platforms and involve third-party suppliers as necessary.**

Life sciences companies can benefit from owning their patient engagement and data management platforms in-house while drawing on third-party suppliers for important but secondary operational roles. It is important to build the right internal process, technology, and data skill sets to support an in-house platform.

### **Drive insights through data, AI, and machine learning.**

Patient data, obtained from more channels and sources than ever before, can yield relevant insights that can allow companies to craft more targeted and meaningful patient experiences. Investing mindfully in the new world of AI and machine learning-driven technologies may yield significant operational and strategic business decision-making benefits sooner than most might think.

### **Keep your eyes on outcomes.**

One danger of pursuing advanced digital patient engagement solutions is that companies can easily, though perhaps accidentally, lose sight of real-world outcomes. Either the program launch itself is viewed as a success, or measuring increased therapy adherence becomes the focus without considering patient outcomes. Setting clear goals for improvement in outcomes and partnering early with payers to understand their value drivers will help ensure that the right data is

being collected from the start to accurately understand and track the impact of new, innovative digital engagement solutions.

**Look for opportunities to integrate patient experience across organizations.** The larger health care ecosystem—life sciences companies and health care providers in particular—has an opportunity to truly integrate patient engagement processes, technologies, and data to comprehensively improve patient outcomes. Although this high-value opportunity has tangible hurdles to clear along organizational, process, people, technology, and regulatory lines, life sciences companies may find it worthwhile to explore partnerships, consortiums, or even joint ventures to this end.

The life sciences industry is moving beyond core patient services to the next generation of patient engagement that seamlessly connects and spans the entire patient engagement life cycle—awareness, education, onboarding, adherence, and efficacy—to improve patient health outcomes. Patient marketing platforms, patient services platforms, patient data management platforms, and a myriad of patient devices and wearables are converging in a “patient engagement 2.0” opportunity to give life sciences companies the ability to deliver on their promise and passion: to exceed the needs of their patients and their families in the life moments that matter most. ●

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**MARK LUSH**, a principal with the Customer & Marketing practice at Deloitte Consulting LLP, is the national marketing technology practice leader across all industries, including life sciences and health care.

**CHRISTOPHER ZANT**, a principal at Deloitte Consulting LLP, leads the Customer & Marketing practice for life sciences and health care. He is also the chief digital officer of ConvergeHEALTH.

**SHERILYN NOTTE TUTHILL** is a senior manager with the Customer & Marketing practice at Deloitte Consulting LLP, focused on patient engagement operations and technology for the life sciences industry.

**ALICIA SADDOCK** is a senior manager with the Customer & Marketing practice at Deloitte Consulting LLP, focused on marketing technology and operations for the life sciences and health care industries.

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HEALTH CARE TRANSFORMED

# Narrowing the rural-urban health divide

**BRINGING VIRTUAL HEALTH  
TO RURAL COMMUNITIES**

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ALEX SCHULTE, MELISSA MAJEROL,  
AND JESSICA NADLER

ART BY NEIL WEBB

Access to health care ranks among the top challenges facing rural communities today due to provider shortages, long travel distances, and the acceleration of hospital closures in recent years. While not a panacea, virtual health can address many of these issues, and in turn, help narrow the rural-urban health divide—the stark disparity between access to care and the overall health of citizens in rural areas compared to their urban counterparts.

In this report, we lay out some of the key steps rural health care organizations—including critical access hospitals, federally qualified health centers, rural health clinics, and tertiary care facilities—should consider when delivering virtual health in rural settings, and what government can do to support and enable rural communities in this capacity. Our analysis is based on interviews with more than a dozen rural health care experts and reviews of secondary literature.

Below are six key steps leaders of health care organizations should consider as they build their virtual health programs:

- **Conduct a needs assessment.** Before starting a virtual health program, leaders should conduct a needs assessment of the organization and the population it serves to identify the most appropriate virtual health solutions, current technological capabilities, future technological needs, and how to bridge the gap.
- **Develop a strategy, governance structure, and partnerships.** Having a coordinated strategy and a centralized governance structure within the health care organization are critical to the success of any virtual health program. In addition, organizations should build partnerships and networks with other entities.
- **Invest in data and technology infrastructure.** Hardware and software investments are core to any virtual health program, but health care organizations should also pay attention to interoperability and investments that should be made in cognitive technologies and analytics.
- **Engage with and train your workforce.** Making virtual health a mainstream aspect of rural care will require significant buy-in from—and investment in—the health care workforce. To help win over key stakeholders, leaders can emphasize the benefits to patients and clinicians and teach the workforce to use the new technology.
- **Create new workflows, care models, and risk mitigation protocols.** Virtual health should be integrated into a seamless and coordinated delivery process across different providers, services, and settings.
- **Engage with and educate patients.** Just like clinicians, patients should be educated on the benefits of virtual health, and how to use the new technology.

While health care organizations will need to take the lead, they won't be able to do it alone. In order to see the potential of virtual health realized, public and private organizations should work together to

align incentives, leverage scarce resources, share best practices, and create economies of scale. The role of government is critical as well. By helping to build connectivity, simplifying the process of applying for funding, and driving the adoption of value-based care (VBC), government agencies can enable and support rural communities as they use virtual health to help bridge the rural-urban health divide.

## Virtual health: The opportunity for rural communities

Martina was born in a hospital in rural Nebraska. Shortly after her birth, her doctors detected a pneumothorax, or collapsed lung. Neonatal events such as these sometimes require an intervention; other times they heal on their own—a call that a neonatal specialist needs to make. But this rural hospital wasn't equipped to handle rare conditions such as the one Martina was experiencing, and no such specialist was on hand.

The standard protocol would have been to put Martina in a helicopter and transport her to the nearest tertiary care facility, more than 150 miles away, so that a specialist could assess whether an intervention was, in fact, needed. Luckily, the local hospital had just joined a virtual hospital service:

Martina's parents were given the option to have a remote neonatal intensive care unit (NICU) physician monitor the newborn via two-way video conference.

They chose this option. As a result, Martina was able to fully recover with very little treatment, and has grown into an active and healthy toddler. Her parents were able to stay in their community with their three other children, rather than being separated from their newborn and having to travel long distances each time they went to see her in the NICU. And thousands of dollars were saved in helicopter transfer costs.<sup>1</sup>

This story is emblematic of some of the challenges facing rural communities, and how virtual health could improve health care access for rural residents. Virtual health services can also offer important benefits to the health care system more broadly: the opportunity for rural clinicians to learn from specialists, and for rural hospitals to retain vital revenue and enhance the quality of their services. Moreover, a growing number of studies have shown that virtual health can improve health outcomes, reduce costs, reduce unnecessary utilization (such as nonurgent visits to the emergency room), improve adherence to medication and other protocols, and improve patient satisfaction.

**Virtual health services can offer important benefits to the health care system more broadly: the opportunity for rural clinicians to learn from specialists, and for rural hospitals to retain vital revenue and enhance the quality of their services.**

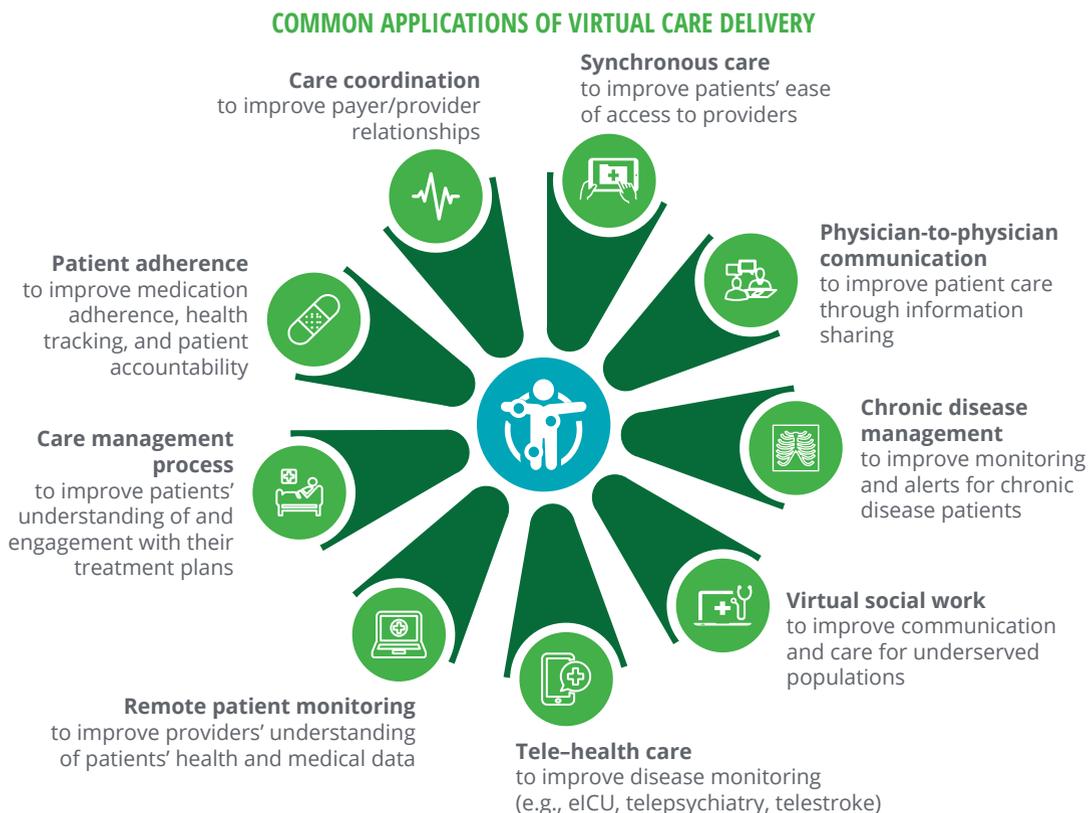
## WHAT IS VIRTUAL HEALTH?

Virtual health refers to the delivery of health services in a way that is independent of time or location using enabling technology, such as video conferences, mobile apps, in-home sensors, text-based messaging, and analog telephones. Virtual health visits can take place between a patient and his/her clinician, or between clinicians. But virtual health goes beyond video conferences (synchronous visits) to include remote patient monitoring, email/telephone communication, and store-and-forward technology (asynchronous visits, in which data such as MRI scans or photos of a rash are captured and sent to medical professionals via a secure and encrypted internet connection). With applications designed to drive connected, coordinated care, virtual health can complement, or substitute for, in-person care as appropriate (figure 1). These applications present a critical opportunity for rural areas to receive improved access to care.

FIGURE 1

## Virtual health applications drive connected, coordinated care

How virtual health applications can help stakeholders access data more easily, improve quality of care, and deliver value to patients



Source: Deloitte analysis.

## How can virtual health help rural communities?

**Among the many issues impacting rural America, access to health care and related**

**health disparities rank among the top** (figure 2). A recent spike in hospital closures has exacerbated these issues, as more health care professionals in rural areas already experiencing provider shortages have left to find jobs elsewhere.

FIGURE 2

### A snapshot of rural and urban America: Population characteristics and leading health indicators<sup>2</sup>

	Rural (nonmetropolitan)	Urban (metropolitan)
<b>Population characteristics</b>		
Population (percentage in 2015) <sup>3</sup>	14.3	85.7
People aged 65 and over (percentage in 2017) <sup>4</sup>	18.1	14.3
Household income (median in 2014) <sup>5</sup>	US\$43,616	US\$58,229
<b>Access to care</b>		
Primary care physicians per 10,000 people (2014) <sup>6</sup>	5	8
Total physicians per 10,000 people (2014) <sup>7</sup>	13	33
Percentage saying access to good doctors and hospitals is a major problem in their local community (2018) <sup>8</sup>	23	18
Longest average drive time to the nearest hospital, in minutes (2018) <sup>9</sup>	34	18.7
<b>Health status</b>		
Diagnosed diabetes prevalence (percentage in 2016) <sup>10</sup>	12.6	9.9
Obesity prevalence (percentage in 2016) <sup>11</sup>	33.5	28
Preventable hospitalization (hospital stays for ambulatory-care sensitive conditions per 1,000 Medicare enrollees in 2013) <sup>12</sup>	64.6	50.6
<b>Mortality<sup>13</sup> (age-adjusted rate per 100,000 people in 2014)</b>		
All-cause	830.5	703.5
Suicide	16.8	12.4
Drug poisoning	15.6	14.7

Source: Deloitte analysis.

This has resulted in many rural residents needing to travel even longer distances to receive care, and has increased access barriers to both specialty and primary care because hospital emergency departments are a major source of primary care in rural communities.<sup>14</sup> Among the hardest hit have been elderly and low-income populations; both are more likely to delay or forego needed care because of transportation challenges. What's worse, the trend in rural hospital closures is expected to continue.<sup>15</sup>

**Virtual health has been identified as one part of a suite of new health care models that could help address rural health needs and narrow the rural-urban health divide.**

Virtual health has been around in some form for decades. However, due to advances in digital technologies,<sup>16</sup> an increasingly supportive policy landscape,<sup>17</sup> and a growing evidence base showing its effectiveness, implementing it now makes more sense than ever. Nevertheless, successful implementation of virtual health into mainstream health care systems has been slow.

There are several forms of virtual health that can be used in lieu of, and in addition to, in-person visits to alleviate various rural health challenges, including provider shortages, and time, distance, and transportation barriers. These include virtual visits, store-and-forward technology, and email/telephone communication (see sidebar, "What is virtual health?"). Virtual visits can be used to address specialty provider shortages by connecting groups of community providers with specialists at centers of excellence in real-time sessions. This allows specialists to share their medical knowledge and expertise with on-site clinicians,

helping them diagnose and determine a course of treatment for a patient.

## Virtual visits can be used to address specialty provider shortages by connecting groups of community providers with specialists at centers of excellence in real-time sessions.

Finally, health care organizations can use remote patient monitoring (RPM) to track the vital signs of people who require chronic, postdischarge, or senior care, allowing them to keep track of patient data between visits and intervene with medication adjustments or other treatment recommendations *before* a patient requires urgent medical attention. Using virtual health as a preventive care tool can help reduce the number of unmonitored chronic conditions that become urgent episodes. Given that rural areas have a higher prevalence of chronic disease,<sup>18</sup> RPM can be especially effective at preventing adverse events and maintaining continuity of care in these settings.

**Virtual health can also help rural residents maintain privacy and confidentiality, while overcoming the stigma associated with certain health conditions.** In small, tight-knit communities, individuals with a behavioral health condition may know the local behavioral health specialist personally—if their community is lucky enough to have such a specialist. Some may be reluctant to seek help for their condition because of privacy and confidentiality concerns, and due to the stigma still often associated with these conditions. The ability to receive treatment from a professional outside the community may encourage an individual with these needs to seek care.<sup>19</sup>

## METHODOLOGY

To get insights into what rural health care organizations should be doing to expand virtual health, the Deloitte Center for Government Insights interviewed more than a dozen rural health care experts with experience in virtual health. Interviewees included leadership from hospital systems, federally qualified health centers (FQHCs), health technology companies, broadband providers, academic institutions, advocacy groups, policy institutes, and philanthropic organizations. We used the findings from our interviews as well as secondary sources to offer practical recommendations to health care organizations and government agencies as they plan and implement virtual health programs in rural areas.

**Note:** We largely set aside reimbursement and clinician licensure policies in this report and during our interviews because these issues have been covered extensively in other literature on virtual health, and because the policy landscape around these issues is rapidly evolving and varies greatly by state and insurance type.

**Rural patients who have tried virtual health generally report high satisfaction.** According to a recent survey of life in rural America, one-quarter (24 percent) of rural adults have used telehealth to obtain prescriptions and manage chronic conditions, and among them, the vast majority report satisfaction (90 percent).<sup>20</sup> The most common reason rural Americans give for using telehealth is convenience (69 percent), followed by inability to see a regular doctor in person (30 percent), and difficulty traveling to a doctor/hospital (26 percent).<sup>21</sup>

## Planning and implementing a virtual health program: Key steps for health care organizations

### CONDUCT A NEEDS ASSESSMENT

**Before starting a virtual health program, health care organizations should conduct a needs assessment to identify organizational and population needs.** This can help leaders determine whether virtual health solutions can help

address the specific needs of their population, and if so, which solutions are most appropriate. Health care organizations should draw on existing evidence to assess the impact of potential virtual health solutions, looking at current technological capabilities and future technological needs, and how to bridge that gap (both within the organization and among the population being served).

For example, access to high-speed internet is a problem for roughly one in five rural adults (21 percent).<sup>22</sup> This may limit the ability of rural residents to access virtual health, and the ability of rural providers to deliver it. Still, several people we spoke with told us that many forms of virtual health require only a smartphone with cellular service (which, in some cases, is also difficult to access), an intermittent internet connection, or a landline telephone, depending on the virtual health solution. “Remote patient monitoring can be as simple as setting up an interactive voice response system and having a patient or caregiver enter or report their daily blood pressure or heart rate using an analog phone—it can be done in online or offline mode,” said Bill Paschall, vice president of business development at Vivify Health, a company that

offers RPM solutions to health care organizations throughout the country. Health care organizations should take the technological capabilities of their populations into account when designing their virtual health programs, recognizing that low-cost solutions are also available.

As they get started, health care organization leaders should also reach out to federally funded national and regional telehealth resource centers (TRCs). The Office of Advancement of Telehealth established 12 regional and two national TRCs to expand the availability of health care to

FIGURE 3

## Implementing a virtual health program

Six key steps health care organizations should take



Source: Deloitte analysis.

underserved populations through virtual health. Each TRC is staffed with experts in policy, technology evaluation, operational implementation, technical assistance, and knowledge of funding sources. In addition, because they are federally funded, their services are generally provided free of charge.<sup>23</sup>

## DEVELOP A STRATEGY, GOVERNANCE STRUCTURE, AND PARTNERSHIPS

**A coordinated strategy and centralized governance are critical to the success of any virtual health program.** The decision to implement a virtual health program should come from executive leadership and be part of the organization's strategic vision. Organizations should earmark time and resources for the initiative and develop centralized governance structures inside the organization, with a clear delineation of decision rights and responsibilities, operational champions, and an integrated road map. This can enable leadership and clinical staff to be engaged and aligned on the vision for virtual health and how to get there as an organization.<sup>24</sup>

“Ensure there is a solid strategic plan for what needs to be implemented. You need clinician buy-in, leadership buy-in, and a stated vision of virtual health for the organization.”

— Tim Polley, interim vice president,  
enterprise strategy and development,  
Carle Foundation Hospital

**At the same time, organizations should build networks with other health care providers.** According to experts we spoke with, this is especially critical in rural communities due to provider shortages, long distances to sites of care, varying access to the internet, low patient volume, and slim operating margins. As mentioned,

rural health care providers, such as critical access hospitals (CAHs) and Federally Qualified Health Centers (FQHCs) may need to establish networks, often with tertiary care centers that are geographically distant, to deliver specialty care services to their local populations.

Beyond sharing clinical resources, however, partners can also share technological capabilities and data infrastructure. For example, the Finger Lakes Telehealth Network provides open access to its telehealth infrastructure and support resources to partnering organizations in exchange for a small subscription fee. This arrangement allows for a collaborative sharing of services as well as cost savings to providers.<sup>25</sup> These networks often help members develop the required broadband infrastructure, usually for a discounted rate, and can provide access to data analysts and other experts that may be needed to deliver certain virtual health services (see the section on data and technology infrastructure).

“We’re talking about small communities with smaller budgets. For us, buying equipment is a big deal. Rolling out a new program is a big deal. ... We have no choice but to collaborate. With networks and partnerships, we have shared risk and responsibility.”

— Mary Zelazny, chief executive officer,  
Finger Lakes Community Health

**Public-private partnerships can be an effective way to establish local sites of care to address issues related to internet access or privacy concerns.** Many individuals, including those who have slow or inconsistent internet access, and those who lack access to a private space inside their home, may need to go to a site outside their home for virtual sessions.

Accessing Telehealth through Local Area Stations (ATLAS), a veterans affairs (VA) initiative designed to enhance access to VA health care through virtual health, has teamed up with Walmart to deliver video sessions to veterans. Established in fall 2019, the pilot sites were created to offer a convenient, comfortable, and private space with strong internet connectivity in communities where veterans often have long travel times to VA facilities and/or poor connectivity at home.<sup>26</sup> Other locations that can serve similar functions include libraries and schools (see sidebar, “North Carolina is building Health-e-Schools”).<sup>27</sup> Developing innovative partnerships can help rural communities make the most of limited resources.

#### INVEST IN DATA AND TECHNOLOGY INFRASTRUCTURE

**Hardware and software investments are core to any virtual health program, but health care organizations should also pay attention to interoperability and**

#### **investments that should be made in cognitive technologies and analytics.**

Hardware and software investments can vary, depending on the type of virtual health solution. A basic virtual visit could be enabled by a simple digital camera and an audio/video software platform.<sup>28</sup> Other solutions may require more sophisticated technology. For example, a specialized examination tool with an integrated high-resolution camera may be necessary for one medical professional to capture and transmit the image of the inside of a patient’s ear to another professional.<sup>29</sup>

While the need to make hardware and software investments may be obvious, less so is the need to build interoperability, security, and analytics into every aspect of the virtual health program. Doing so should not be an afterthought, but rather, baked into the vision of a seamless, patient-centered virtual health program. Interoperability allows data from the virtual visit to be sent to the

#### **NORTH CAROLINA IS BUILDING HEALTH-E-SCHOOLS**

In four counties in western North Carolina, elementary, middle, and high school students can receive virtual primary care at school through a program called “Health-e-Schools.” With the help of a school nurse, high-definition video conferencing, and specially equipped stethoscopes and cameras, students can receive a range of physician-supervised services, including sports physicals, behavioral health services, and consultations for respiratory issues.

The program was created in 2011 by the Center for Rural Health Innovation (CRHI), with support from BlueCross and BlueShield North Carolina Foundation and grants from Health Resources and Services Administration (HRSA) and the United States Department of Agriculture (USDA), among others.<sup>30</sup> CRHI is a nonprofit whose mission is to apply innovative technologies to improve access to health care in rural communities.<sup>31</sup> It created Health-e-Schools after recognizing that traditional sites of care are often geographically distant from where students live and go to school. A parent might have to take several hours off from work to bring their child to a health care facility, while the student would miss several hours of school—both of which could present strong barriers to accessing health care. School-based health centers have been shown to improve attendance and reduce barriers to learning, and Health-e-Schools has increased classroom attendance for students and decreased time spent away from work for parents and caregivers.<sup>32</sup>

patient's primary care clinician or medical team and integrated into their electronic health record (EHR). Meanwhile, organizations need to ensure that systems are protected and that data is not intentionally or unintentionally compromised, altered, or made public.

"I should know if my patient used Teledoc, and the outcome of that visit. Virtual health should contribute to seamless care, not drive further fragmentation."

— Dr. Steve North, founder and medical director,  
Center for Rural Health Innovation

**Virtual health solutions such as RPM may require investments in cognitive and analytic capabilities.** RPM involves the use of smart devices to provide real-time data to health care teams on vital health measurements such as blood pressure and heart rate. Algorithms are used to process data streams and notify a patient's health care team if a problem arises that requires analysis or intervention. Health care organizations should invest not only in the software, but also in the workforce needed to continuously run and update such algorithms and analyze the data. Rural health care providers may face significant challenges finding such talent locally, and may not be able to afford to pay competitively for such a position. In such cases, leveraging partnerships, as discussed above, is key.

## ENGAGE WITH AND TRAIN YOUR WORKFORCE

**Making virtual health a mainstream aspect of rural care will require significant buy-in from—and investment in—the health care workforce.** Rural clinicians may have a keen sense of the health care challenges facing their communities, but may not necessarily trust that virtual health can help solve these issues. Sharing

the evidence base on virtual health effectiveness with respect to outcomes, quality, and patient experience, in addition to real-life stories on how it has made patients' lives easier, are important first steps to gaining clinician buy-in. However, it's also important to emphasize how clinicians themselves can benefit. Virtual visits between specialists and primary care clinicians allow specialists in rural areas to care for a broader range of acutely ill or complex patients than they would otherwise have access to, keeping their skills sharp and continuing their practical education.<sup>33</sup> Connections made through virtual health also allow rural providers to become part of a broader community of clinicians, helping to decrease feelings of professional isolation.<sup>34</sup> Once engaged, some clinicians may emerge as champions, rallying peers to get onboard with virtual health, too.

**But engagement is only half the story. The workforce should also be trained to use these new technologies.** According to a 2018 physician survey from the Deloitte Center for Health Solutions, more than half (51 percent) of the physicians say that training on a new technology is necessary to support its adoption. But training isn't simply about getting clinicians comfortable with the new technology and modified workflow. It's also about teaching them how to modify their bedside manner—or "websites" manner—to build rapport with patients in virtual interactions, provide them with knowledge of the legal and clinical limitations of virtual health, teach them competencies in virtual examination using the patient or on-site family members,<sup>35</sup> and make sure they know what to do if an emergency arises. This training may happen formally, either in continuing education classes or it can be engrained into medical school curricula. It can also happen more informally, as technologically sophisticated clinicians or identified "super users" provide

hands-on training and mentoring to their hesitant colleagues.

### CREATE NEW WORKFLOWS, CARE MODELS, AND RISK MITIGATION PROTOCOLS

**Virtual health should be integrated into a seamless and coordinated delivery process across different providers, services, and settings.** Once health care organizations gain workforce buy-in, they need to sustain that buy-in by ensuring that delivering virtual health doesn't create additional work or inefficiencies.<sup>36</sup> The goal is to explicitly integrate virtual health into mainstream care delivery so that it becomes as routine as in-person visits.

At Carle Health System, registered dietitians in the nutrition service department have dedicated virtual days or half-days where they go to the "virtual health room" in the clinic and see patients virtually.<sup>37</sup> Blocking off time on their calendars helps other providers, administrative staff, and patients know when the dietitians are available for virtual visits. Additionally, having a dedicated room ensures that the necessary equipment will be available, and privacy and security concerns are addressed. When planning to adjust staffing and operational workflows, consider conducting interviews and simulations with clinicians, administrative staff, and patients so that all perspectives and experiences are incorporated into the new workflow. This can help create a more human-centered design and experience.

**Risk mitigation and clinical escalation paths should also be integrated into virtual health workflows.** An unexpected emergency can take place during any virtual visit, but the risks may be higher in rural areas where distances to the

nearest emergency room or site of care may be greater. Health care organizations should develop protocols for connecting patients experiencing emergencies with clinical support, regardless of whether the patient is in their own home, a retail clinic, or a virtual health center. Additionally, if the electricity goes out or there are other technological difficulties during a virtual visit, there should be protocols in place to continue or reschedule the visit as necessary that are known to clinicians and communicated to patients.

### ENGAGE WITH AND EDUCATE PATIENTS

**Just like clinicians, patients should be educated on the benefits of virtual health, and how to use it.** Eighty-five percent of rural Americans use the internet. They do so to get health information, manage their finances, and carry out business-related activities. But only one-quarter (24 percent) of rural adults have ever had a virtual visit.<sup>38</sup> This could be because virtual health visits are not available to them, they don't trust the quality of care they might receive, worry that they won't know how to initiate or interact in a virtual visit, or don't know that the service is available. Just like clinicians, patients should be told about the availability of virtual health services, educated about the benefits and effectiveness of virtual health, and shown how to use some of the technology, such as patient-operated digital stethoscopes.<sup>39</sup> Clinicians themselves can play a key role in informing their patients that they offer virtual health services, showing them how it works, and telling them what kind of equipment they might need.<sup>40</sup> Whenever possible, health care organizations should ensure that patients see the same clinician during virtual and in-person visits. This consistency can help maintain a personalized clinician-patient relationship, which is a top priority for many patients.<sup>41</sup>

“We need to educate and empower patients, and keep in mind that people have different levels of comfort with virtual health. Meet the patient where they are in terms of understanding and comfort.”

— Jennifer Farrell, senior director,  
global market development,  
Medtronic Care Management Services

## How government can help

Health care organizations should drive the adoption of virtual health solutions; however, there are a variety of actions federal, state, and local governments can take to accelerate the adoption of virtual health in rural areas. Below, we discuss the role government agencies can play in helping rural communities implement virtual health programs.

### BUILDING CONNECTIVITY

The federal government has developed several programs to help bring broadband to rural communities. Among them are the Federal Communications Commission’s (FCC) Rural Health Care Program, which provides funding to eligible health care providers for telecommunications and broadband services,<sup>42</sup> and the USDA’s ReConnect Loan and Grant Program, a pilot program authorized by the Consolidated Budget Act of 2018 to facilitate broadband deployment in rural areas that lack sufficient access.<sup>43</sup>

But local governments and communities should also explore creative infrastructure deployment strategies that go beyond broadband networks offered by private companies. These can include wireless (4G and soon, 5G), low Earth orbit,<sup>44</sup> and

municipal internet, in which a municipal electrical provider lays down fiber-optic cables next to existing electrical wires. The cost of municipal internet is often well below that of large internet providers. And while more than 150 communities in 29 states have publicly owned municipal networks offering at least 1-gigabit services, 19 states have laws in place discouraging or preventing local communities from making such investments.<sup>45</sup> Finally, state and local governments should establish formal mechanisms to coordinate broadband efforts across the state and share best practices for rural infrastructure development. Such efforts can also help unlock new economic value and enable rural communities to reach their full potential in a digitally connected world.

**Health care organizations should drive the adoption of virtual health solutions; however, there are a variety of actions federal, state, and local governments can take to accelerate the adoption of virtual health in rural areas.**

### SIMPLIFYING THE PROCESS FOR APPLYING FOR FUNDING

Nonprofit organizations and health care providers in rural areas typically rely on government and state funders as well as foundations to help launch or sustain virtual health projects. However, getting a grant is resource-intensive and often complicated. Funders hold competitive cycles for grant programs in which rural organizations must sometimes compete against well-funded, well-prepared organizations with dedicated and

experienced grant-writing teams. Organizations in rural areas are less likely to have staff members strictly dedicated to grant writing, and even when rural communities seek to tap some of those resources, it is not always obvious which programs they may be eligible for.<sup>46</sup> Conducting research on dozens of programs to zero in on the most likely prospect often takes more labor than a small, resource-strapped rural organization can commit.

Government agencies should simplify their rural health funding programs to make it easier for communities to establish these essential services. One option is for agencies to create a government funding portal for health care organizations to use to access information about programs and apply for funding. After entering their relevant data into the portal, a health care organization would be presented with a streamlined list of grants and funding opportunities for which it is eligible, and links to the organization's regional telehealth resource center for additional assistance.

### DRIVING VALUE-BASED CARE

Issues related to whether and how virtual health is currently reimbursed by various payers were explicitly set aside for this report; however, they inevitably came up during many of our interviews. Several rural health experts we interviewed expressed skepticism about the widespread adoption of virtual health until the shift from fee-for-service to VBC was more broadly adopted in rural areas. They mentioned that many hospitals are currently incentivized to keep their hospital beds full rather than provide preventive care through virtual visits, RPM, and other forms of virtual health.

Currently, accountable care organizations and other value-based payment (VBP) models are less prevalent in rural areas,<sup>47</sup> as they often lack

sufficient patient volumes and the core capabilities needed to succeed. Recognizing these challenges, the National Rural Health Association, along with other partners, has developed draft legislation to establish a critical access hospital VBP program, which would give critical access hospitals an on-ramp into VBP models and help them to assume more financial risk over time.<sup>48</sup> By supporting and enabling VBC delivery in rural settings, government agencies can create the right financial incentives and the business case for rural providers to integrate virtual health into a mainstream delivery model.

"We're seeing the incentives change, which has encouraged providers to move away from the fee-for-service mentality and instead look upstream and prioritize preventive services. You *can* herd cats, you just need to move the food."

— Brock Slabach,  
senior vice president, member services,  
National Rural Health Association

## Conclusion

Rural health care challenges are nothing new, but the recent acceleration of rural hospital closures threatens to increase rural and urban health disparities, even beyond what they've been historically. Virtual health is one tool among many that can help address these challenges.

With leadership from rural health care organizations, support from government agencies, and collaboration with other public and private entities, virtual health can help bridge the rural-urban health divide and allow rural residents and providers to reap the benefits of technology-assisted health care delivery. ●

**ALEX SCHULTE** is a practitioner in Deloitte Consulting LLP's Commercial Strategy and Operations practice. She is based in Denver.

**MELISSA MAJEROL** is a former health care research manager with the Deloitte Center for Government Insights.

**JESSICA NADLER** is a health care strategy leader in Deloitte Consulting LLP's Government and Public Services practice. She is based in Arlington, Virginia.



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## The realist's guide to quantum technology and national security

**Q**UANTUM INFORMATION TECHNOLOGIES will almost certainly have significant impacts on national security, touching everything from extremely secure communications to faster code-breaking to better detection of aircraft and submarines.<sup>1</sup> The diversity of quantum applications across the national security domain warrants some immediate attention from governments, both for how they can harness quantum systems and for how those quantum systems may undercut national security.

One major national security concern is that quantum computers will someday be able to relatively easily break many current forms of encryption.<sup>2</sup> Although cryptographers are working on “quantum-resistant” algorithms that can be used to replace existing algorithms, the hard part will be implementation. Elsa Kania, adjunct senior fellow at the Center for a New American Security, notes that “the transition required in updating to new, postquantum cryptography can be extremely difficult, especially for defense and national security organizations that tend to have a significant proportion of legacy systems.”<sup>3</sup>

On the flip side, quantum communications and quantum detection technology can improve existing capabilities. Quantum communications should be able to better protect government from losing sensitive information by creating communication methods that are potentially immune to undetected interception. These methods can also be useful in scenarios such as communicating with submarines: Some forms of quantum communications use blue-green photons, which can travel much farther and deeper in seawater than radio waves.

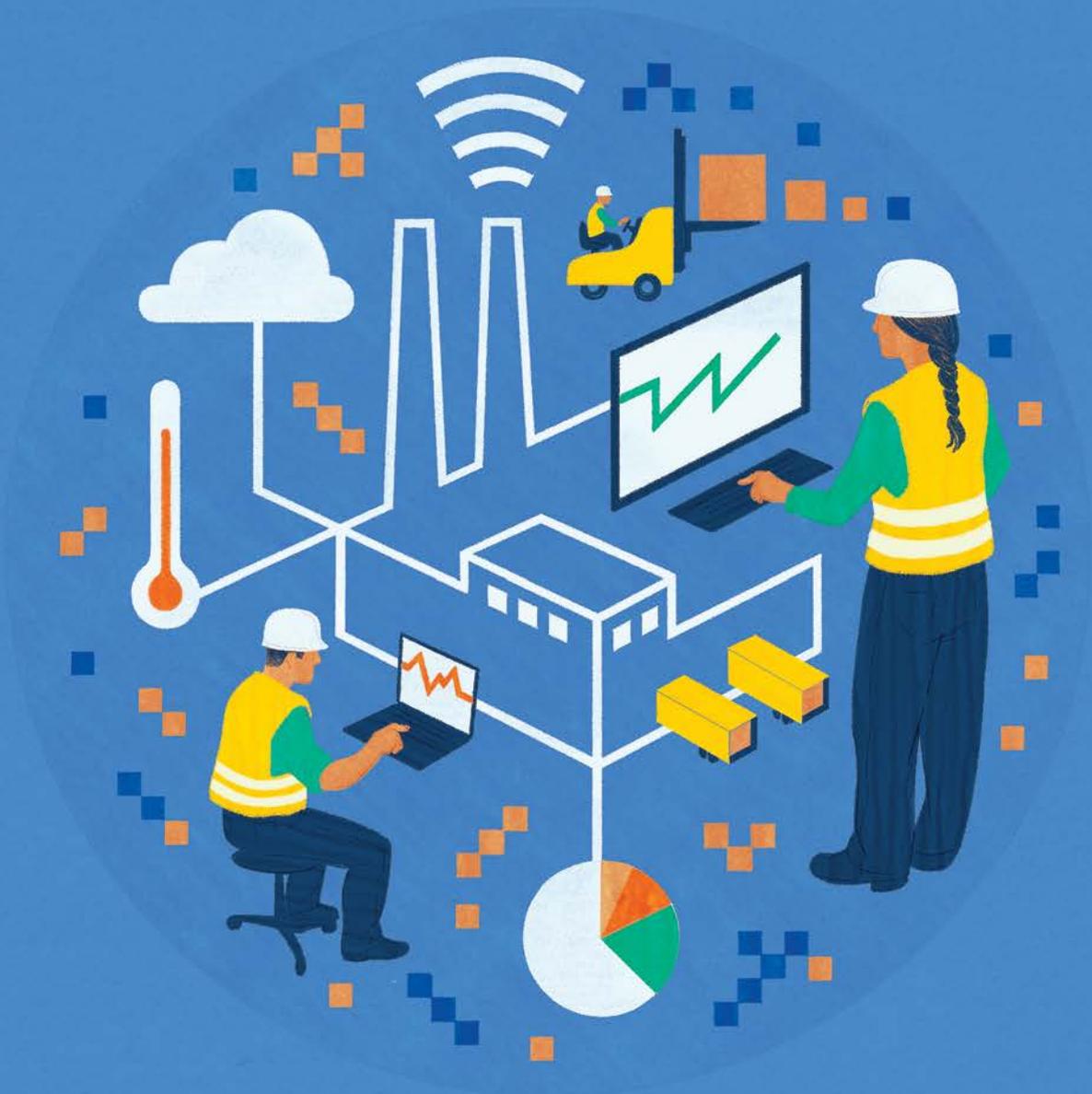
Other forms of quantum technology can also have a big impact on national security. For example, taking advantage of the same properties of blue-green photons, quantum LIDAR could allow submarines to detect and navigate obstacles silently, making submarines much harder to detect and track than today's, which must use noisy active sonar for the same purposes.<sup>4</sup>

The diversity of **quantum applications** across the national security domain warrants some immediate attention from governments, both for how they can harness quantum systems and for how those quantum systems may undercut national security.

Governments can consider taking several steps to proactively prepare for the advent of pragmatically viable quantum information technologies:

- **Educate yourself.** With a basic understanding of the science and the technology, leaders can begin to identify the areas where their organizations can benefit from or be vulnerable to different quantum technologies.
- **Practice good cybersecurity hygiene.** No matter what capabilities quantum systems may have in the future, an adversary can't decrypt information they don't have.
- **Know your data and your systems.** Managing data in the quantum era will require leaders to know what data their systems maintain and how to incorporate necessary safeguards without overloading their infrastructure.
- **Support basic research and education.** Governments can create an R&D portfolio to help balance core, adjacent, and transformational research bets to help ensure that no future contingency catches them off guard.<sup>5</sup>
- **Connect with others.** Government leaders should connect with experts across government, industry, and academia to help create a quantum innovation ecosystem that can enhance the ability of all of its members to meet quantum's challenges.<sup>6</sup>
- **Begin planning.** Finally, with the right background knowledge, connections, and preparation through workshops, government leaders can begin to explore how to best implement changes. They should bring quantum into the strategic planning process, integrating its potential challenges and opportunities into thinking about how the organization will execute its mission in the coming quantum world. ●

To learn more, read the full article, *The realist's guide to quantum technology and national security: What nontechnical government leaders can do today to be ready for tomorrow's quantum world*, on [www.deloitte.com/insights/quantum-tech-national-security](http://www.deloitte.com/insights/quantum-tech-national-security).



**CONNECTIVITY AND ITS POTENTIAL**

# Implementing the smart factory

**NEW PERSPECTIVES FOR DRIVING VALUE**

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STEPHEN LAAPER, BEN DOLLAR, MARK COTTELEER,  
AND BRENNAN SNIDERMAN

ART BY ALEX NABAUM

The strategic importance of smart factories is undeniable, as early adopters have reported operating more efficiently and driving more to the bottom line.

## Smart factories have arrived

In the United States alone, 86 percent of manufacturers believe that smart factories will be the main driver of competition by 2025. Furthermore, 83 percent believe that smart factories will transform the way products are made.<sup>1</sup>

Research consistently reveals improvement in cost, throughput, quality, safety, and revenue growth through the deployment of smart factory technologies that combine capabilities in industrial internet of things (IIoT), cloud and edge computing, robotic process automation (RPA), artificial intelligence (AI) and machine learning, vision systems, and augmented and virtual reality systems, among others.<sup>2</sup> Leaders have a broad range of choices and opportunities with respect to smart factory transformations, both in terms of which technologies to use and how to deploy them.

Despite all of this, however, many are still only just getting started. For example, only 5 percent of US manufacturers surveyed in a recent study reported full conversion of at least one factory to “smart” status, with another 30 percent reporting they are currently implementing initiatives related to smart factories.<sup>3</sup> This means that nearly two out of three (65 percent) manufacturers surveyed report no progress on initiatives that they overwhelmingly point to as their main driver of near-term competitiveness in five years.<sup>4</sup>

That’s a significant percentage of companies leaving substantial and demonstrated value on the table. So how do leading companies get started, succeed, and—most importantly—realize value in these efforts? What can leaders pursuing smart factory deployment learn from those who have already done it? And how can leaders then translate those lessons into value—not only for their smart factories, but for their broader organizations?

To better understand the outcomes from organizations that have undergone smart factory transformations, we interviewed leaders with hands-on smart factory experience. For the companies and smart factory deployments we studied (see the sidebar, “Our research approach”), the results have been powerful indeed.

### OUR RESEARCH APPROACH

Deloitte conducted more than 40 qualitative interviews with a global array of manufacturing leaders, staff, and professional services providers with hands-on experience of smart factory transformations across diverse industries such as chemicals, paper, aerospace, plastics, consumer products, and life sciences and health care.<sup>5</sup> The topics discussed here emerged as common themes, both across the different deployments and among the many study participants that we engaged.

Drawing from those interviews and building on Deloitte's in-depth, collaborative study with the Manufacturers Alliance for Productivity and Innovation (MAPI), which investigates the state of smart factory deployment across the United States, and our initial 2017 smart factories study, which offered an initial exploration of the concept, this report offers insight into lessons that can be drawn from leaders' experiences with smart factory transformations.

## Sixty-five percent of manufacturers surveyed report no progress on initiatives that they overwhelmingly point to as their main driver of near-term competitiveness in five years.

Despite the range of industries of those we interviewed, an overarching set of considerations, challenges, lessons learned, and strategies for success remained consistent. We've divided our findings into two sections:

- **Positioning smart factory initiatives for value: Lessons in smart factory transformations from those who have done it.** This section relates common themes encountered and lessons learned when transitioning to smart factory functionality. In this section, we take insights from our interviews to uncover the key elements of smart factory transformations.
- **Turning lessons into outcomes: Realizing the value of smart factory transformations.** Here, we examine the question of "what's next?" Now that organizations have positioned their factories for value,

how can they make that transformation pay dividends? These opportunities result from the data, improved processes, and optimization opportunities that smart factory deployments illuminate. Each builds upon the one before it, amplifying value and driving results at scale. Early identification of potential pathways and their impacts can be critical to maximizing the value delivered by smart factory efforts.

## Positioning smart factory initiatives for value

In our research, several common themes emerged. Some are the same that emerge in any transformation: those related to culture and change management

and rooted in the notion that transformation is only as successful as the people who embrace it. Others are far more specific and unique to the smart factory and its technologies, and can be critical considerations that leaders should address (figure 1).

### THE FAMILIAR THEMES: CHANGE MANAGEMENT IN SMART FACTORY TRANSFORMATIONS

"How do you make sure that you can change your processes and people when they have been working for so many years, and give them tool[s] to engage them?"<sup>6</sup>

#### *Human-centered design based on real user needs*

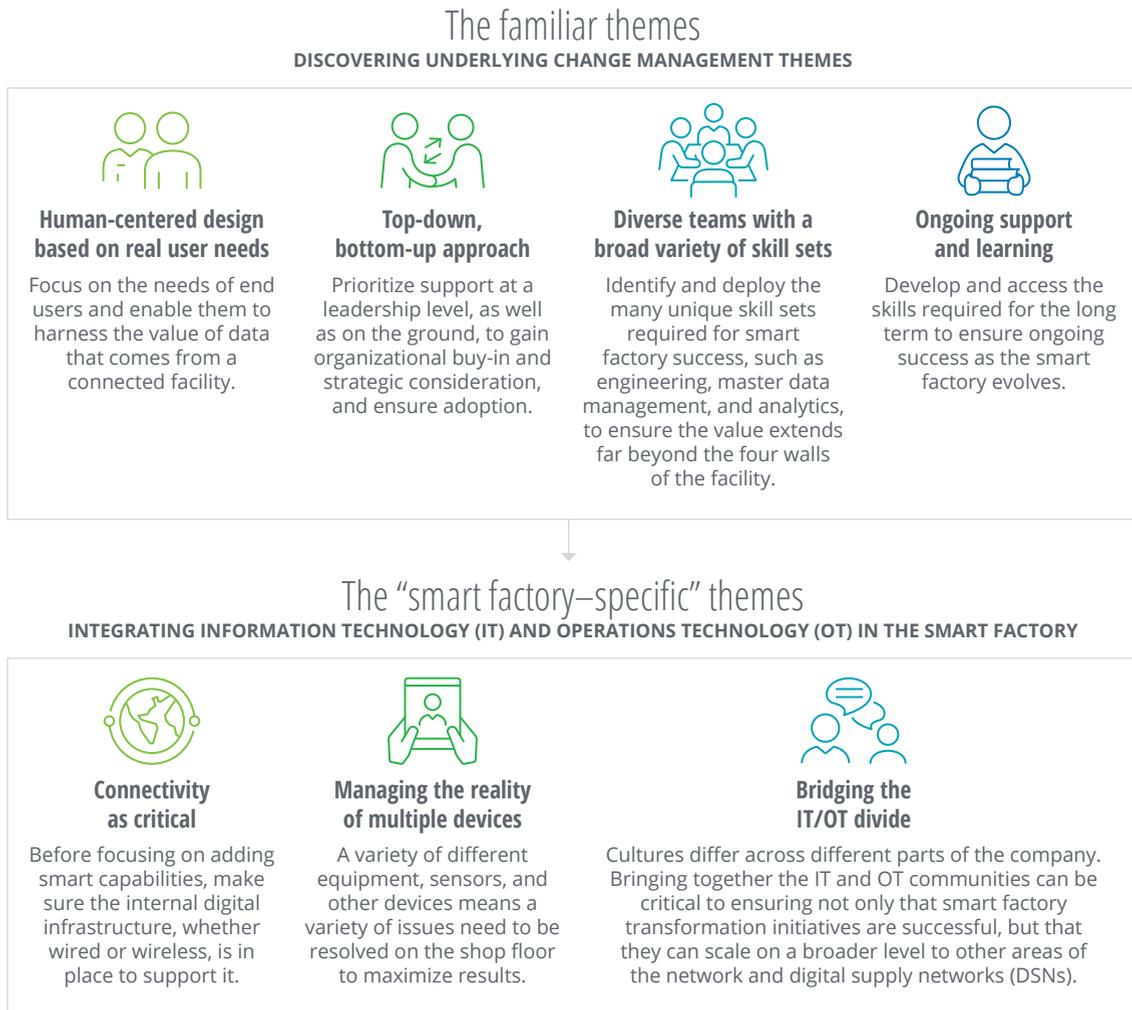
Many successful smart factory transformation leaders point to the need to consider user-oriented perspectives to achieving business objectives when

designing smart factories. One study participant described the approach as taking the time to understand how individual roles work and what tools they need, employing a “human-centered approach to understand what [the user’s] pain points are, making sure we understand how they need to use information, what they need to look for, why they need to investigate it, and how they need to act on it.”<sup>7</sup>

By focusing on the user first, they identify issues to address and behaviors that need to change, and only then think about how technology can support those efforts. The intention is to ask not only “How do we make the technology sticky?” but also, “How do we make the application relevant and valuable to the user?” Leaders can create interfaces in which users see data and information that is relevant to *their* role, rather than having to sift through

FIGURE 1

### Themes from smart factory initiatives



Source: Deloitte analysis.

information that they don't need. This way, users see the value of having information at their fingertips to do their jobs, speeding adoption and improving workflows. As one leader noted, "When the development is separated from the end users, you end up with a subpar product, subpar adoption ... the human element is the critical ingredient that if you don't get right can lead these projects to the point where it was an investment without value."<sup>8</sup>

### *Top-down, bottom-up approach led by change champions*

Change champions inside the business can provide support at a leadership level as well as on the ground to remove roadblocks, gain organizational buy-in, and outline the business case for smart factories. Leaders stress the importance of executive-level sponsorship, as these initiatives often require large investments of resources—whether people, time, assets, or financials. They spoke frequently about the need for a project sponsor to drive projects forward and the importance of strong leadership for successful transformations.

Beyond that, support from all sides is important when the rubber meets the road. Senior leaders in operations, supply chain, strategy, and other functions can think strategically about how the smart factory transformation can drive value more broadly at the network level. Those on the ground—plant managers, plant engineers, manufacturing operators, technicians, and others—can drive change and results on the shop floor. As one individual noted, "If any factory wants to introduce [Industry] 4.0 or a smart factory ... it has to be a top-down, bottom-up approach. ... It must be both sides. That would be the biggest key to success."<sup>9</sup>

## **If any factory wants to introduce [Industry] 4.0 or a smart factory ... it has to be a top-down, bottom-up approach. ... It must be both sides. That would be the biggest key to success.**

### *Diverse teams with a broad variety of skill sets*

Diversity breeds insight. Our findings reinforce research claiming that most successful transformations employ teams representing diverse functions and capabilities.

Skill sets include engineering, information technology (IT), supply chain, production, master data management, analytics, digital marketing, finance, user interface designers, and human resources, among others. As one interviewed leader stated, "You are going to need data scientists, you are going to need software developers, you are going to need people that understand human-centered design and design thinking—you are going to need all these different skills."<sup>10</sup>

Some interviewees suggested that cross-functional teams reduced the probability that important controls, processes, and cultural elements were missed during the transformation effort—and could help ensure that the smart factory could offer value more broadly across DSNs later on. Research on the power of cross-functional teams supports this;<sup>11</sup> cross-functional teaming has been shown to result in greater organizational innovation and growth.<sup>12</sup>

This means transformation leaders should take pains to ensure the right skills are deployed at the

right time, and that diverse mindsets can inform the overall approach. Leaders should also look for opportunities to ensure the knowledge is transferred across initiatives at scale. This can pay dividends in the long run as the smart factory transformation scales across DSNs and the broader network.

### *Ongoing support and learning*

Given the breadth of capabilities required to successfully deploy the smart factory, organizations should consider how to bring skills into the company, and how to develop skills for the people already there. Adding and growing skills is one of the biggest issues facing organizations in this domain; just 14 percent of C-level manufacturing leaders in a recent global quantitative survey strongly agreed their organizations currently possess the skills they will need in the future.<sup>13</sup> Building skills can pay major dividends, such as driving acceptance and adoption of solutions, providing support for employees as they adapt, and creating a culture of constant learning where talent can continually acclimate to new technologies, capabilities, processes, and ecosystem changes. In fact, research reveals a correlation between hands-on experience with smart factory technologies and managers' belief that the organization, and its people, can navigate the change.<sup>14</sup>

But it is easier said than done. As smart factories leverage advanced technologies, roles within the facility will call for new and different skills than had been needed previously, making it challenging to upskill and train.<sup>15</sup> Beyond developing in-house capabilities, other approaches can also help sustain smart factory systems and technologies, such as implementing alternative talent models, collaborating with universities and other schools to build

a pipeline of talent, and leveraging the skills of ecosystem partners.

## THE "SMART FACTORY-SPECIFIC" THEMES

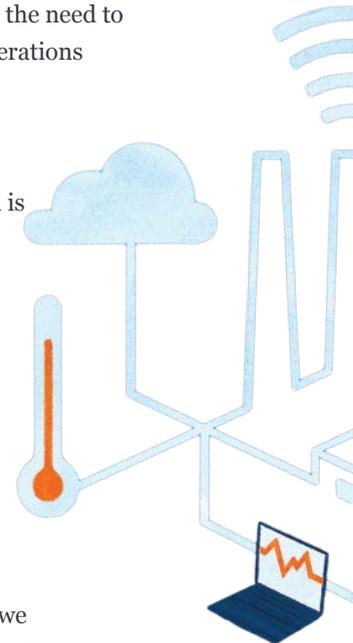
Although there are certain considerations that hold true for nearly every type of transformation, nuances specific to smart factory transformation also exist: the criticality of connectivity, the need for a flexible approach to assets, and the need to bridge the divide between IT and operations technology (OT).

### *Connectivity as critical*

It all begins with connectivity, which is typically one of the most critical factors driving smart factories and DSNs. In fact, it would be fair to say the smart factory and its resulting value generally hinge on the ability to connect assets, processes, people, and devices.

This is, of course, no small task. The issue of connectivity arose in nearly every smart factory deployment that we studied; in many facilities, Wi-Fi and cellular connectivity are often irregular in the labyrinth of steel and concrete. Connectivity was also identified as a top challenge for smart factory adopters in broader research: Thirty-three percent of smart factory leaders in the recent Deloitte-MAPI survey identified lack of necessary IT infrastructure as a significant impediment to smart factory initiatives.<sup>16</sup> Connectivity, or lack thereof, can make all the difference. If an application or process can't connect to the network to share and access information, it will fail no matter how well thought out it is.

Yet that connectivity enables multiple opportunities to reshape the ways in which value is captured within the smart factory, and beyond it. Leaders



can think not just about how to connect and gather data from assets and processes within the four walls of the factory, but also plan for how that connectivity can scale, and how data can be shared throughout networks, ecosystems, and DSNs.

The deployment of smart factory technologies across the network will likely demand a carefully crafted strategy, using qualified advisers, for building a digital infrastructure that is scalable, while also accommodating the unique demands of each environment.

### *Managing the reality of diverse devices*

Connectivity can be critical for a smart factory deployment, but the variety of machinery, sensors, and other devices that exist on the shop floor is just as important to consider. After all, you must be *able* to connect it and make it all work together. Even within the same plant network, each facility is likely unique in terms of layout,

equipment, and product. Smart factory practitioners interviewed as part of our research identified multiple dimensions to this challenge, including:

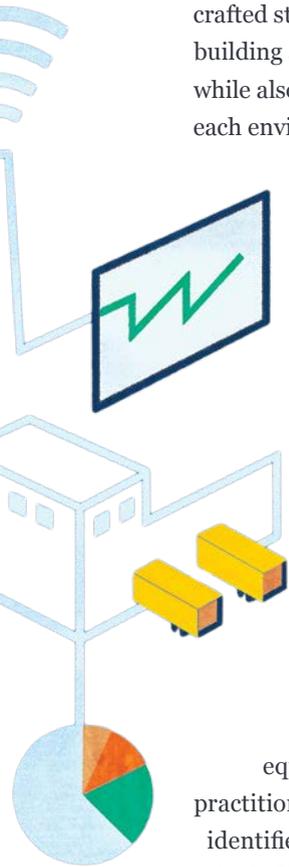
- **Diversity in age.** Smart factory deployments span some of the newest, most advanced manufacturing technologies in the world—as well as some of the oldest. As one leader noted, “Connecting these old machines, some of them from the 1950s and 1960s, was definitely a challenge.”<sup>17</sup> Integrating across these age groups can indeed be difficult—but it can also

lead to significant value, as it allows leaders to access data about processes and functions that were previously impossible to get.

- **Diversity in purpose.** In some cases, new real-world applications of devices provide teams the chance to innovate, discover new ways to capture data, and find new opportunities for value.
- **Diversity in data structure and format.** Data comes from many sensors and devices and takes many formats. In a smart factory, it is critical to ensure that data from one system or device can be combined and leveraged with data from another. Cleansing and mapping efforts are often crucial to developing visibility into factory processes.
- **Diversity in access methods.** Adding sensors to all equipment is not always practical; issues with access, quality, security, or machine uptime may intervene. In some cases, teams can leverage technology to develop new means for measurement and data collection. One interviewee spoke of how smart factory principles enabled their organization to improve the quality of a manufacturing process that involved an early-stage chemical reaction where direct access to the reaction chamber was not possible. Instead, the team deployed a variety of approaches to capture reaction inputs, temperature, and time to infer data about the reaction itself. In another example, process control on older, analog machines was accomplished via digital cameras, AI, and vision systems to “read” gauges and capture data.<sup>18</sup>

### *Bridging the IT/OT divide*

Twenty-seven percent of respondents in the Deloitte-MAPI survey identified difficulties in



developing a broader integration between IT and OT as a major challenge to smart factory initiatives.<sup>19</sup> A significant percentage of those we interviewed pointed to battles between the IT and OT communities over issues such as data access and rights, IT development rights, and shifts in technology approach. Further, some OT leaders and teams may also experience discomfort with agile sprint methods, which are meant to enable change quickly.

IT organizations have historically made large investments in qualifying and securing technology assets. The OT organization may not be familiar with those demands, and the rationale behind them. At the same time, IT's focus on maintaining system integrity may be perceived by OT as resistance to suggestions or lack of understanding of the reality on the shop floor. Achieving balance among competing priorities, and understanding across different professional cultures, can make all the difference. It can also pay dividends in the long run as companies seek to scale smart factory principles beyond a single facility or process to the broader network.

## Turning lessons into outcomes: Realizing the value of smart factory transformation

How can companies move from lessons learned from smart factory transformations toward outcomes and the ways smart factory capabilities make processes and organizations better? There are multiple opportunities to recognize value: from illuminating data and bridging the smart factory to the broader DSN, to driving improved versions of current processes, to layering advanced technology for operational excellence, to scaling beyond the four walls of the facility to the broader ecosystem. We explore some of these opportunities (see figure 2 for a summary).

### ILLUMINATING THE HIDDEN FACTORY

Most of those who spoke with us about their smart factory transformations pointed to the importance of connectivity and the need to connect assets and data across a broad range of systems, platforms, and data structures, some of which were never meant to

FIGURE 2

## Smart factory transformations leverage always-on connectivity to drive greater value



### **Illuminate the hidden factory**

Connected smart factories provide data that leaders have often never had access to before, illuminating things that were perhaps always there but in the “dark” due to lack of digitization.



### **Augment current systems for new value**

Companies can evolve and improve upon familiar methodologies and disciplines, such as lean manufacturing and talent management, to uncover new ways to create value, drive greater productivity, make faster decisions, respond more quickly, and more effectively leverage talent.



### **Harness AI to get to the next level**

Once everything is connected, data abounds. Companies need tools to make sense of all that information in a way that humans cannot—to drive value quickly, proactively, and flexibly.



### **Scale the smart factory throughout the network and ecosystem**

While significant value can be realized by transforming a single facility into a smart one, the value that can be realized by scaling across the facility network is exponentially greater.

Source: Deloitte analysis.

be connected. Once a facility and its assets are connected, they unleash a flood of information to be untangled, translated, and acted upon. The infusion of new data enables organizations to see things that were always there, but previously impossible to observe or quantify.

Through connected assets and flows of data, information from throughout the facility is now visible. At the same time, rapid increases in processing power have led to new analytics capabilities and the ability to generate ever-deeper insights that were virtually impossible to produce even several years ago. In one example, a manufacturer more than doubled production on existing capital equipment by using predictive capabilities driven by advanced shop-floor analytics. With the right architecture in place, this can also pave the way for use of information from the smart factory throughout the broader DSN: using data across the connected ecosystem to inform fulfillment, product development, planning, supply, and customer service.

#### LEVERAGE CURRENT SYSTEMS IN NEW PROCESSES TO ACHIEVE OPERATIONAL EXCELLENCE

Leaders we interviewed discussed the need to be flexible in their approach to diverse devices, data, and systems, and to acknowledge the complexity and difficulty of connecting the range of systems and assets. By integrating their current systems digitally and leveraging the data, companies can evolve and improve upon areas such as lean manufacturing and workforce management—exploring new ways to optimize operations, drive greater productivity, and leverage talent.

- **Empower digital lean.** For as long as facilities and factories have existed, method-

ologies have been around to inform the way they are run. Approaches such as lean have been used for decades to optimize processes and workflows, identify and reduce waste, and maximize value. The flexible nature of smart factory transformations, however, allow organizations to improve upon approaches such as lean, vaulting them forward in a digital environment to capture previously unseen value. *Digital lean* represents the marriage of lean manufacturing with smart factory principles and extends existing lean capabilities through digital tools that provide more accurate, precise, and timely information about operations. The result can be a better ability to monitor production and report issues, among other capabilities.

**In one example, a manufacturer more than doubled production on existing capital equipment by using predictive capabilities driven by advanced shop-floor analytics.**

- **Enable smarter approaches to talent.** Leaders spoke about the importance of tools built with users' needs in mind, the need for diverse teams matched to the array of skills needed for smart factory transformations, and the importance of ongoing learning and proof of ROI to keep teams invested in and adaptive to smart factory capabilities. But beyond that, the smart factory itself can also enable smarter allocation of workforce. Data can indicate where maintenance crew, machine operators, and others need to be to optimize performance, and power persona-based tools that focus efforts on insights relevant to specific roles. Further, workers can team with digital and physical technologies to augment their

capabilities, and the technology itself can create wholly new roles within the smart factory.<sup>20</sup>

## HARNESS AI AND OTHER ADVANCED TOOLS TO GET TO THE NEXT LEVEL

It is the fusion of humans and technology, including IT and OT, that makes a smart factory smart. Applications of physical technologies such as robotics have led to significant shifts in the smart facility, while IoT and cloud and edge computing have led to the creation and aggregation of data and information. In fact, research has shown that leaders prioritize investing in IoT, AI, cloud, and analytics above other technologies.<sup>21</sup> These technologies form the foundation of organizations that are not only connected but also harness, analyze, and use data to drive decisions.

As they bring together information from a wide variety of sources, however, leaders need a way to make sense of it, maximize value quickly and proactively, and accelerate realization of benefits. Advanced analytics, powered by AI, enable organizations to comprehend all the information from their newly illuminated processes, and handle data loads as well as critical, previously unknown correlations in the data that a human, at scale, cannot.

AI can be deployed in a variety of ways throughout the facility for example, robots capable of navigating and learning from the types of uneven or unpredictable configurations that can be found in industrial facilities<sup>22</sup> as well as capable of emulating human vision and hearing for quality sensing and asset health prediction.<sup>23</sup> It can drive predictive maintenance; dynamically route inputs and other materials throughout the facility; and analyze, sense, and proactively respond to circumstances across the breadth of the smart factory's operations in a control tower, among other capabilities. AI can also be used to monitor and optimize performance of products or

processes through the deployment of digital twins and digital threads. Digital twins allow companies to capture value by detecting potential issues sooner, optimizing plant capacity and predicting outcomes of various scenarios. Likewise, AI can be deployed in the digital thread, creating a digital record of the life cycle of products themselves.

The value that can be derived from deployment of AI capabilities can be significant. Some leaders reported double-digit percentage improvements in production processes, machine utilization, and throughput from the deployment of AI-driven capabilities.

## SCALE THROUGHOUT NETWORKS, ECOSYSTEMS, AND DSNS

Scaling smart factory capabilities and processes throughout the enterprise's network allows the organization to recognize smart factory value on an even broader scale. In one example, a consumer products manufacturer generated double-digit returns on an investment in advanced analytics and AI to optimize input purchasing decisions across its manufacturing network. In another, a biopharma company projected a net value of US\$50–75 million year over year in operational expense reduction when assessing whether smart factory benefits could be realized at scale.<sup>24</sup> The influx of data and information can drive improved operations not just in one facility, but throughout the network and even the broader ecosystem.

## Applying lessons to scale up

Though there may be no single approach to smart factory deployment, lessons can be learned from each approach that can lead to significant value. These range from people-centric experiences such as change management, putting humans at the

center of capabilities, and managing skill diversity, to broader operational and technological considerations such as the criticality of connectivity in often-challenging environments, the diversity of assets, and the need to bridge the IT/OT divide. But all these insights can come together to drive a vision for a successful smart factory future, informed by the wisdom of experience and the impact it can lead to.

Powered by data from throughout the connected factory, leaders can create new processes to optimize operations and leverage technologies such as AI to make sense of data and anticipate, sense, and respond to shifts in the environment. After piloting and testing these capabilities in discrete locations, organizations can start small, learn, and adapt—and then scale their solutions more broadly. Scaling beyond the four walls to other facilities

throughout the network or ecosystem can allow value to be recognized exponentially.

If leaders take just one lesson away, however, it's the importance of moving forward. Our research clearly demonstrates that manufacturers broadly agree that the future of manufacturing is “smart,” and the empirical results we have seen as a part of this study clearly link to significant value delivery. While it can seem daunting and even impossible to tackle, by starting small with specific programs that can produce measurable results, companies can get themselves started on the path to substantial value. For companies already on the journey, it's about accelerating and scaling the benefits you're already seeing. For those just contemplating how to start, now is the moment to begin—or risk being left behind. ●

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**STEPHEN LAAPER** is a Digital Supply Networks leader in Deloitte Consulting LLP's Strategy and Operations practice. He is based in Boston.

**BEN DOLLAR** is a principal in Deloitte Consulting LLP's Global Supply Chain practice. He is based in Boston.

**MARK COTTELEER** is a managing director in Deloitte's Digital Supply Networks practice. He is based in Milwaukee.

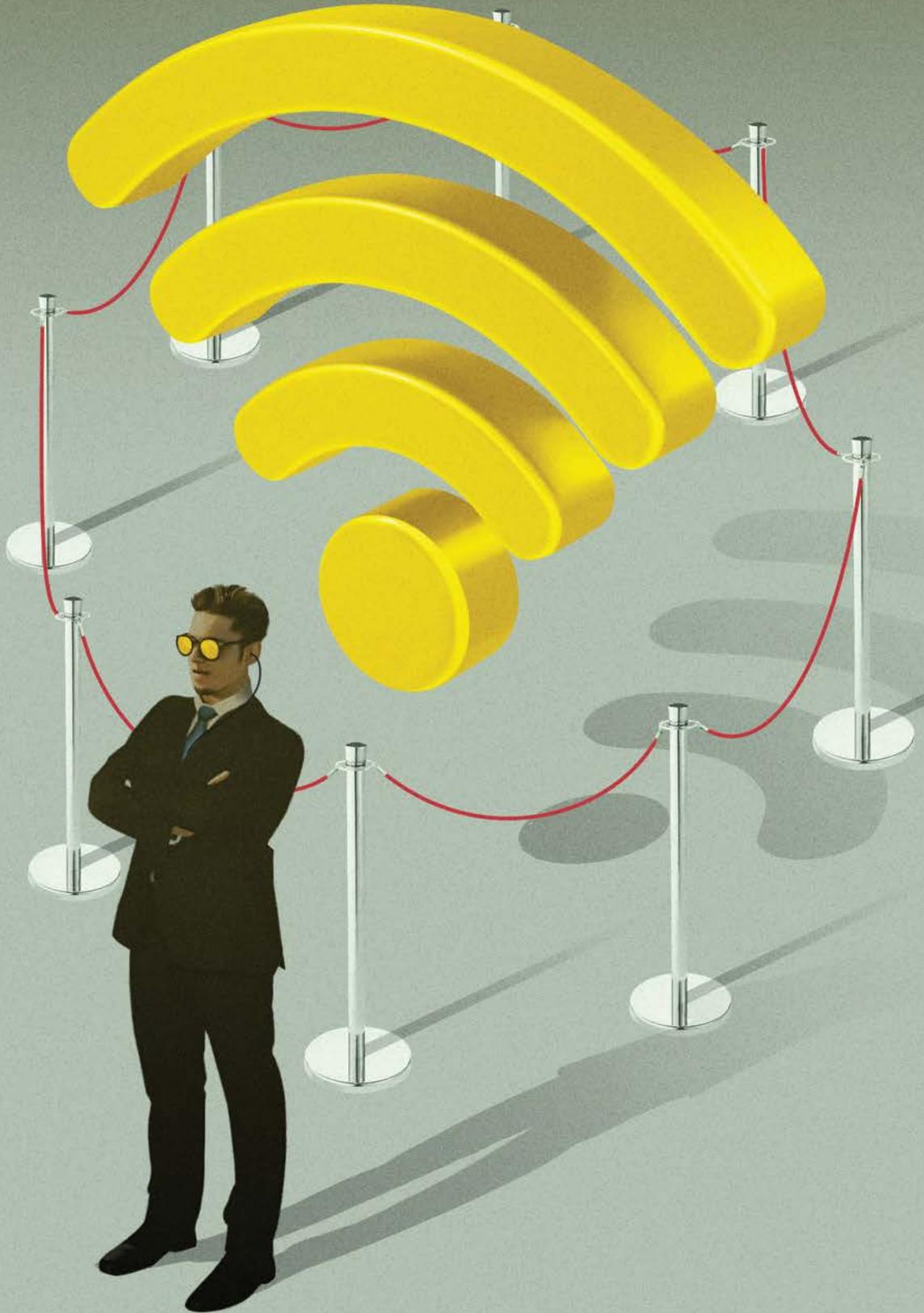
**BRENNA SNIDERMAN** leads Deloitte's Center for Integrated Research. She is based in Philadelphia.

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CONNECTIVITY AND ITS POTENTIAL

# Private 5G networks

**ENTERPRISE UNTETHERED**

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PAUL LEE, MARK CASEY, AND CRAIG WIGGINTON

ART BY STUART BRIERS

To enable enterprise connectivity—and not just any connectivity, but ultra-reliable, high-speed, low-latency, power-efficient, high-density wireless connectivity—a company likely has two basic options.

It can connect to a public 5G network. Or it can opt for a private 5G network, either by purchasing its own infrastructure while contracting for operational support from a mobile operator, or by building and maintaining its own 5G network using its own spectrum. For many of the world's largest businesses, private 5G will likely become the preferred choice, especially for industrial environments such as manufacturing plants, logistics centers, and ports.

We expect that more than 100 companies worldwide will have begun testing private 5G deployments by the end of 2020, collectively investing a few hundred million dollars in labor and equipment. In subsequent years, spend on private 5G installations, which may be single-site or spread across multiple locations, will climb sharply.<sup>1</sup> By 2024, the value of cellular mobile equipment and services for use in private networks will likely add up to tens of billions of dollars annually.

It's easy to understand the appeal of 5G, which promises superior performance to that of other wireless standards and greater flexibility than wired networks. What wasn't so easy was to make cellular

mobile networks thrive in environments full of metal and radio interference—until now. In June 2020, the long-anticipated release of 5G's standards for enterprise may largely remove that limitation, opening the door to 5G's implementation over the next decade in factories, warehouses, and other previously inhospitable locations.

And although not all enterprise 5G networks will be private, many organizations will have good reasons to want them to be. Unlike a public network, a private 5G network can be configured to a location's specific needs,<sup>2</sup> and configurations can vary by site depending on the type of work undertaken in each venue. A private network also allows companies to determine the network's deployment timetable and coverage quality. The network may be installed and maintained by onsite personnel, enabling faster responses to issues. Security can be higher, affording network owners a degree of control that may not be possible on a public network:<sup>3</sup> The company determines which users connect, and data can be contained within the site, which can reduce latency. The private network may even run on dedicated spectrum, reducing the risk of variable service levels due to usage by third parties.

**We expect that more than 100 companies worldwide will have begun testing private 5G deployments by the end of 2020, collectively investing a few hundred million dollars in labor and equipment.**

## HOW SECURE CAN A PRIVATE 5G NETWORK BE? IT DEPENDS WHERE YOU CRUNCH THE NUMBERS

A private 5G network has obvious privacy and security advantages over a public one—or so one might think. But just because a company owns its own network doesn't mean that data never leaves it. A company can take a variety of approaches to where it chooses to process its data, with different security and privacy implications for each.

An enterprise that wants to keep its data *wholly* onsite would need, in addition to a private network, the appropriate hardware and software to process the data locally. For machine learning computations, for example, the company would need to run its own machine learning appliance and/or equip its devices with edge artificial intelligence (AI) chips to enable them to perform those computations onsite. Other companies may be willing to have some of their data leave the private network to be processed in the public cloud. This can elevate privacy and security risks, but techniques such as federated learning, in which data is preprocessed inside the private network and only the encrypted results sent to the cloud, can help mitigate those risks.<sup>4</sup>

Where it can become more complicated is when an enterprise works with a network operator that uses a "telecom edge" architecture. In these cases, the telecom edge AI computer could be located on the telco's premises, but it would be physically close to the enterprise (less than 50 kilometers). Data could travel to and from the telecom edge computer over public networks, or it could be colocated on the company's premises inside its private 5G network, an approach known as "colo edge." It seems likely that most private 5G deployments that choose telecom edge AI approaches will use colo edge.

## 5G for enterprises: As capable as wires, but without the wires

Private 5G for enterprises will exploit new capabilities available in the next phase of the 5G standard, known as 3GPP Release 16. Release 16 aims to enable 5G to substitute for private wired Ethernet, Wi-Fi, and LTE networks, and includes multiple capabilities designed specifically for industrial environments.<sup>5</sup> The various 5G networks that launched commercially in 2019 were based on Release 15. A Release 17 that will focus on additional applications, such as 5G broadcast, is also planned for the mid-2020s.<sup>6</sup>

Release 16 includes three pillars that, in combination, equip 5G for a range of industrial environments:

- **Ultra-reliable low-latency communication (uRLLC).** With uRLLC, 5G should be able to connect controllers, switches, sensors, and actuators at latency and reliability levels equivalent to those of a wired connection.<sup>7</sup>
- **Massive machine-type communications (mMTC).** mMTC supports extremely high connection densities, enabling industrial-scale internet of things (IoT). With it, 5G will be able to connect up to a million IoT sensors and devices per square kilometer.
- **Enhanced mobile broadband (eMBB).** eMBB, which was included in Release 15, enables 5G to transmit data incredibly fast, at speeds of up to 20 Gbps.<sup>8</sup>

Release 16 also incorporates support for time-sensitive networking (TSN), which permits fixed Ethernet and 5G networks to coexist and converge.<sup>9</sup> TSN will allow 5G networks to be used for applications that are currently usually only carried

over Ethernet wireline networks.<sup>10</sup> Additionally, Release 16 should include support for unlicensed networks, which means that private 5G deployments could use spectrum in unlicensed ranges.

### 5G'S INDUSTRIAL-GRADE CAPABILITIES

5G's enhanced capabilities can take wireless connectivity where no standard has gone before, opening up many previously infeasible locations and uses. With Release 16, 5G will be capable of:

- **Connectivity speeds of hundreds of megabits per second per application**, a rate previously only available through fiber. Among other things, this is fast enough to support ultra-high-definition (UHD) video feeds running at hundreds of megabits per second each, making remote visual inspection viable.
- **A 99.9999 percent reliability rate**. This rate, also known as “six nines” reliability, implies expected downtime of a mere five minutes per year,<sup>11</sup> equivalent to the performance of fixed Ethernet networks.
- **Even greater reliability for mission-critical processes**. A 5G network can be selectively partitioned, with users able to specify the service quality provided by different network segments. This can further reduce expected downtime for top-priority applications.
- **Functioning in environments with metal obstructions**. This ability, which uses a Release 16 capability known as 5G CoMP (coordinated multi-point),<sup>12</sup> is essential for industrial applications. If a metal object, such as a crane or conveyor belt, blocks a 5G signal's path, the data can be sent via an alternative path. Multiple transmitters create redundant paths to the receiver, ensuring that the packet is delivered successfully.
- **Massive density**. 4G networks can only support a maximum of 100,000 devices per square kilometer; 5G can connect up to a million. For a 100,000-square-meter factory, this translates into the ability to connect 100,000 devices, compared to 4G's 10,000, allowing companies to connect every sensor and device in a factory. Greater density is a growing industrial need: For instance, BASF's main production facility in Ludwigshafen, Germany, currently has 600,000 networked sensors and other devices—but it would like to have 10 times more.<sup>13</sup>
- **Millisecond latency**. Under Release 16, a 5G network will be able to react in a thousandth of a second. This extremely low latency is required for some kinds of process automation and remotely controlled devices. Latency on a private 5G network can be even lower than on public networks: If the core of the private 5G network is on-premise, everything can be processed locally, whereas offsite processing would entail an additional lag—of perhaps a few milliseconds if done through a telecom edge approach, and tens of milliseconds if through a more remote data center—as the data travels to the external site and back.

5G isn't the only option for getting online, of course. In the short term (through about 2023), 5G will likely coexist with the many other cellular mobile, Wi-Fi, and wired standards that are widespread today. In fact, in the medium term (through 2026 or so), most companies will likely deploy 5G in combination with existing connectivity, including

wired Ethernet networks. However, in the long term—over the next 10 to 15 years—5G may become the standard of choice in demanding environments, when flexibility is paramount, reliability is mandatory, or for installations that require massive sensor density.

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## WI-FI AND LTE HAVE THEIR PLACE, TOO

5G may be a big leap forward for wireless, but it isn't the only technology that works. For many uses and environments, Wi-Fi and/or LTE will do just fine, and we expect companies to continue to build private networks using both (figure 1).

Wi-Fi deployment is fast, easy, and cheap compared to private cellular networks, making it an attractive choice where speed and economy are a priority. Private Wi-Fi networks are already used in factories, typically for noncritical applications. New Wi-Fi standards, including Wi-Fi 6, are being launched that offer significant enhancements. Wi-Fi 6 routers were on the market as of summer 2019,<sup>14</sup> although client devices were not yet available.

Multiple private LTE networks—based on public LTE standards, but scaled down for private deployment—are also likely to be deployed in 2020. Some companies may do this as a stopgap measure until full 5G industrial networks are available (likely starting in 2021–2022). A private LTE network, which typically uses high-caliber radio frequency equipment, can be expensive. However, the most advanced versions of LTE may be more spectrally efficient than Wi-Fi, and it also offers network slicing, although only of the radio network. LTE can also be more stable than Wi-Fi.

To date, LTE has usually been the technology of choice to enable connectivity in the most demanding industrial environments. China's Yangshan Port, for instance, uses a variant of LTE to run its fleet of automated guided vehicles (AGVs).<sup>15</sup> The advantage of LTE for this use is its greater coverage and mobility than fixed Ethernet or Wi-Fi. When fully deployed, the port will house 130 AGVs, 26 bridge cranes, and 120 rail-mounted gantry cranes, all operating remotely or autonomously. Similarly, in the United Kingdom, Ocado has deployed a private LTE network to control 1,000 fast-moving robots in a logistics center for online grocery orders. The network allows the robots to be managed from a single base station, communicating with them up to 10 times per second.

Though potentially expensive, a private LTE network can pay off economically. For instance, Nokia has used private advanced LTE networks (4.9G) to automate one of its base station factories. The LTE network has enabled IoT analytics running on an edge cloud, a real-time digital twin of operational data and internal logistics automation via connected mobile robots. According to Nokia, the use of these networks has improved productivity by 30 percent and reduced the cost of delivering products to market by 50 percent, benefits that add up to millions of euros annually.<sup>16</sup>

Continued ›

## WI-FI AND LTE HAVE THEIR PLACE, TOO—CONTINUED

FIGURE 1

### Different connectivity technologies have different strengths and weaknesses

	Wi-Fi 6	Private LTE	5G
 <b>Environment</b>	<ul style="list-style-type: none"> <li>• Office environments</li> <li>• Homes</li> <li>• Vehicles</li> <li>• Shopping malls</li> <li>• Transportation hubs</li> </ul>	All environments, including those such as mines or construction sites where public LTE networks do not exist	All environments, including industrial environments
 <b>Availability</b>	Wi-Fi 6 certification finalized in Q3 2019	Available now	Release 16 standards finalized in June 2020; initial commercialization expected from 2021 onward
 <b>Speed</b>	Up to 9.6 Gbps	Up to 1 Gbps in best cases, down to narrow-band IoT (very low speed)	Up to 10 Gbps in the initial phase
 <b>Density</b>	Designed for densely digitally populated homes and offices; Wi-Fi 6 offers a 4x improvement in dense environments over the prior standard	100,000 connections per square kilometer; enterprises can configure uplink and downlink, and set usage policies	1 million connections per square kilometer
 <b>Mobility</b>	Designed primarily for fixed locations	Roaming from private to public LTE networks; capable of handover at high speed (350 km/h relative)	Roaming from private to public LTE networks; capable of handover at high speed (500 km/h relative)
 <b>Latency and reliability</b>	> 100 milliseconds, but may not be able to guarantee low latency with high reliability as the load increases	40–50 milliseconds when managed privately using LTE-M	Ultrareliable low latency (URLLC): <ul style="list-style-type: none"> <li>• Submillisecond latency when managed privately</li> <li>• 99.9999% (six nines) reliability</li> </ul>
 <b>Frequency ranges</b>	2.4 GHz and 5 GHz at launch, extending to 1 GHz and 6 GHz	Licensed and unlicensed spectrum, including CBRS (3.5 GHz) in the United States and 5 GHz	Licensed and unlicensed spectrum, 600 MHz to mmWave (24–29 GHz and 37–43 GHz)

Sources: Mark Turner, "Wi-Fi 6 explained: The next generation of Wi-Fi," Techspot, September 17, 2019; Gabriel Brown, *Private LTE networks*, July 2017; Lauren J. Young, "Telecom experts plot a path to 5G," *IEEE Spectrum*, October 6, 2015; Yongbin Wei, *The role of 5G in private networks for industrial IoT*, Light Reading, May 22, 2019; Sacha Kavanagh, "5G vs. 4G: No contest," 5G.co.uk, September 27, 2018; Wi-Fi Alliance, *Wi-Fi 6: High performance, next generation Wi-Fi*, October 2018.

## The hotbeds of private 5G implementation

Thanks to the specifications in Release 16, 5G has the potential to become the world's predominant LAN and WAN technology over the next 10 to 20 years, especially in greenfield builds.

Those building a new factory, port, or campus may significantly reduce their usage of wired connections. The next five years will likely see a boom in private 5G implementations at locations that would greatly benefit from better wireless technology—in terms of speed, capacity, latency, and more—right now.

We predict that about a third of the 2020–2025 private 5G market, measured in dollars of spend, will come from ports, airports, and similar logistics hubs, which we expect to be among the first movers. It's not hard to see why. A major seaport, for instance, has some fixed machinery and equipment that can connect to networks over cables, but it also needs to track and communicate with hundreds of forklifts and dollies—not to mention hundreds or thousands of employees—in a controlled, sensitive, and secure environment. Further, port managers need to track multiple data points for thousands or tens of thousands of containers: exactly where each container is, whether it has cleared customs, whether it is at the right temperature, whether anyone has moved or opened it, whether anything has been removed or added, and so on. Ideally, every single high-value object in every single container could be tracked—potentially a million objects. And all this must be done in an area only about one kilometer square, filled with moving metal objects and radiofrequency-emitting devices.

For operations such as these, 5G is the clear choice. 5G works in these types of environments; all other technologies, including 4G and Wi-Fi, do not. And security, flexibility, and price considerations will likely drive these organizations to want to control their own networks.

**We predict that about a third of the 2020–2025 private 5G market, measured in dollars of spend, will come from ports, airports, and similar logistics hubs, which we expect to be among the first movers.**

Another third of the total private 5G opportunity will come from factories and warehouses. Today, these facilities operate with a mix of wired and wireless technologies, but many companies are adopting new equipment that they expect to transform their businesses—but that won't work with wires. Again, the “private” nature of these networks can offer better security, privacy, and flexibility; allow companies to develop proprietary, specialized solutions; and cost less than buying services from a public network.

Several of 5G's Release 16 capabilities will be crucial in industrial settings. Paramount among them is the ability to function in an environment filled with metal, which has stymied all prior generations of wireless technology. Another critical driver of adoption will be network slicing. Instead of allocating equal network share to each device, network slicing allows network performance to be assigned by priority. Top priority might go to remotely piloted vehicles operating at speed,

while sensors and tracking devices could make do with lower speed or higher latency.

Still another of enterprise 5G's important features is its ability to support an extremely high connection density. Every industrial screwdriver in an assembly plant or weighing scale in a hospital can become part of a massively expanded network, allowing the equipment to be better monitored and managed for higher productivity. Connecting everything can also greatly enhance simple asset management: knowing where the screwdriver is and how often it has been used since it was last serviced.

## Companies can take multiple approaches to deploying a private 5G network. The very largest companies are likely to install private 5G networks using fully owned infrastructure and dedicated spectrum.

Using 5G to communicate with and among machines, manufacturers can build flexible factories that can be reconfigured with relatively little downtime. Some factory equipment, of course, might not need to move. A traditional industrial robot arm is powerful, expensive, and may always need to be fixed in place. But companies are introducing more and more mobile elements into factories and warehouses in their efforts to improve productivity. One example is the growing use of autonomous professional service robots—machine-controlled, not driven remotely by a human operator—to take things from place to place. We predict that nearly half

a million of these devices will be sold in 2020, up 30 percent from 2019. By 2025, annual sales could exceed a million units.<sup>17</sup> These autonomous dollies will need 5G capabilities to support activities such as precise indoor navigation and positioning (within 10 centimeters).<sup>18</sup> As devices such as these become more important, factory floors will evolve into a blend of fixed and mobile equipment aimed at an ideal of complete flexibility.

The final third of the private 5G market will consist of greenfield installations, especially on campuses. In fact, many companies may initially choose to deploy 5G only for greenfield sites, creating islands of private 5G adoption among a heterogenous mix of connectivity technologies at legacy sites.

Historically, building a new facility or campus entailed designing, buying, installing, and operating a wildly heterogenous jumble of copper wires, Ethernet cables, fiber-optic cables, 3G and/or 4G cellular repeaters, and Wi-Fi equipment.

Over the next five years, however, private 5G networks will become cost-effective enough for many sites to skip wires entirely, or at least to have as few as possible. In some cases, these campuses may be temporary. For example, a private 5G network could be deployed for a few days to support a major music festival. A mobile operator may ship in a mobile network to serve the influx of 200,000 music fans, reserving a portion of capacity with specific speed and latency requirements for festival operations such as television broadcasting (with 5G replacing cabled connections), speaker connections, and emergency services.<sup>19</sup>

Companies can take multiple approaches to deploying a private 5G network. The very largest companies are likely to install private 5G networks using fully owned infrastructure and dedicated spectrum (in markets where this is permitted), managing these networks either through an in-house team or via an outsourced mobile operator. Medium-sized and smaller companies are more likely to lease network equipment, outsource network management, and sublease spectrum (geofenced to their location) from a public mobile operator—or, in some cases, use unlicensed spectrum.<sup>20</sup> A mobile operator, systems integrator, or equipment vendor may manage the network and all of its attached elements.

## 5G for industry: From cost reduction to process reinvention

Enterprises are likely to deploy 5G in stages, with initial deployments in the next couple of years largely focused on cost reduction. Some deployments may start off on public 5G networks and then be converted to private networks or vice versa.

Below are some of 5G's applications in industrial contexts. All of these applications could be deployed over public networks, but companies may stand to gain greater benefits if their networks were eventually made private.

### **A NICE-TO-HAVE FOR CONSUMERS, A MUST-HAVE FOR MANUFACTURERS?**

The first 5G launches in 2019 were aimed at consumers, in large part because the standards applicable to consumers (known as 3GPP Release 15) were available first. But first offered does not necessarily mean most useful, at least in terms of broader economic impact. Most consumers may experience only incremental benefits from 5G. It alleviates congestion in densely populated areas such as train stations, and can offer an alternative to fixed connections for home broadband, but the resulting gains in speed, convenience, and availability may be too small for many to notice.

Businesses are a different story. With the advent of Release 16 in June 2020, 5G is poised to drive massive changes in the way companies work, particularly in the manufacturing industry.

In 2020, only an estimated 10 percent of the world's machines will have a wireless connection. (This compares to the estimated 5 billion people worldwide who will have a mobile data connection by 2025—the majority of the human population.)<sup>21</sup> This means that most of today's production lines are fixed and cabled, making it time-consuming and expensive to reconfigure production lines. This, in turn, constrains the flexibility of their outputs. Physical cables attached to moving machines also weaken over time. Maintaining and replacing them is expensive, not just due to parts and labor costs, but also because of the interruption to production.

Recent manufacturing history is rife with efforts, not all of them successful, to reconcile the factory floor's inflexibility with customers' burgeoning expectations for mass personalization.<sup>22</sup> 5G Release 16, deployed in a private environment, may be the solution.

### 5G FOR CABLE REPLACEMENT

In some cases, an organization may opt for 5G simply because it is cheaper than adding additional fixed connections.

This is the rationale for Rush University Medical Hospital in Chicago, which is installing 5G in one of its older buildings.

At 100 years old, the building's architecture was simply not designed for the computer age:<sup>23</sup> Its false ceilings are already full, and there is no space for additional cables. Adding wires to the building would cost millions of dollars more than connecting it with 5G, which offers equivalent connectivity and greater flexibility. That's not to say that Rush is indifferent to 5G's potential for newer buildings—the hospital is also designing a new 11-story facility with 5G connectivity at its heart.

### 5G FOR REMOTE CONTROL

5G can also be used to control facilities remotely. For example, a small farm in the United Kingdom plans to use 5G to create a “hands-free hectare”—a fully automated farm.<sup>24</sup> Remote-controlled machines, such as tractors and drones, will be used to sow, maintain, and harvest crops. Extra sensors at ground level provide additional information.

Similarly, one Japanese company uses 5G to connect drivers, based in a Tokyo office building, to a mechanical digger at a construction site tens of kilometers away.<sup>25</sup> Video streams from multiple 4K cameras relay the digger's surroundings at 5G speeds. The driver can thus control the digger without having to sit cramped in a cab, possibly in arduous weather conditions, or having to commute to a distant site. Besides the advantages in comfort and convenience, remote-controlled machinery can allow aging or disabled individuals to remain economically active—an important benefit in countries such as Japan with aging populations.

**Besides the advantages in comfort and convenience, remote-controlled machinery can allow aging or disabled individuals to remain economically active—an important benefit in countries such as Japan with aging populations.**

Some ports are also looking at using cellular mobile to monitor autonomous guided vehicles or to control cranes remotely, as well as for video surveillance. In Rotterdam, Netherlands, 5G-connected ultra-high-definition cameras enable visual inspection of a 160,000-kilometer pipeline network.<sup>26</sup> In Tianjin, China, 5G-connected drones have been used to inspect electric power lines.<sup>27</sup>

### 5G FOR NEW DEVICE CATEGORIES

The full 5G standard may enable some relatively niche, nascent device form factors to attain their full potential. Augmented reality (AR) and virtual reality (VR) goggles are two examples. As of 2019, sales of AR goggles in both consumer and enterprise contexts were estimated to be in the hundreds of thousands,<sup>28</sup> as were sales of VR goggles for industrial use.<sup>29</sup> 5G's high-speed, reliable connectivity could allow these devices to process images in the cloud rather than locally, greatly improving the user experience. In trials, 5G has been able to deliver images to VR goggles with a 2880-by-1600-pixel display (equivalent to between HD and 4K resolution) with a refresh rate of 75 frames per second.<sup>30</sup> This rapid frame rate is necessary to minimize goggle-related motion sickness.<sup>31</sup>

Of their possible enterprise applications, AR and VR goggles may be especially useful for maintenance. Maintenance workers could don high-caliber AR goggles to access automated assistance in the field, for instance, with AR overlays guiding workers around the equipment.<sup>32</sup> VR, too, could be used for remote maintenance, relaying images from 360-degree spherical cameras.

### 5G FOR PRODUCTIVITY IMPROVEMENT

By improving the efficiency of existing processes, 5G has the potential to drive huge productivity gains. One trial by Worcester Bosch in the United Kingdom found that private 5G enabled a 2 percent productivity improvement for some applications, double what was expected. To put this figure in context, 2 percent improvement is equivalent to the United Kingdom's average productivity gain over the whole of the past decade.<sup>33</sup>

The manner in which 5G can help improve processes is constrained only by human ingenuity. At one manufacturing plant in Helsinki, for instance, a 5G-connected camera provides real-time feedback to staff assembling low-voltage drives. The camera's video feed is analyzed using machine vision,<sup>34</sup> and any assembly errors trigger an instant alert. An absence of alerts reassures workers that the assembly is perfect. The machine vision application also guides workers on ergonomically correct body and hand positions for assembly.

Ericsson is using 5G to automate the maintenance of about 1,000 high-precision screwdrivers based on utilization levels. Previously, workers had to manually calibrate and lubricate the screwdrivers, using a paper-based system to track when service was needed. Adding motion sensors to quantify screwdriver usage, along with narrowband internet of things (NB-IoT) modules for connectivity, has enabled Ericsson to automate the process, cutting annual workload by 50 percent.<sup>35</sup>

### 5G FOR PROCESS REINVENTION AND NEW OPERATING MODELS

Perhaps 5G's most compelling aspect is its ability to contribute to fundamental process redesign, particularly in manufacturing. 5G technology is arriving at a time when manufacturing, in many markets, is looking to reinvent itself. For many companies, the timing could not be better.

Take the automobile industry as an example. Car buyers today expect, and will pay for, personalization in their vehicles. While vehicle manufacturers are offering an ever-widening range of car models and subcategories to meet this demand, assembly lines need to be more flexible to



accommodate their manufacture. In response to this need, Mercedes has created a template for a new type of factory based on a flexible production line, called “TecLine.” Mercedes’s TecLine facility, equipped with 5G, houses a flexible assembly line composed of 300 driverless systems. Rather than moving step by step down a linear assembly line, builds in progress are carried by autonomous transport systems to different areas of the factory, with the appropriate parts brought to each station by intelligent picking systems.<sup>36</sup>

Bosch Rexroth is taking this concept even further. It is building a factory in Xi’an, China, in which only the walls, floors, and ceiling are fixed; everything else is mobile. Assembly lines are modular, with their constituent machines—communicating with each other over 5G—autonomously moving and reconfiguring themselves into new production lines.<sup>37</sup>

Other industries can reinvent processes using 5G as well. A 5G-equipped hospital, for instance, could connect many more devices than was formerly possible, and the devices would remain connected even if they were moved around. Medical instruments, from scales to blood pressure cuffs, would no longer need to stay in a fixed location to be connected,<sup>38</sup> while doctors could access more sophisticated remote imaging and diagnosis capabilities from these devices.

## Private 5G follows in the footsteps of the private branch exchange (PBX)

In the early days of enterprise telephony, when the sole application was voice calls, a company that wanted each of its 10 employees to have a different

phone number needed to provision and pay for 10 separate lines. If one employee wanted to make an internal call—for example, a call to a colleague five meters away—the call was routed from that employee’s phone out of the building, to the telecommunications operator’s central office switching center, and then back into the building to the colleague’s office. This was neither cheap nor efficient.

The 1970s saw the development of an alternative solution: an automated private branch exchange (PBX). A PBX is a telephone switch that resides inside the business’s premises. Each internal phone has its own extension number. With a PBX, internal calls never leave the office: It is, in effect, a private network, which connects to the public network only for external calls. A business can lease or rent a PBX from the telephone company, which maintains and services it for a monthly charge or, from the 1990s, the business could buy and maintain its own PBX. A PBX offers various benefits and features (hold music, for example) not available on public network lines, and also offers cost savings.

In the early days of the PBX, almost every company left installing and maintaining PBXs to the telephone company. It took decades for the enterprise-owned and -operated PBX market to take off.

By 1988, the US PBX market amounted to nearly 5 million phone lines annually.<sup>39</sup> The launch of internet protocol PBX (IP PBX) technology in 1997 allowed enterprises to use PBXs for local and even long-distance calls as well as internal calls, enabling them to offer even more features and reduce costs even further.<sup>40</sup> IP PBXs enable a company’s geographically dispersed sites to be

part of a single nationwide, or even multinational, voice network.

Like a PBX, a private 5G network is internally self-contained, but it also needs to be connected to the external network. It can work in partnership with a telco on a managed service basis, or it can be

entirely run by the enterprise. It enables features as well as many benefits that are not available on public 5G, and it may offer cost savings.

We expect that in the early days of private 5G, most companies will opt to leave it to the experts: the operators who also run the public 5G networks.

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## THE BOTTOM LINE

Businesses have always been disrupted by successive generations of communications technology improvement. 5G's Release 16, however, could be the most disruptive mobile technology yet. Its broader adoption for private networks has implications for many types of companies.

For mobile operators, the growth of private 5G networking can mean additional revenue. Operators supporting private 5G deployments have an opportunity to bring their network management skills to individual companies, especially small and medium-sized businesses to establish and operate private networks. In some markets, they may be able to sublease their spectrum in specific geofenced locations. To effectively tap into these opportunities, mobile operators will need to build vertical sector capabilities or partner with companies with sector-specific knowledge. Each sector—indeed, each deployment—will likely have a custom set of needs and applications, each requiring a different combination of performance attributes such as speed, latency, and reliability.

For network equipment vendors, the private 5G prize is a much-expanded market into which to sell cellular mobile equipment. One (admittedly hyperbolic) estimate projects that private wireless networks could eventually account for up to 14 million cellular base stations, which would be more than double the 7 million base stations currently operated by the world's public mobile operators (although the price per site for enterprise cellular is likely to be lower than for public).<sup>41</sup> Additional revenue opportunities can come from companies' needs for service and support to maintain their private 5G networks. Vendors will need to determine whether to sell directly to companies or to partner with mobile operators, often as part of a consortium.

Regulators should determine how much, if any, spectrum to make available to companies' private networks. In some markets, regulators may need to decide whether to allocate spectrum directly to companies or to distribute it through mobile operators. Regulators should also consider at which frequency bands to make spectrum available.

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Hundreds of thousands of companies are likely to deploy private cellular networks over the next decade. Some may simply swap some or all their cables for wireless, but potentially much more rewarding—though more challenging—would be to pair private 5G deployment with process change and business model redesign. As more and more

companies undertake transformations on the back of 5G, the shape of industry itself will alter, perhaps dramatically. If and when that happens, history will likely view 5G not just as a technological marvel, but as an elemental force that reshaped the way companies do business. ●

### SPECTRUM BANDS FOR PRIVATE 5G

The performance of private 5G networks will depend on the quantity and ranges of spectrum available. Mid-band spectrum (1–6 GHz) works well in indoor environments, enabling wide coverage with a relatively small number of transmission points. Millimeter-wave spectrum (24–29 GHz, 37–43.5 GHz, and 66–71 GHz) offers higher speeds and lower latency, and its signals are easier to contain within a building, thus lessening the potential for interference with macro mobile networks. However, it requires denser radio deployment than mid-band.

Many approaches to spectrum for private mobile networks are currently deployed, in trial, or under consideration. These include:

- 5G in licensed spectrum. In this approach, which has been adopted in Germany,<sup>42</sup> spectrum may be allocated to an individual company or managed by an operator.
- LTE in licensed spectrum.
- Standalone LTE in unlicensed spectrum (MulteFire). This is the current approach in Japan, where the plan is to eventually migrate MulteFire to 5G NR.
- LTE in shared spectrum (e.g., Citizens Broadband Radio Service band [CBRS] in the United States). This operates at 3.5 GHz in the United States, where the US Federal Communications Commission has set up a three-tiered spectrum-sharing framework.
- Standalone 5G in unlicensed spectrum (MulteFire). One example is NR-U, with standalone and nonstandalone modes of operation in the 5 GHz and 6 GHz bands.

**PAUL LEE** is a UK partner and the global head of research for the technology, media, and telecommunications (TMT) industry. He is based in London.

**MARK CASEY**, a partner with Deloitte Netherlands, is Deloitte's global leader for the telecommunications, media, and entertainment industry. He is based in Amsterdam.

**CRAIG WIGGINTON**, a partner with Deloitte & Touche LLP and vice chairman, Deloitte LLP US, leads the telecommunications industry for the United States, the Americas, and globally. He is based in New York City.

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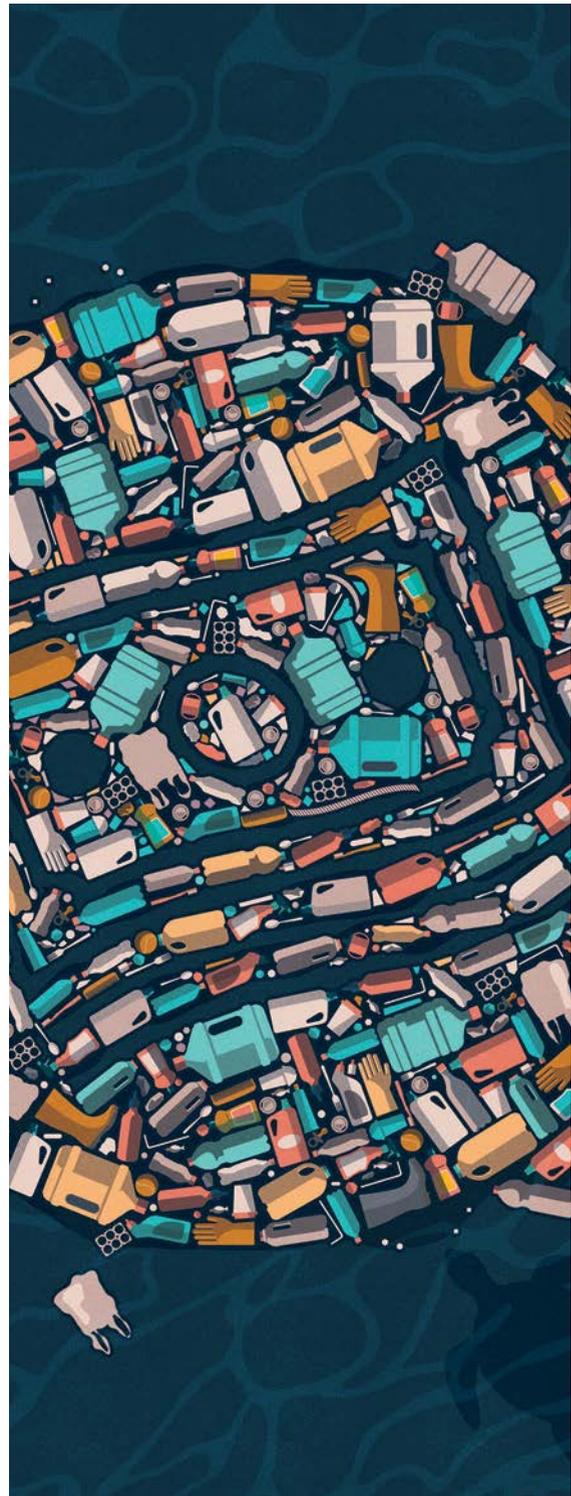
# Marine plastic pollution

## THE HEFTY COST OF DOING NOTHING

**P**LASTIC WASTE FLOWING from rivers into oceans around the world has reached an estimated 0.8–2.7 million metric tons per year.<sup>1</sup> Awareness of the harmful impact has led to several initiatives from governments and volunteers aiming to curb the problem. The ability to objectively quantify the impact of marine plastic pollution could enable the construction of effective and efficient frameworks to assess solutions for controlling or preventing the buildup of marine litter at the source itself before it enters the oceans.

In collaboration with The Ocean Cleanup under the Impact Foundation, Deloitte Netherlands developed an economic assessment model to quantitatively estimate the impact of land-sourced marine plastic on key economic sectors linked to the blue economy.<sup>2</sup> By compiling information from existing research literature across Europe, Asia, Africa, Middle East, and the Americas, our model highlighted that marine plastic pollution could have resulted in an annual economic loss of up to US\$19 billion for 87 coastal countries in 2018. Although staggering, this number could be conservative, as the economic loss relates to inhabited coastlines, and only selected industries linked to oceans were scoped in to study the impact.

The model indicated that the highest costs generally arise from cleanup activities, which relate



directly to government spending. Because government-sanctioned cleanup activities are typically systematic with dedicated budgets, governments are generally the primary orchestrators of cleanup activities and the bearers of associated costs. With the scope of our analysis limited to selected coastal countries, we identified four primary cleanup areas: coastlines, rivers/other waterways, marinas, and ports. According to the costs estimated by the model,<sup>3</sup> cleaning stranded or floating plastic waste from inhabited coastal areas would have cost US\$5.6–15 billion in 2018.

The second direct cost estimated by the model<sup>4</sup> is related to marine tourism: The industry potentially lost an estimated US\$0.2–2.4 billion in revenue in 2018. The aesthetic value of the environment can be greatly affected by mismanaged waste. Stranded debris can also cause injuries and long-term health concerns for humans. Whether tourists are turned off by health/safety risks or just the prospect of an unpleasant experience, a reduction in tourism activity has caused a snowball effect, and tourism-associated businesses are seeing a loss of livelihood.

The third direct cost is being felt by fisheries and aquaculture businesses, which lost US\$0.3–4.3 billion in revenue in 2018, as estimated by the model.<sup>5</sup> The presence of plastic debris in water bodies has an adverse effect on marine biodiversity. Not only can this affect local ecosystems and the food chain, but it can also harm fishery reserves which are typically the main source of sustenance for the fisheries sector. The degradation of water quality tends to compound the problem by creating unfavorable conditions for aquaculture. Fish larvae can have high mortality rates and are sensitive to water quality and nutrient feed. Any slip in their survival rates can result in significant economic losses for the fisheries and aquaculture industry.

We further studied the waste management value chain in coastal countries that have higher volumes of waste leakage. A responsible, well-established waste management infrastructure allows for waste collection, transportation, sorting, and processing—ideally recycling—in a way that keeps plastic from ending up back in the environment. We found that the challenge is exacerbated by the fact that the countries with the highest outflow of river plastics typically have underdeveloped and/or underfunded plastic disposal options, as well as substantial leakage. While the public and private sectors have made some efforts to address this issue, more commitment is likely needed to act locally.

The financial impacts of marine plastic pollution emphasize the incentive to remove river plastic. The field is wide open for potential heroes, from government to development agencies to corporates. The prospect of involvement for all seems win-win: Cut the cost of plastic waste and earn a reputation for taking action. ●

**To learn more, read the full report, *Marine plastic pollution: The hefty cost of doing nothing*, on [www.deloitte.com/insights/marine-pollution](http://www.deloitte.com/insights/marine-pollution).**



RESPONSIBLE BUSINESS

# The sustainability transformation

LOOK AHEAD, LOOK INSIDE,  
AND LOOK AROUND

SARAH KERRIGAN AND DULEESHA KULASOORIYA

ART BY LIVIA CIVES



Climate change is a crisis of unprecedented magnitude that threatens to multiply a broad range of sustainability risks. Organizations are under increasing pressure to respond. Many will need to sustainably transform their business models to find new opportunities and avenues for growth for their future business.

In examining organizations that have started down this path, we have identified three basic actions that have enabled them to turn sustainability from a risk into an opportunity. First, they look *ahead* to understand how they can capture new growth opportunities from sustainability. Second, they look *inside*, within their business, to find ways to reconfigure their operations to help accelerate the transformation toward greater sustainability. Finally, they look *around* for opportunities to leverage their business ecosystem to help create competitive advantage in a sustainability-focused world. In this article, we explore what each of these actions entails, drawing lessons from some companies focused on sustainability.

## Reaching the point of no return

The experience of Unilever over the last decade demonstrates that, despite financial headwinds, undertaking a sustainability transformation can create meaningful business value.

When Paul Polman took the reins as Unilever CEO during the global financial crisis, the firm was undergoing one of the most tumultuous periods of its 150-year history. In his first year, Polman created the Unilever Sustainable Living Plan, a decade-long scheme to double the company's revenue while simultaneously reducing its environmental footprint and increasing its social impact. But the Sustainable Living Plan wasn't

“just” a sustainability plan. It was a business plan to grow Unilever's sustainable brands, drive innovation, and attract and retain talent.<sup>1</sup> During Polman's 10-year tenure (2009–2019), the company delivered consistent top- and bottom-line growth. His commitment to sustainably transform Unilever created excellent returns for its shareholders, delivering a total shareholder return of 290 percent.<sup>2</sup>

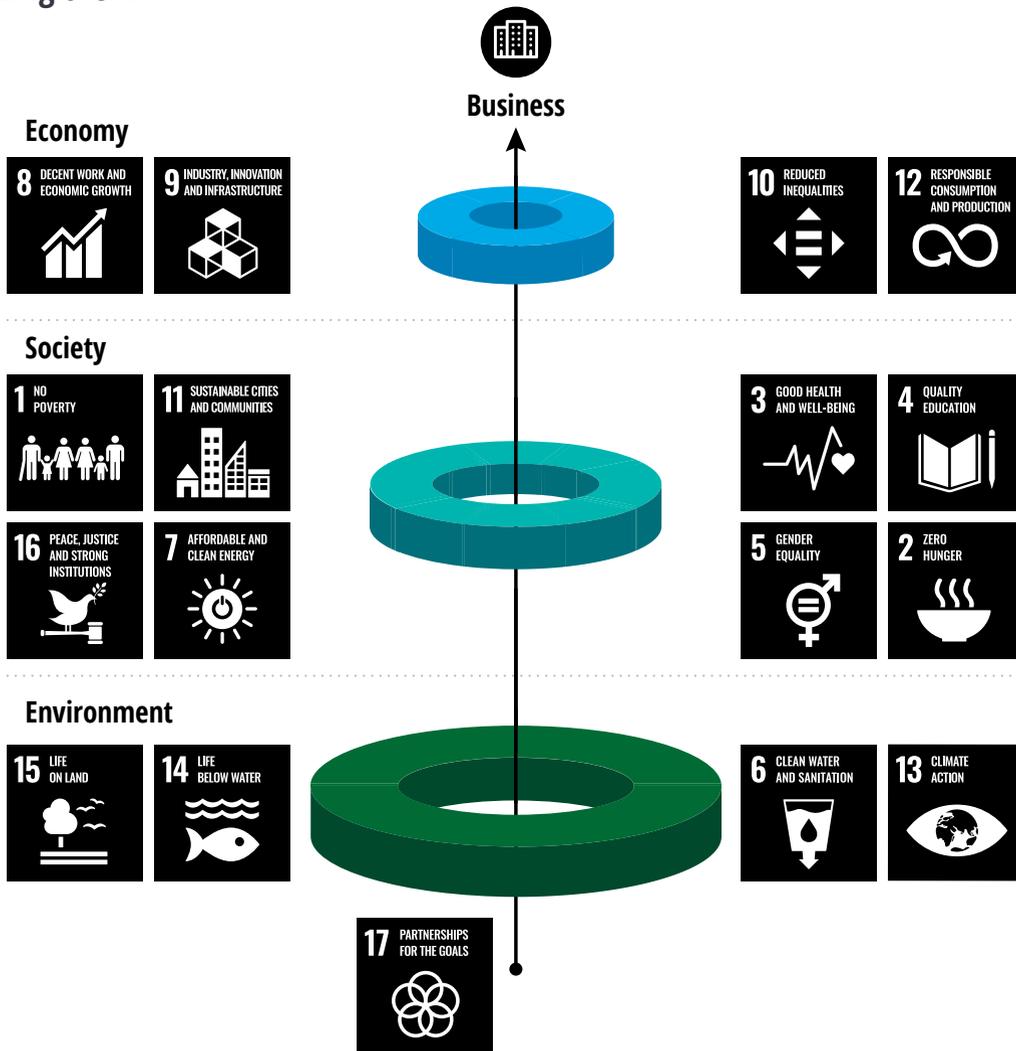
Polman has long held the conviction that expectations are changing, insisting that business leaders need to take a more active role in tackling the sustainability agenda to protect their future business.<sup>3</sup> That sustainability agenda, as articulated by the 17 United Nations (UN) Sustainable Development Goals (SDGs), recognizes that businesses are an essential partner for addressing the SDGs, from contributing finances to providing products and services that address sustainability (figure 1).<sup>4</sup>

The 17 UN SDGs are interdependent and interconnected. The climate crisis threatens to disrupt water supplies, food production, and energy security, harming the livelihoods and incomes of many.<sup>5</sup> In late 2019, UN Secretary-General António Guterres warned that a “point of no return” for climate change is “in sight and hurtling towards us.”<sup>6</sup>

Yet crises can also be profound catalysts for change, creating opportunities to gain new perspectives. Businesses that see climate change—and

FIGURE 1

The UN's SDGs are interdependent, with business playing a critical role in realizing them



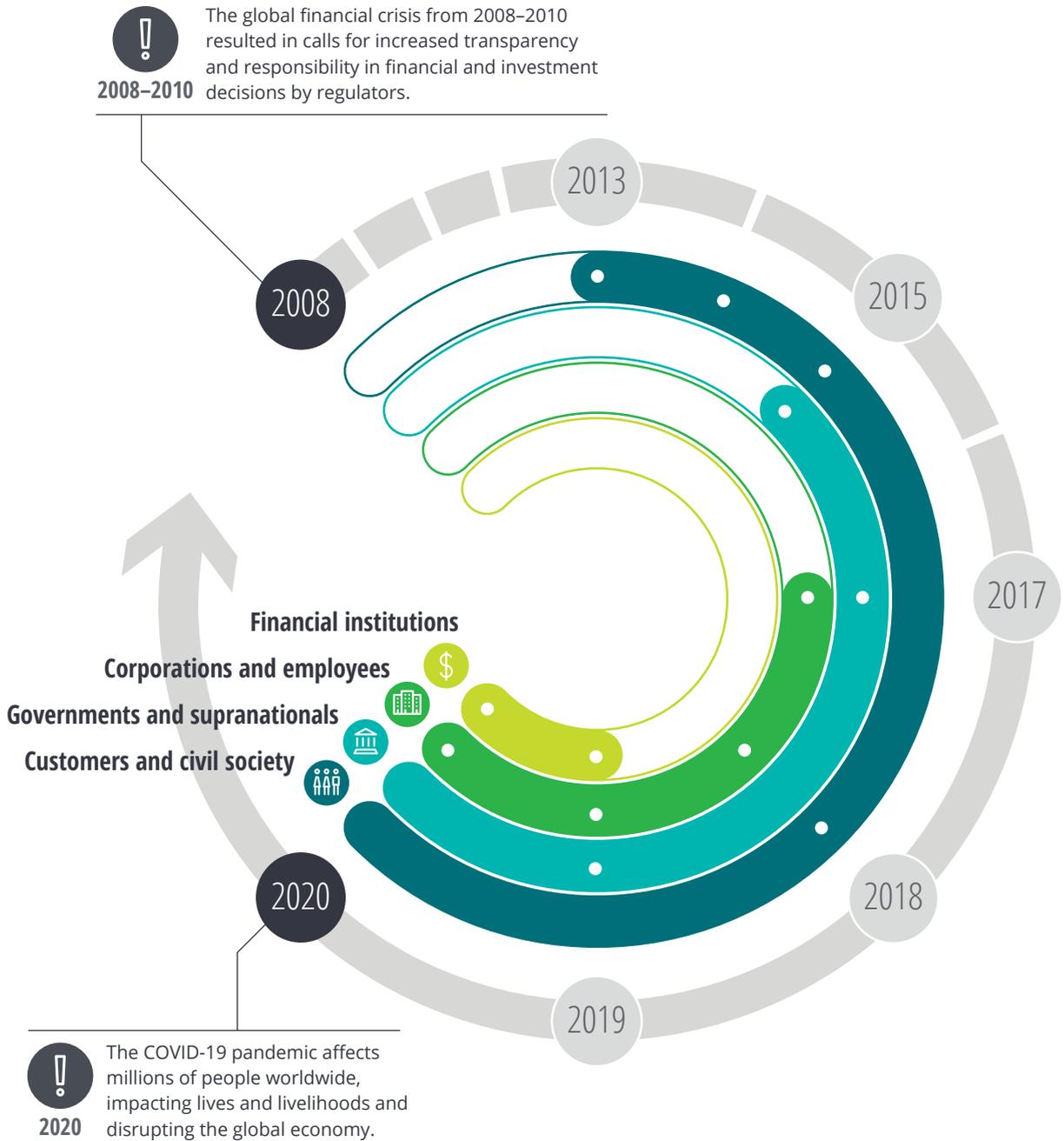
Source: Adapted from Stockholm Resilience Centre, "Contributions to Agenda 2030," accessed April 18, 2020.

sustainability—not only as a threat but as an opportunity might be best placed to unlock new innovations and ignite unexpected collaborations. Businesses may need to transform themselves to thrive in an era where tackling sustainability is becoming an imperative.

New business pressures toward sustainability make this imperative critical. The combined actions of a range of parties—including communities, consumers, employees, regulators, corporations, and, recently, financial institutions—suggest that the momentum toward sustainability is reaching a tipping point (figure 2).

FIGURE 2

**The momentum behind sustainability is accelerating**



Source: Various public sources.



## Customers and civil society

- 2013** Collapse of the Rana Plaza apparel factory in Dhaka, Bangladesh kills 1,132 workers and awakes the world to poor labor conditions in the global apparel supply chain.
- 2014** Exposé of debt bondage, trafficking, and abuse of migrant workers in the Thai fishing industry implicates global supermarket retailers in modern slavery.
- 2015** World leaders adopt the 2030 Agenda for Sustainable Development calling for urgent collective action to address the United Nations' 17 SDGs.
- 2018** Greta Thunberg stages a protest in August 2018 outside the Swedish Riksdag (parliament), holding a sign that read "Skolstrejk för klimatet" ("School strike for climate"), sparking a global movement in youth climate activism.



## Governments and supranationals

- 2015–2020** New legislation, including the UK Modern Slavery Act (2015), French Duty of Vigilance Law (2017), Australian Modern Slavery Law (2019), and Dutch Child Labor Due Diligence Law (2020), call on companies to tackle social and environmental harms in their extended supply chains.
- 2015** Countries adopt the Paris Agreement at the COP21 in Paris, committing to limit global temperature rise to below 2 degrees Celsius and striving for 1.5 degrees Celsius.
- 2017** Launch of Network of Central Banks and Supervisors for Greening the Financial System (NGFS), with the aim of mobilizing mainstream finance to support the sustainability transition.
- 2019** The European Banking Authority (EBA) launches its Sustainable Finance Action Plan, which sets out its approach to integrate environmental, social, and governance (ESG) considerations into its risk management policies.



## Corporations and employees

- 2017** More than 100 companies with a combined market cap of more than US\$3.5 trillion and financial institutions responsible for assets of more than US\$25 trillion publicly commit support for the Task Force on Climate-Related Financial Disclosures (TCFD).
- 2018** Patagonia CEO Yves Chouinard announces in November 2018 that he would channel US\$10 million the company received through corporate tax cuts to protecting air, land, and water and finding solutions to the climate crisis.
- 2019** The Business Roundtable updates its decades-old definition of the purpose of a corporation; nearly 200 CEOs agree to eliminate its bedrock principle that shareholder interests must be placed above all else.
- 2020** Amazon CEO Jeff Bezos commits US\$10 billion to address climate change through the establishment of the Bezos Earth Fund.
- 2020** Corporate leaders of major international brands take a stand on racial injustice by speaking out in support of Black Lives Matter, a political and social movement that campaigns against violence and systemic racism toward Black people.



## Financial institutions

- 2019** World's largest pension funds and insurance companies representing US\$2.4 trillion in AUM commit to transition their portfolios to become carbon-neutral by 2050.
- 2019** Goldman Sachs pledges US\$750 billion across investing, financing, and advisory activities by 2030 to accelerate the climate transition and advance inclusive growth.
- 2020** Principles for Responsible Investment (PRI), an international network of responsible investors, hits 500th asset owner signatory milestone. PRI signatories, now representing over US\$90 trillion in AUM, commit to mainstream sustainable finance.
- 2020** BlackRock CEO Larry Fink publishes letter to CEOs signaling the fundamental reshaping of finance.

**Financial flows are being redirected toward sustainable practices.**

An important shift motivating change in business behavior has been the redirection of financial flows as investors, lenders, and insurers increasingly realize that sustainability risks generate financial risk. Investors, in particular, are playing a central role in accelerating capital flow toward sustainable funds. In 2019, sustainable funds in the United States attracted more than US\$4 billion per quarter. Prior to this, flows had never topped US\$2 billion in any quarter.<sup>7</sup> For investors, climate change is taking center stage. At the United Nations' (UN's) annual climate conference in 2019, more than 630 investors, collectively managing over US\$37 trillion in assets, signed a statement urging companies to take stronger action to address climate change, including phasing out coal and supporting the transition to a lower-carbon future.<sup>8</sup> Larry Fink, CEO of BlackRock, the world's largest institutional investor with US\$7.4 trillion in assets under management (AUM), has been a prominent advocate of this shift, stating in January 2020 that climate change has brought businesses to "the edge of a fundamental reshaping of finance."<sup>9</sup>

## An important shift motivating change in business behavior has been the redirection of financial flows as investors, lenders, and insurers make the connection that sustainability risks generate financial risk.

**Regulations are increasingly supporting the adoption of sustainable business practices.**

Governments have numerous regulatory tools at their disposal to shape business practices, and they

are increasingly using their regulatory authority to urge companies to adopt sustainable business practices. For example, in 2017, the French government enacted new regulations requiring that French multinational companies identify and prevent adverse sustainability impacts resulting from their own activities *and* the activities of their subcontractors or suppliers.<sup>10</sup> Additionally, we have seen supranational organizations such as the World Bank Group urge governments to adopt COVID-19 stimulus packages that will promote sustainable growth.<sup>11</sup>

**Growing worker activism is pushing employers toward sustainability.**

Workers are emerging as a newly empowered and vocal group with the ability to materially influence a company's strategy and reputation. More than ever, workers are calling out perceived hypocrisy among their employers, such as donating funds to climate action while still investing in carbon-intensive industries. Companies are experiencing a growth in worker petitions, strikes, and walkouts over inaction on sustainability. Companies that fail to meet employee expectations on sustainability may

see talent shortages or problems with engagement: Deloitte Global's 2019 millennial survey found that millennials and Gen Zs show deeper loyalty to employers that boldly tackle environmental and social issues that resonate with them.<sup>12</sup>

**Customer preferences are tilting toward sustainable products and services.**

Continued changes in consumption and purchasing patterns are trending toward a greater overall emphasis on sustainable products and services. This trend is especially noticeable among

millennials and Gen Zs. Deloitte Global's 2019 millennial survey found that 42 percent of millennials decided to purchase a company's products or services because they perceived it to have a positive impact on society or the environment.<sup>13</sup> These shifts in consumer behavior are creating market opportunities for sustainable alternatives. For instance, by 2028, the used-fashion market is set to skyrocket in value to US\$64 billion in the United States, while fast fashion is expected to only reach US\$44 billion.<sup>14</sup> Similarly, meat alternatives—plant-based meat substitutes—are expected to become a US\$140 billion global industry in the next decade.<sup>15</sup>

These pressures are elevating sustainability as a priority among executives and boards. Shifting attitudes have made it an imperative for companies to place sustainability at the heart of their strategies. Indeed, the statement on corporate purpose issued by the Business Roundtable in

2019<sup>15</sup> stresses that businesses have an obligation to create value for their customers, employees, suppliers, and communities in addition to shareholders.

A number of high-profile business leaders have recently publicly committed to tackling sustainability issues, with a particular focus on climate change. In February 2020, Amazon CEO Jeff Bezos committed US\$10 billion to address climate change through the establishment of the Bezos Earth Fund,<sup>17</sup> while Patagonia CEO Yvon Chouinard announced in November 2018 that he would channel US\$10 million the company received through corporate tax cuts to protecting air, land, and water and finding solutions to the climate crisis.<sup>18</sup> These events illustrate business leaders' increasing concern about the climate crisis, as well as the willingness of some to invest in doing something about it.

### **BLACKROCK LEADS IN CALLING FOR CHANGE**

In his 2020 annual letter to CEOs, BlackRock CEO Larry Fink called upon every government, company, and shareholder to confront the "new climate reality." BlackRock also announced it would remove companies generating more than 25 percent of their revenues from thermal coal production from its investment portfolios.<sup>19</sup>

Fink used his 2020 letter to signal to the market that investors are realizing that climate risk creates investment risk and that, therefore, organizations should anticipate "in the near future ... a significant reallocation of capital."<sup>20</sup> He noted that companies that fail to integrate sustainability and climate considerations into their businesses risk being left behind as investors and businesses shift to a low-carbon economy, warning them that such firms may be profitable in the short term, but that negative externalities would catch up with them and destroy shareholder value in the long run.<sup>21</sup> Fink emphasized BlackRock's conviction that sustainable and climate-integrated portfolios will provide better risk-adjusted returns to investors, making them a key focus for BlackRock going forward.

Fink reaffirmed BlackRock's commitment to sustainability in a March 2020 letter to shareholders, saying that "the pandemic we're experiencing now highlights the fragility of the globalized world and the value of sustainable portfolios." Noting that "we've seen sustainable portfolios deliver stronger performance than traditional portfolios during this period," Fink sees an opportunity to accelerate the trend toward sustainable investment as the global economy recovers from the COVID-19 crisis.<sup>22</sup>

## Toward a more sustainable enterprise

We have identified three business strategies that can guide the sustainable transformations of future-thinking companies:

- **Look ahead.** Understand what threats and, more importantly, opportunities the pressures toward sustainability present for the future of the business.
- **Look inside.** Consider how business operations could be reconfigured to accelerate the transformation toward greater sustainability.
- **Look around.** Leverage the surrounding business ecosystem to create competitive advantage.

### LOOK AHEAD TO YOUR FUTURE BUSINESS

Businesses that want to succeed in the future need to look ahead to the future. Executives need to be aware of the shifts taking place and understand how growing sustainability expectations may shape their company's and industry's future.

Some business leaders may need to pull themselves out of the short-term thinking that is often driven by pressures for quarterly performance, and not lose sight of how they can create lasting value over the long term. Encouraging this kind of thinking can sometimes take radical forms. At Unilever, one of Polman's first actions as CEO was to end quarterly reports and earnings guidance, urging shareholders to focus on the long-term health of the business. Although the decision was heavily

criticized and shares plunged by 8 percent, Unilever's strong performance over the next decade demonstrates that such a longer-term focus can be an effective way to manage a business.<sup>23</sup>

An example of looking ahead to identify these risks and opportunities comes from the energy industry, particularly coal, oil, and gas companies. In 2019, an estimated 6 million people in more than 180 countries, in probably the biggest climate protest in history, took to the streets to demand far more action to cut greenhouse gas emissions.<sup>24</sup> By the end of that year, more than 450 investors representing more than US\$40 trillion in AUM signed the Climate Action 100+ initiative, which is committed to pressurizing the largest corporate greenhouse gas emitters to "curb emissions, improve governance, and strengthen climate-related financial disclosures."<sup>25</sup>

## Executives need to be aware of the shifts taking place and understand how growing sustainability expectations may shape their company's and industry's future.

Investor pressure is pushing the clean energy transition forward in the fossil fuel industry, threatening its profitability while also creating avenues for new business models. As an example, in December 2019, Goldman Sachs announced a US\$750 billion commitment to drive global climate transition and inclusive growth strategies.<sup>26</sup> BlackRock announced in January 2020 that it had raised US\$1 billion for its Global Renewable Power III fund, which will focus on renewable power generation and energy storage and distribution.<sup>27</sup> It is expected that investment in solar, wind, and

other green energy technologies will double over the next decade, with the world on pace to hit US\$2.6 trillion for renewable energy investments by 2030.<sup>28</sup> A growing number of startups are responding to this opportunity by entering the renewable energy industry, aiming to gain ground while older companies work to adapt.

A number of incumbent energy companies have begun to reinvent themselves in response to these pressures. The Danish company Ørsted, for instance, is moving from coal to renewable sources of generation to meet growing demands for renewable energy. A decade ago, Ørsted was one of Europe's most coal-intensive energy companies. Today, Ørsted is in the midst of shifting entirely to high-growth renewable energies such as wind, solar, and storage solutions. The company estimates that it will completely phase out the use of coal by 2023 and generate almost 100 percent of its energy from green sources by 2025.<sup>29</sup>

As the energy industry's experience illustrates, the sooner a business can look ahead, the more likely its chances of turning future disruptions into new opportunities. These new opportunities have the potential to support a range of business models while answering societal needs. For instance, circular businesses that strive to minimize waste, regenerative businesses that may restore land, and inclusive businesses that aim to alleviate poverty.

To identify these opportunities, we recommend an approach termed “zoom out/zoom in.” In this

approach, strategic planners “zoom out” beyond the short-term time horizons typical of strategy planning to take a longer-term view of 10 to 20 years ahead.<sup>30</sup> Having understood what this future could hold, they then “zoom in” back to the immediate future to identify actions within the next six to 12 months that can help the business reach that future destination.

Scenario planning can be a useful tool in this exercise for illuminating possible futures for which to prepare. For instance, Royal Dutch Shell's SKY scenario, developed in 2018, illustrates a technologically, industrially, and economically viable route to limit global average temperatures to below 2 degrees Celsius.<sup>31</sup>

#### LOOK INSIDE FOR WAYS TO ACCELERATE YOUR TRANSFORMATION

With a longer-term narrative in place, executives can look inside their business to see what initiatives they could launch today to accelerate the path toward that future. Depending on the magnitude of the sustainability risks and opportunities they face, some companies may find that they need to go beyond integrative approaches—which seek to weave sustainability into *existing* business models, strategies, products, and services—to transformative approaches in which sustainability considerations drive the design of *new* business models, strategies, products, and services.

Organizations that take a transformative approach to sustainability have made several characteristic shifts to think and act differently (figure 3).



FIGURE 3

## Several key shifts characterize companies that take transformative approaches to sustainability



Source: Deloitte analysis.

By viewing sustainability through the lens of growth and opportunity, businesses have been able to apply their creativity and innovation to tackle some sustainability challenges while also opening up new business models, strategies, products, and services. By innovating for sustainability, businesses can also identify ways to accelerate toward their future business, as illustrated by the following examples:

**Opportunity-focused: Volkswagen embraces opportunity in the electric vehicle market.** By 2028, Volkswagen plans to sell 70 models of fully electric vehicles (EVs). Volkswagen anticipates producing 22 million EV units by 2030, when EVs are expected to comprise 40 percent of the automaker's offerings.<sup>32</sup> The automotive manufacturer, one of the most aggressive movers into the electric car market, intends to leverage the increased demand for EVs as a new market expansion opportunity.

**Transparent: Olam International enhances supply chain transparency through the development of a sustainable and traceable sourcing solution.** Agribusiness Olam International is meeting growing consumer demand for transparent and sustainable food supply chains through its subscription platform AtSource. The platform offers subscribers a line of sight into the environmental and social footprint of raw ingredients by providing access to a range of metrics and insights into the efforts underway to improve sustainability performance.<sup>33</sup>

**Purpose-driven: Patagonia paves the way for purpose-driven businesses.** Patagonia is the first B Corp in California, a certification that designates any company with "an explicit social or environmental mission and a legally binding fiduciary responsibility to take into account the

interests of workers, the community, and the environment."<sup>34</sup> Its purpose-driven strategy has driven the brand's differentiated business model to new heights as the company has developed a strong following, earning over US\$1 billion in annual revenue by 2018 and increasing the legitimacy of mission-centric companies.<sup>35</sup>

**Ecosystem-focused: The Ellen MacArthur Foundation's Make Fashion Circular initiative promotes collaboration and innovation among leading apparel brands.**

This industry initiative brings together industry leaders, including Burberry, Gap Inc., H&M Group, HSBC, PVH, Stella McCartney, and other key stakeholders to stimulate collaboration and innovation at scale across the textile economy to reduce waste and pollution. For instance, one effort sponsored by the initiative, The Jeans Redesign project, is working with brands, manufacturers, and fabric mills to launch renewable jeans products.<sup>36</sup>

**Collaborative: Mars Incorporated identifies new routes to market through a collaborative business model management innovation.**

Consumer goods company Mars Incorporated increased market access by piloting a hybrid collaborative approach to working with microentrepreneurs and forming citizen sector partnerships. Launched in 2013, Mars's "Maua" EoM initiative has engaged more than 1,000 microentrepreneurs in impoverished urban and rural areas that are difficult to reach through traditional channels to distribute and sell Mars products.<sup>37</sup> This constituted the first practical application of the firm's "Economics of Mutuality" (EoM) business model for management innovation, which holds that greater economic and societal value is simultaneously created—without trade-offs and in scalable ways—when a business and its stakeholders mutually benefit from a company's activities.

**Regenerative: Danone Ecosystem Fund tests new business models in regenerative farming.**

Food products company Danone is testing future-focused regenerative business models. The 100 million-euro Danone Ecosystem Fund supports projects codesigned by a local Danone subsidiary and a not-for-profit partner.<sup>38</sup> Projects are organized into four areas corresponding to key activities in Danone's value chain: *sourcing and watershed* for sustainable water resources and sourcing of key raw materials; *distribution* to create new product distribution channels; *caring services* to strengthen knowledge and access to nutrition and health services; and *recycling* to reinforce the circular economy.

**Circular: IKEA launches a new rental model to strengthen relationships with younger customers.**

Representing one instance of the growing product-as-a-service trend, furniture retailer IKEA announced plans to start renting its furniture in 2019, allowing customers to acquire, care for, and pass on IKEA products more sustainably. In the Netherlands, IKEA allows students to rent a bed, desk, table, and chairs for a monthly fee of up to 30 euros (about US\$33.68). A senior IKEA executive notes that “our future success will lie in our ability to reshape and improve our business model ... and become a more affordable, accessible, and sustainable business.”<sup>39</sup> IKEA's move toward a more circular economy comes at a time when many young consumers say they want to minimize their impact on the environment, preferring to rent items ranging from clothing to cars.<sup>40</sup>

**LOOK AROUND TO LEVERAGE YOUR BUSINESS ECOSYSTEM**

Companies that look ahead to identify risks and opportunities to their future business can look inside to identify actions to accelerate toward that future. They can then look around to support their

sustainability transformation and may gain competitive advantage by tapping into their broader business ecosystem. This strategy begins with the realization that it is not always necessary for businesses to build the capabilities—the knowledge, skills, and technology—or the influence needed to transform in-house. If the needed capabilities exist within others in their ecosystem, businesses should consider seeking to engage and mobilize ecosystem partners to help support their own sustainability transformation.

Executives can look around in two ways: first, by *leveraging others' capabilities* to accelerate their sustainability transformation, and second, *leveraging others' influence* to create a favorable environment for their transformed business.

Some businesses may lack the necessary knowledge, skills, or technology to achieve the desired scale or pace of their sustainability transformation. Rather than building or buying these capabilities, companies can leverage the capabilities of others within their ecosystem.<sup>41</sup> For instance, consumer goods company Nestlé has made a commitment that 100 percent of its packaging will be recyclable or reusable by 2025.<sup>42</sup> Recognizing that the company would struggle to achieve this alone, the company opened the Institute of Packaging Sciences in 2019 to codevelop and test new environmentally friendly packaging materials and systems together with suppliers, research institutions, and startups.<sup>43</sup> Through this approach, Nestlé is able to leverage the technology and innovation of ecosystem partners while also sharing the financial cost and accelerating the pace of innovation needed to develop recyclable packaging.

Executives can similarly leverage the influence of like-minded businesses in their ecosystem. Leveraging influence entails the coordinated

mobilization of multiple companies. A benefit of this strategy is that it enables businesses to effectively shape the strategies of those around them, supporting the creation of a favorable business environment that will enable their own future business to flourish.<sup>44</sup>

As one example of leveraging influence from the ecosystem, four leading food companies—Mars Incorporated, Danone, Nestlé, and Unilever—came together in 2018 to establish the Sustainable Food Policy Alliance (SFPA), which aims to shape food-related regulation in five key areas: the environment, nutrition, consumer transparency, people and communities, and food safety.<sup>45</sup> SFPA initiatives include shifting the industry toward a more circular economy; working together to minimize waste generation; designing reusable, recyclable, or compostable packaging; and extending the useful life of materials and products. These efforts support innovative business models

that could create value for farmers, ranchers, consumers, and other stakeholders. This ecosystem approach enables these companies to distribute and thereby reduce market risk by uniting their efforts to shift the policy environment around sustainable food, thereby accelerating the sustainability transformation at both the business level and the industry level.

## It's time to transform

Many businesses will likely need to radically transform their business models to respond to shifting market conditions calling for greater sustainability. Looking ahead, looking inside, and looking around can help companies understand not only how the pressures toward sustainability could be a threat to their current business, but what opportunities they may hold for their future business. ●

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**SARAH KERRIGAN** is the strategy lead for the Deloitte Center for the Edge, Asia-Pacific. She is based in Singapore.

**DULEESHA KULASOORIYA** is the executive director of the Deloitte Center for the Edge, Asia-Pacific. He is based in Singapore.

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**RESPONSIBLE BUSINESS**

# Measuring the business value of corporate social impact

**BEYOND SOCIAL VALUE TO ENTERPRISE  
PERFORMANCE**

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RHONDA EVANS AND TONY SIESFELD

ART BY PETER LLOYD

In the midst of the COVID-19 pandemic, businesses are stepping up with massive contributions in the name of public health and well-being. For most of these companies, responding to the current crisis is simply a moral imperative.

But once the next normal is reached on the other end of the crisis, many companies will once again be forced to articulate the *business* value of corporate social impact.

More and more leaders are beginning to recognize that value. Deloitte Consulting LLP's 2019 Global Human Capital Trends survey found that, for the first time ever, CEOs named societal impact as the *top* success factor for annual performance.<sup>1</sup> As Larry Fink argued in his 2020 letter to CEOs, “A strong sense of purpose and a commitment to stakeholders helps a company connect more deeply to its customers and adjust to the changing demands of society. Ultimately, purpose is the engine of long-term profitability.”<sup>2</sup>

However, many corporate leaders have struggled with how to adequately assess the business value that social impact efforts provide. Social impact activities are typically presented in terms of their “social value” only—the public good they do in the world. This can make it difficult for leadership to effectively weigh corporate social initiatives against other business needs and to properly understand the relative importance of social value to the company's overall economic value.

Fortunately, measurement techniques and data analytics have improved in ways that now enable organizations to measure the *business value* of social impact as well. This can be done by organizing measurements along six key drivers of value creation from corporate social activity—brand differentiation, talent attraction and retention, innovation, operational efficiency, risk

mitigation, and capital access and market valuation<sup>3</sup>—and then adapting existing business metrics to measure the business value of these benefits in ways that are comparable and consistent with other corporate considerations. This, in turn, allows a company to more accurately assess risks, assign costs, and predict growth related to social impact activities.

Using this approach, corporations can identify concrete measures around both the social and business value of each of the six dimensions. These measures together can be used as a form of *corporate social impact scorecard* that can help business leaders make key decisions about when and how to integrate social purpose into core business activities across the business or with specific campaigns, initiatives, or brands.

## Six drivers of business value from social impact

The term “social impact” is used expansively to cover philanthropic and volunteering initiatives, sustainability efforts to mitigate social and environmental risk, and other core business activities that also deliver economic, social, and environmental benefits.

In 2016, Monitor Deloitte identified six primary areas where a company's social impact efforts can drive business value:

- **Brand differentiation.** Social purpose has been shown to drive consumer purchasing

decisions and enable companies to charge a price premium, leading to increased revenue.

- **Talent attraction and retention.**

Alignment between company and employee values increases employee engagement, leading to improved profitability through higher productivity and cost reductions from lower turnover.

- **Innovation.** Efforts to improve the healthiness and/or environmental and social footprint of products can be an engine of innovation, spurring increased revenue from new products and new markets.

- **Operational efficiency.** Decreasing a company's footprint in packaging, water use, materials use, and waste production can yield significant cost savings.

- **Risk mitigation.** Failure to effectively address environmental and social risks can create serious financial and operational performance challenges. Social impact efforts can have important mitigation effects, resulting in avoided costs or lost revenues and higher valuations.

- **Capital access and market valuation.**

Corporate social impact efforts are positively related to market valuation and cost of capital.<sup>4</sup>

A company can break out and specifically measure the business value derived from each of these areas to create a corporate social impact scorecard that can look across all six areas or focus on just one or two priority areas, depending on a company's industry, business priorities, and scope of efforts. Using the scorecard, social impact professionals and business leaders can not only better

understand the value of their current social impact activities, but also prospectively calculate social impact investments' potential net benefits to better allocate resources and make strategic decisions to benefit the company's long-term health.

## Principles for creating a social impact scorecard

The process of developing a corporate social impact scorecard is meant to be flexible, allowing it to provide the necessary insight for decision-making under a variety of circumstances and to adapt to diverse corporate environments. The scorecard can be used to value individual social impact initiatives, assess the effects of broad purpose efforts on specific business units or functions, or provide an aggregate view of the business value of social impact activities across the company. Business leaders can create comprehensive scorecards or target very narrow business questions. It is important to create a fit-for-purpose approach that leads to actionable information and uses reasonable resources in data collection and analysis.

Key principles behind creating such a scorecard are:

- **Determine the key decision(s)** to be made that involve the business value of social impact. For example, are you aiming to decide whether to invest in socially responsible new product development, assess the social and environmental practices of your supply chain, or determine whether the company is receiving sufficient returns for all of its social impact work? Being clear about the questions you are trying to answer and for what purpose helps define the scorecard's scope and clarify the

types of relevant goals or targets it should consider.

- **Assess which drivers of business value are salient.** While some business questions are specific to particular business functions or units, others have wider applicability and may touch more than one of the six dimensions of social impact's value. Moreover, all six dimensions may be relevant in the case of cross-company scorecards. The business drivers behind the specific social impact activities to be considered in the scorecard will govern what and how costs and benefits are measured.
- **Determine how business activities and outcomes are already measured internally absent social impact considerations.** Wherever possible, it is important to align with existing business measurement systems and approaches to enable comparability and actionable information. Internal measurement systems and approaches for determining risk, for example, can be adapted to include environmental and social risks, as can employee engagement and brand reputation approaches. While adjustments are necessary and distinct techniques may be used, alignment with existing approaches is essential to enable business decision-making around social impact.
- **Choose appropriate indicators** to capture the business value of social impact—indicators that can quantify the costs and benefits of initiatives or effects to track. In addition to maintaining internal comparability, use indicators that are consistent with standard social impact approaches to facilitate peer benchmarking where possible. Methods and resources are discussed below.

- **Monetize where relevant.** It is often helpful to translate net benefits into monetary values for the purpose of assessing business value. Monetization is particularly helpful for evaluating relative benefits across a range of drivers, as well as for making resource and investment decisions. However, it should be noted that for some business questions translating benefits to monetary values may be difficult and unnecessary. Efforts to monetize value should be driven by what's needed for decision-making.

With these principles in mind, let's explore what it looks like to measure each of the different dimensions on a corporate social impact scorecard in turn.

## Brand differentiation



### Illustrative brand differentiation metrics

- Social value as a percentage of total brand value
- Social sentiment over time
- Third-party rankings

Social impact and corporate purpose drive business value by enhancing consumer identification with brands as an expression of their values, which can affect consumers' purchase choices, their loyalty, and the costs they are willing to incur.

The importance of social impact to brand reputation is considerable. The RepTrak Company has found that good "citizenship" and good

“governance” qualities account for nearly 30 percent of corporate reputation, more than any other factors besides products and services.<sup>5</sup> Nielsen has found that two out of three consumers are willing to pay more for sustainable brands,<sup>6</sup> and recent retail research shows that, after quality, the second-highest reason for customer brand loyalty is sustainable/ethical business practices.<sup>7</sup>

To assess the brand value of social impact, consumer purchase and use decisions can be broken down to understand the weight of different choice elements, including those related to social impact. Companies whose reputations are large enough to be tracked and indexed can work with various third-party organizations that track reputation to determine the relative importance of social impact, broadly, to a company’s overall reputation. The RepTrak Company, for example, includes citizenship and governance as part of its standard breakdown of consumer perceptions of different components of reputation.<sup>8</sup> If an organization has developed a total dollar brand valuation, or if a third-party valuation exists, it can calculate the dollar value of the percentage of reputation attributable to social impact concerns.

While third-party rankings can be helpful for determining the reputational value of social impact for larger companies, smaller companies may need to construct or adapt existing consumer preference data collection tools to disaggregate the social impact component of brand value. Companies could also conduct their own research to explore more fine-grained consumer preference questions. Additional aspects of customer preference can be measured through surveys, focus groups or interviews, social sentiment analysis, and sales data.

Through surveys or interviews, leaders can explore ways to help address new market segments and better target existing customer segments, assess the value of marketing campaigns that spotlight the company’s social impact work, and understand the possible business impact of additional social impact efforts. These tools can allow companies to assess how specific social impact efforts or sustainable product attributes affect purchase intent—whether they make consumers more or less likely to make a purchase. They can also help assess consumers’ price sensitivity for sustainable products as well as their brand loyalty to these products.

To monetize this more granular consumer preference data, business leaders can capture the price premium of sustainable products and services, additional sales revenue through new market segments, and the lifetime value of sustainability-oriented consumers.

### **A RESOURCE FOR MEASURING IMPACT ON BRAND DIFFERENTIATION**

The RepTrak Company tracks the reputations of 7,000 companies each year. The corporate citizenship component of RepTrak’s measures tracks customer perceptions of whether a company supports good causes, has a positive societal influence, and is environmentally responsible, while the governance component tracks perceptions of a company’s openness and transparency, ethical behavior, and fairness in the way it does business. The RepTrak Company helps quantify the impact of these components on purchasing decisions, as well as consumer willingness to advocate for, accept, and defend a brand.<sup>9</sup>

## Talent attraction and retention



Illustrative talent attraction and retention metrics

- Increase in employee engagement
- Satisfaction percentage
- Employee sentiment
- Attraction, recruitment, and turnover

In most industries, talent represents a substantial percentage of company budgets and is a critical driver of profitability. Replacing one employee can cost from one-half to two times the employee's annual salary due to recruiting, orientation, and training costs.<sup>10</sup> On the flip side, high worker engagement delivers measurable benefits to the bottom line: Companies with top-quartile employee engagement ratings have twice the customer satisfaction and 25 percent higher profits than organizations with bottom-quartile engagement ratings.<sup>11</sup>

Research shows a clear link between employee alignment with company social impact values and higher worker engagement rates, lower turnover, and improvement on other measures of business health. Employees are more likely to stay with companies that offer volunteering and fundraising opportunities.<sup>12</sup> Nearly 40 percent of millennials say they selected their job because their employer's social impact was better than that of alternative companies.<sup>13</sup> Gallup has found that a 10 percent increase in employees' connection with their organization's mission or purpose would lead to a 13 percent decline in safety incidents, an 8 percent decrease in turnover, and a 4 percent improvement in profitability.<sup>14</sup> Social impact efforts can therefore

play an important role in talent recruitment, retention, and engagement strategies.

Since talent benefits can come from the direct and indirect effects of volunteering and fundraising initiatives as well as from a company's broader corporate purpose, leaders will need to collect different types of data on employees based on the specific decisions to be made. To measure the direct effects of social impact volunteerism or social impact involvement, leaders should start with employee participation data. To measure alignment with corporate purpose and the indirect effects of a company's social impact efforts, which can lead employees to feel more connected to companies that engage in social impact work even if they don't directly participate in these activities, leaders should track employee awareness of and alignment with corporate social impact efforts.

Employee perceptions about their alignment with a company's purpose, as well as this alignment's correlation with satisfaction levels, can be assessed through tailored surveys, frequent pulse checks, and/or other sentiment monitoring based on employee chat logs and comment streams gathered from internal communications tools.<sup>15</sup> Employee engagement surveys can be used to assess whether those who participate in social impact activities and those who feel more aligned to corporate purpose experience higher engagement levels.

Business leaders can also correlate employee sick leave, turnover rates, performance, and profitability with social impact participation rates and alignment data for individuals and teams. Return on investment can be calculated using cost valuations for this kind of employee outcome data. It will be important to account for the time lag for metrics such as attrition; the effect of participation in social impact activities may also decay over time.

## Innovation



### Illustrative innovation metric

- Growth in percentage of company sales based on social and sustainable innovation (such as healthy or green alternatives)

Product innovation is a key driver of long-term company growth, enabling companies to access new markets and users as well as drive more revenue through existing channels due to product improvement. Within the broad category of innovation in general, social innovation involves the development of products or other solutions to address systemic social and environmental challenges, while sustainable innovation involves the development of products and services that improve consumer health or well-being or are socially or environmentally sustainable in their production or use.

Since 2014, US sales of sustainable products have grown by nearly 20 percent, with a CAGR that is four times greater than typical consumer products.<sup>16</sup> In a large majority of consumer product goods categories, in fact, sustainable products have been the fastest-growing product segments.<sup>17</sup>

For purposes of demonstrating the value of sustainable product and services development, the most effective measures adapt existing innovation metrics to explicitly track the percentage of new products or services that have a social innovation or sustainability component. Percentage of sales (or growth in sales) driven by product innovations related to environmental, social, or health factors provides the most direct assessment of the value of

social or sustainable innovation. Leaders can also measure the overall growth rates of a company's new sustainable products, innovation in sustainable products as a percent of overall product innovation, and the growth rates of new customer segments focused on sustainability to determine their growth and speed of adoption.<sup>18</sup>

Return on innovation investment, which is calculated by dividing the profits generated by new products and services by the research, development, and other direct expenses expended in their creation, can also be a useful metric. This can be calculated for social and sustainable innovation investments by specifically focusing on profits from sustainability-related customer segments or product categories. These figures can then be compared to industry benchmarks, internal thresholds, or other portions of the product portfolio to help assess whether the company is sufficiently including social and sustainable innovation as drivers of product growth.

## Operational efficiency



### Illustrative operational efficiency metrics

- Savings in energy, materials, and water
- Reductions in waste

In the context of social impact, operational efficiency enables companies to continue to maintain the quality of their products or services while reducing their environmental and social effects. Operational efficiency is the easiest driver to translate into business value, since it is

immediately translatable into cost impacts, and it is often the area where the biggest direct business value can be achieved. One study found that companies could achieve an average internal rate of return ranging from 27 to 80 percent on low-carbon investments alone.<sup>19</sup>

While social savings such as reductions in worker injury or illness can also be relevant, operational efficiency gains commonly focus on environmental issues such as resource use, waste management, and emissions. Business leaders and social impact professionals can bolster efforts to reduce environmental and social impact by making a clear business case, and business leaders can calculate returns on operational efficiency investments to weigh against competing investment options. Determining where the biggest returns on operational efficiency gains can be made also helps leaders prioritize efforts.

The primary approach for measuring the business value of operational efficiency as a result of social impact is to calculate the net benefits of operational changes from a baseline, factoring in total operational costs avoided and subtracting out total social impact efficiency initiative costs and investments, while taking into account depreciation and amortization for capital expenditures and other investments. Savings from potential decreases in the use of energy, product materials and packaging, and water; costs avoided from the use of recovered materials; and reductions in regulatory fees and fees from waste disposal are common areas of focus. Other potential areas of gain, such as additional revenues from recycled and reused materials and new revenues from additional capacity use, should be considered as well.<sup>20</sup>

Calculating net returns and the return on investment across multiple possible efficiency initiatives often provides sufficient information for

investment and prioritization decisions. Standards such as those developed by the Sustainability Accounting Standards Board (SASB), the Global Reporting Initiative, and the Carbon Disclosure Project offer clear measures and guidance for the capture of relevant operations data. Following these standards has the additional benefit of enabling comparability with other companies' efforts and industry benchmarks.

### A RESOURCE FOR MEASURING IMPACTS ON OPERATIONAL EFFICIENCY

SASB provides standards for identifying, managing, and reporting on sustainability topics and related measures that are material for financial and operational performance. These standards describe the minimal set of financially material sustainability topics and related metrics for companies by industry, along with technical protocols for compiling data and activity metrics that enable companies to normalize and compare data.<sup>21</sup>

## Risk mitigation



Illustrative risk mitigation metric

- Financial benefits of reduced environmental and social risk

The mitigation of environmental and social risks can have a substantial impact on corporate financial conditions and operating performance. Failure to effectively address environmental and social risks can result in disruptions in operations, market imbalances, negative regulatory outcomes,

and damaged reputations with customers, consumers, and employees from negative events. In 2019, 215 of the largest global companies reported almost US\$1 trillion at risk from climate impacts alone, with many risk events possibly occurring within five years.<sup>22</sup>

Absent an accounting of the financial implications of environmental and social risks, companies are likely to undervalue mitigation efforts and take insufficient action to address those risks. Companies may also miss business opportunities that can arise through avoiding, reducing, or sharing risk. Assessing the costs and return of environmental and social risk mitigation enables business leaders to make more complete risk management decisions and prioritize responses. Leaders can also calculate the risk mitigation value of broader social impact efforts to better capture their full range of benefits.

Ideally, business leaders integrate material risks related to environmental and social issues into their enterprise risk management system.<sup>23</sup> A variety of materiality assessment tools are available to help companies identify relevant business risks and stakeholder concerns. The SASB's materiality map, for instance, identifies more than 25 sustainability issues that may affect the financial condition or operating performance of companies by industry,<sup>24</sup> and provides a range of additional broad business, stakeholder mapping, and environmental, social, and governance (ESG)-specific materiality resources.<sup>25</sup>

For each relevant risk, leaders should identify potential interventions, develop key indicators, calculate baseline data and potential risk, and then monetize the risk. Depending on the type of risk, quantitative assessments of risk can be made using methods such as probabilistic analysis, forecasting

and valuation for business continuity, expert input, and ESG-specific tools for operations.<sup>26</sup>

Monetization metrics for key risk indicators can include avoided costs or lost revenues, higher valuations, and avoided opportunity costs;<sup>27</sup> multiple valuation techniques can help leaders capture different dimensions of value. For example, a company could use market-based valuation approaches that use existing prices for goods and services to estimate potential losses, while cost-based approaches enable leaders to estimate value from avoiding the costs of compensating affected customers or making repairs to faulty products. Revealed and stated preference approaches allow companies to determine the potential financial impacts of likely stakeholder activities (such as reduced consumption) by observing existing market behavior, or by directly asking stakeholders their preferences. Finally, value transfer techniques estimate economic value by adapting the findings of studies of similar circumstances.<sup>28</sup>

### **A RESOURCE FOR MEASURING SOCIAL IMPACT RISK**

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) and the World Business Council for Sustainable Development (WBCSD) have released guidance, *Enterprise risk management: Applying enterprise risk management to environmental, social and governance-related risks*, that helps companies incorporate ESG-related risks into their ongoing enterprise risk management processes. As part of a comprehensive risk management framework, this guidance includes measurement options for monetization and other quantitative approaches to assessing social impact risk, as well as resources and approaches for determining the nature of those risks.<sup>29</sup>

## Capital access and market valuation



### Illustrative capital access and market valuation metrics

- Inclusion in sustainability indexes
- Social return on investment

Because market valuation is a function of revenues, costs, and risk, the other five areas of social impact benefit feed into valuation. In 2018, Bank of America Merrill Lynch determined that companies with better social impact records had greater three-year returns and were more likely to become “high-quality” stocks. Their stocks were also less likely to have substantial price drops, and the companies were less likely to experience bankruptcy.<sup>30</sup> Recent research also underlines the importance of materiality and operational effectiveness in market performance. Companies that primarily target material social and environmental issues in their social impact efforts outperform the rest of the market to achieve an annual alpha of 3–6 percent.<sup>31</sup>

Sustainable investing, which broadly refers to investing based on some set of ESG criteria, is increasingly important in capital markets. Sustainable investment assets under management globally reached US\$30.7 trillion in 2018, a 34 percent increase in two years.<sup>32</sup> In the United States, 26 percent of all professionally managed investment assets included sustainable investing strategies in 2018.<sup>33</sup>

For purposes of measuring social impact’s benefits to capital access and market valuation, we will focus on both the call for and the demonstrated market benefits of transparency in social impact. Transparent and comparable reporting can enable financial accountability and the more efficient allocation of capital to promote long-term sustainability. It also can lead to higher costs of capital for less sustainable companies.

Reporting on the value of social impact is itself an important component of comprehensive reporting and transparency. To inform sustainability indexes and to serve social impact market strategies, a company’s reporting needs to capture the full range of integrated environmental, social, and economic impact of its social impact activities.<sup>34</sup> As a means of capturing value, social return on investment (SROI) is a method for measuring social, environmental, and economic outcomes and calculating monetary values to represent them. This is particularly helpful for leaders when comparing programs that have different types of outcomes, such as education and environmental programs. The SROI calculation process is stakeholder-focused, calculating the financial implications of the meaning and importance that stakeholders assign to social and environmental outcomes. It can also enable future projection, net present value calculations, and sensitivity analyses to determine the impact of changing assumptions.

**Reporting on the value of social impact is itself an important component of comprehensive reporting and transparency.**

### RESOURCES FOR MEASURING IMPACT ON CAPITAL ACCESS AND MARKET VALUATION

The Impact Management Project provides guidance on how to measure, manage, and report social impact. The project brings together the perspectives of investors, funders, businesses, nonprofits, standards bodies, and accounting bodies to create measures with broad applicability across corporate reporting, impact investing, and philanthropy.<sup>35</sup>

Social Value International has developed principles for assessing social return on investment and social value more broadly for the purpose of better integrating social, environmental, and economic value into decision-making.<sup>36</sup>

## Beyond social impact for its own sake

Social impact can have a substantial effect on business value across each of these drivers, and a lack of understanding of these benefits could result in serious miscalculations and undervaluing of social impact's business importance. By understanding how to measure the business returns of social impact, leaders can translate social value into the language of business and demonstrate the value of social impact work to make sure that it is appropriately included in strategic and resource allocation decisions. Companies that use these techniques may not only gain a more complete picture of social impact's business value, but may also find increased incentives over time to expand their social impact efforts and integrate social purpose into their core strategy. ●

**RHONDA EVANS** is a senior manager with Monitor Institute by Deloitte with more than 15 years of experience using data, research, and measurement techniques to improve environmental and social impact.

**TONY SIESFELD** is a managing director with Monitor Institute by Deloitte with more than 30 years of experience in for-profit and for-impact advisory work.

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# The future of fresh

## UNDERSTANDING THE FRESH FOOD CONSUMER

**N**EARLY ALL US consumers purchase some form of fresh food every month—produce, meat, fish, and dairy, to name a few.

According to our recent survey of 2,000 US adults, 74 percent buy fresh foods at least once a week, and more than 60 percent spend up to a third of their average grocery budget on this category. Yet fresh food sales in the United States are lagging behind total grocery store sales: Between October 2015 and October 2018, total store sales grew 4.3 percent, while fresh food sales grew only 4.0 percent, from US\$171 billion to US\$178 billion.<sup>1</sup>

How can fresh food producers and retailers grow this category? One key is to understand that fresh food consumers are not a single homogeneous group. Our segmentation analysis of survey respondents, based on their attitudes and purchasing behavior, reveals three distinct types of fresh food buyers—Forwards, Followers, and Neutrals—each with its own distinct expectations and buying patterns (figure 1).

An analysis of each segment's attitudes about health and wellness, food safety/sustainability, and sourcing with respect to fresh food purchases reveals some important differences. For Forwards, health and wellness was more important than the other two factors. Perhaps as a result, this group was more likely to pay a higher price for fresh foods. However, among Followers and Neutrals—who accounted for more than two-thirds of our sample—price was most important. This suggests that there is likely a price threshold these consumers will not cross, and that competitive pricing remains important to them.



FIGURE 1

## Attitudinal tendencies and demographic details by segments



Source: The Deloitte fresh food consumer survey 2019.

Interestingly, among Forwards, health and wellness concerns rose to the top when considering other types of food as well. This suggests that their desire for health and wellness products is a function of their attitudes rather than age—which also implies that as Forwards age, they will likely maintain their beliefs and not necessarily become Followers. They are more likely to evolve into a new segment of middle-aged adults with higher incomes interested in fresh foods. To track this evolution, manufacturers and retailers may wish to revisit this segmentation every three to five years due to this category’s dynamic nature.

As far as near-term profitability goes, if demand can be stimulated among Followers, the largest group of fresh food consumers, even small growth within this group could be beneficial to the broader fresh food category. Such targeted consumer analysis, coupled with enhancements on the manufacturing end, can truly help realize the growth potential of fresh foods. ●

To learn more, read the full report, *The future of fresh: Strategies to realize value in the fresh food category*, on [www.deloitte.com/insights/fresh-food-consumer](http://www.deloitte.com/insights/fresh-food-consumer).



STRENGTH IN DIVERSITY

# Within reach?

## ACHIEVING GENDER EQUITY IN FINANCIAL SERVICES LEADERSHIP

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ALISON ROGISH, STACY SANDLER, NEDA SHEMLUCK,  
PATTY DANIELECKI, AND TIFFANY RAMSAY

ART BY NICOLE XU

The case for organizational diversity has never been more convincing. Diversity within firms has been shown to drive innovation<sup>1</sup> and increase productivity.<sup>2</sup>

## A call to action

Gender diversity, in particular at the leadership level, has even been linked to boosts in profitability.<sup>3</sup> It's no wonder, then, that 34 percent of CEOs recently ranked diversity and other societal impact indicators as a key measure of success when evaluating firm performance.<sup>4</sup>

Despite this, achieving a greater share of women in leadership roles remains a challenge for many firms. The numbers alone should spark a call to action: While women and men are nearly equally reflected in the US labor force,<sup>5</sup> the representation of women dwindles the higher up they rise in leadership ranks. Women account for a mere 5.4 percent of CEOs at S&P 500 companies.<sup>6</sup> Unfortunately, while many firms have instituted diversity and inclusion initiatives in response to gender disparities and other diversity issues, many traditional programs have not led to a significant acceleration in the share of women in leadership.<sup>7</sup>

Organizations should consider rethinking their strategies to improve leadership outcomes for women. One of the key ways they can do that is by making intentional efforts specifically aligned to growing the share of women in leadership roles. Only then might greater gender diversity in leadership be within reach. Notably, these trends are playing out across industries, and financial services firms are not immune.

Our *Within Reach?* series explores topics related to women in financial services. While there are multiple dimensions to diversity, this inaugural report is focused on gender equity in leadership. We analyzed more than 100 large US financial services institutions to assess how women have fared in leadership roles since 1998. To complement our analysis, we impaneled a virtual forum of executive women leaders, which we called “The future of women leaders in the financial services industry” (see sidebar on pg. 165, “About the project”), to obtain their insights

### KEY MESSAGES

- In 2019, the proportion of women in leadership roles within financial services firms is 21.9 percent, which is projected to grow to 31 percent by 2030—still below parity.
- At an organizational level, our analysis reflects that across financial services organizations, for each additional woman added to the C-suite, the number of women in senior leadership roles rose threefold.
- Among the key challenges that could impact succession, the percentage of women in senior leadership roles has not kept pace with those in the C-suite, and this gap has widened since 2010.
- Strategies for improving leadership outcomes for women should be multifaceted and inclusive.

on the path to leadership. They shared their inputs on the programs and networks they find most valuable, the leadership skills and styles needed to meet the future business environment's complex realities, and their experiences on what,

and who, has motivated and inspired them throughout their careers. Our findings suggest an array of opportunities for financial services institutions to retain, develop, and grow the share of women in leadership.

### **A NOTE FROM AMANDA PULLINGER, CEO OF 100 WOMEN IN FINANCE**

The Deloitte report in your hands, *Within reach?*, presents something rare—long-duration research coupled with practical tactics to more fully realize one of the financial services industry's best opportunities, namely, cultivating larger numbers of female executives to lead the industry forward.

This report contains some positive news. We're encouraged by the fact that women are now the majority of financial services industry employees and that the percentage of female executives is expected to grow from 22 percent today to 31 percent by 2030, but recognize there is more work to be done to realize more than just incremental growth in the next decade. We should take a moment to reflect on factors that most certainly contributed to the growth so far—intentional recruitment, innovation in retention, and supportive reentry, as well as mentoring, sponsorship, and strong peer networks. The industry deserves credit for important initiatives toward improved gender diversity that are now paying off. Today, more women enjoy longer, more satisfying, and more senior-level careers in financial services, and the industry is stronger, in part, for their collective presence and contributions.

Progress, of course, is never as swift or evenly distributed as we'd wish to see. Representation equity in leading lines of business and in risk-taking roles often lags meaningfully across financial services. We note that women still manage only single-digit percentages of client assets, this being an obvious next area of opportunity for the industry's use of women's abundant skills. As fiduciaries, our paramount concern should be bringing forward this pool of talent for immediate client benefit.

100 Women in Finance, along with our industry colleagues such as Deloitte, is working to address this opportunity. We propose that the finance community should think about cultivating female talent much earlier, among precareer young women who are just starting to form career ambitions and those entering the workforce. As we work to advance progress for women now working within the financial sector, we should direct equal attention to inspiring the next generation of young women to favorably view our industry, and to evolve the workplace to be worthy of their career selection.

We are grateful for Deloitte's enduring work to explore the past, present, and future status of women in the financial services industry, as well as its diligence in identifying potential levers for continued progress. We agree with Deloitte that momentum likely depends upon a number of factors, including transparency, visibility of female leaders, support from men, and strong peer networks for women.

We encourage all industry leaders to incorporate Deloitte's recommendations into their leadership praxis, while maintaining confidence that Deloitte's vision for gender equity is, indeed, within reach.

## The business case for gender equity

Tomorrow's business environment will continue to be full of change. In addition to societal forces, firms must also contend with technology's impact on business models and persistent uncertainties within the economic environment.<sup>8</sup> As a result, organizations are imploring their leaders to keep up with this changing landscape and guide them through uncharted territory.<sup>9</sup> Over 80 percent of financial services institutions surveyed in Deloitte's 2019 Global Human Capital Trends report, however, believe their organization is only somewhat effective, or not effective at all, in identifying and developing leaders that can keep up with these evolving challenges.<sup>10</sup>

What capabilities might tomorrow's most effective leaders in financial services possess to navigate these challenges? The overwhelming majority of financial firms listed relationship-oriented skills that are often undervalued—like leading through complexity and ambiguity, leading through influence, and managing remotely—as top leadership requirements in the future.

When asked to describe the type of skills future leaders would need, tellingly, the responses by our

panel of financial executives aligned with the future leadership requirements of those financial services institutions surveyed. The panelists almost unanimously championed the importance of relationship-oriented skills. Confronted with the shifting nature of work<sup>11</sup> and increasingly remote or siloed workforces, the panelists argued that thriving leaders will be strong communicators and connectors who can unite and motivate people to action quickly.

With this in mind, the gender imbalance in leadership at the top in financial services could be a missed opportunity for many institutions. Why? A recent Harvard study<sup>12</sup> revealed that women outscore men in 17 of 19 leadership capabilities, many of which were noted in the survey as requirements for leading in the future. Some of the areas where women were perceived to excel at include taking initiative, building relationships, collaboration and teamwork, leadership speed, powerful and prolific communication, and innovation.

The panelists also highlighted the importance of continuous learning, which arguably must become lifelong<sup>13</sup> in the future business environment, as the nature of work continues to evolve and competition increases. Once again, respondents from the Harvard study rated women higher than men in practicing self-development.<sup>14</sup>

"Too often, inclusion and diversity are used synonymously. Inclusion is a collaborative, supportive, and respectful environment that increases the participation and contribution of all employees. Inclusion efforts make it easier for companies to become more diverse. Finding similar interests, experiences, goals, and values draws people together, focusing on their similarities and not their differences. Inclusion efforts give employees a sense of belonging. Formal inclusion efforts can foster individuals to thrive in an organization, allowing them to contribute to their full potential. Companies that are focused on inclusion can help their organization retain talent, grow new markets, be innovative, create a more positive work environment, and foster good community relations and customer satisfaction."

— Panelist, "The future of women leaders in the financial services industry"

With many financial services institutions citing challenges with future-ready leadership, it might behoove those that want to remain competitive in the face of change to take a closer look at the untapped talent of women within their ranks. Women are just as capable to lead financial institutions into the future.

### Not enough progress: What our data revealed

It is fair and important to acknowledge the progress that has been made over the past two decades. The financial services industry has witnessed a slow but steady rise in the proportion of women serving in leadership positions. The efforts that financial services institutions have made to attract and retain women for these positions can be clearly seen in this rise in leadership. As mentioned earlier, more institutions in recent years have begun to prioritize diversity,

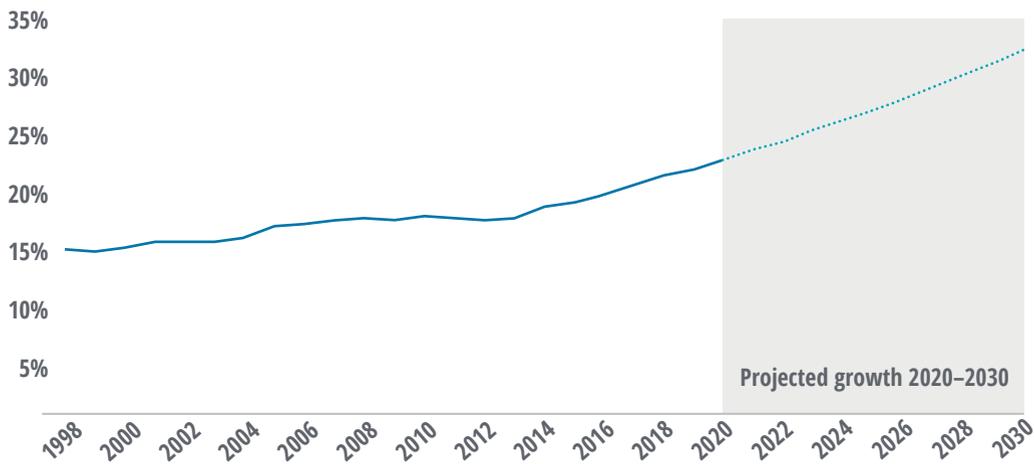
partly due to growing societal pressures that heavily emphasize diversity.<sup>15</sup> Some customers, for instance, have begun to demand diversity in leadership from the companies that serve them.<sup>16</sup> Government requirements to disclose diversity metrics and policies are also already underway in some financial segments.<sup>17</sup>

However, more work should be done. Though women make up more than 50 percent of the financial services industry’s US workforce,<sup>18</sup> they account for just under 22 percent of leadership roles, according to our analysis (figure 1).

Assuming growth continues at the slightly greater rate observed since 2013, the proportion of women in financial services leadership could reach only 31 percent in 2030 (figure 1)—an improvement, but still well below parity. This forecast is in line with some predictions that estimate we might not see an equal number of women and men in overall US leadership roles until at least 2085.<sup>19</sup>

FIGURE 1

### The growth of women in leadership roles in the financial services industry



Note: Percentage of women in leadership roles within a select sample of financial services institutions inclusive of C-suite and senior leaders.

Source: Deloitte Center for Financial Services analysis of Boardex LLC data.

## EMERGING LEADERSHIP

Closer examination of C-suite titles also revealed a subset of roles that have mostly emerged within the last decade (for example, chief data officer, chief sustainability officer, chief inclusion officer, chief diversity officer, and chief digital officer). Women account for approximately one-third of these emerging leadership roles. We'll explore this subset, and the other leadership categories, in future reports of our *Within Reach?* series.

It's important to note, however, that much of the research widely available on women in leadership does not distinguish between the types of roles within leadership and how women are faring within each level. Someone in the C-suite, for example, may progress very differently than someone who is a senior vice president. For firms to further address gender diversity in their top ranks, understanding the nuances within leadership could be an essential factor to consider. Accordingly, we divided the data, based on reported titles, into two major categories: **C-suite**,

which includes all C-titled roles at the corporate leadership level, and **senior leadership**, which includes senior-level roles that are typically one to three levels below the C-suite (figure 2).

When segmenting the data into C-suite and senior leadership categories, another picture emerges (figure 3). The percentage of women in senior leadership has not kept pace with women in the C-suite. The gap has continued to widen since 2010 and reached 7.6 percentage points in mid-2019. If nothing else changes and growth in both segments continues at the pace observed since 2010, when the percentage of each group was relatively equal, the share of women in the C-suite could reach 34.1 percent in 2030 compared with just 24.8 percent in senior leadership. This suggests that institutions might need to place extra emphasis on improving the outcomes for women in the latter category. Without more deliberate effort to add more women to senior leadership roles, institutions could face a talent gap when searching for women with the right experience for top positions in the near future.

FIGURE 2

## Defining leadership roles

### C-suite

C-titled roles at the corporate leadership level (for example, chief executive officer, chief financial officer, or chief marketing officer).

### Senior leadership

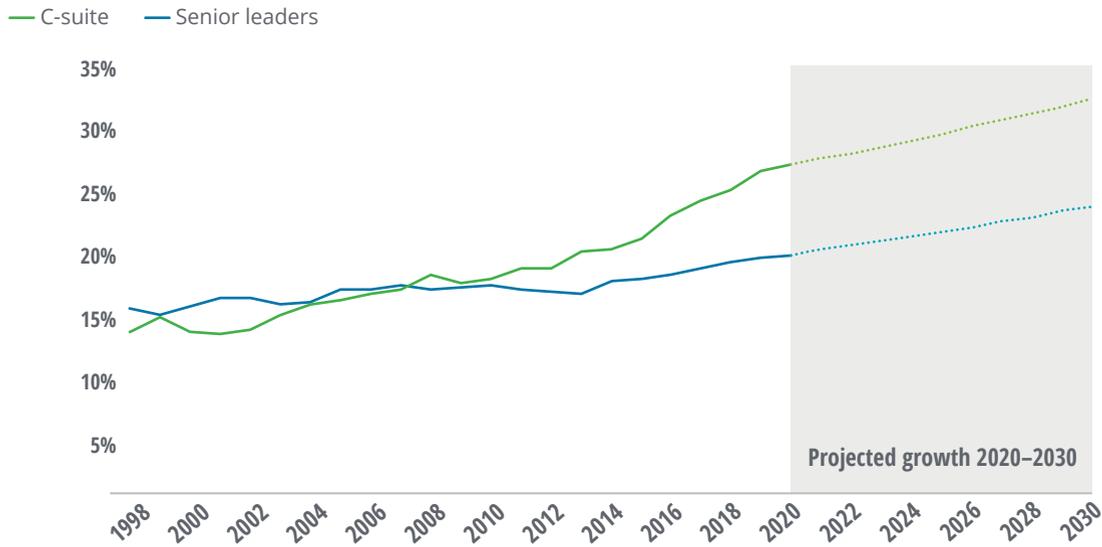
Non-C-titled executives (for example, line-of-business leaders, division chiefs or regional leaders, EVPs, or SVPs or equivalent). Depending on the institution, this may be 1–3 levels below the C-suite).



Source: Deloitte Center for Financial Services analysis.

FIGURE 3

### Percentage of women in leadership roles, by role category



Source: Deloitte Center for Financial Services analysis of Boardex LLC data.

## Tapping into talent: Strategies to help achieve gender equity

Given these findings, what can financial services institutions do to fully unlock the potential of women in their pipeline? How might they accelerate the growth of women in leadership roles? Strategies for improving leadership outcomes for women should be multifaceted and inclusive across leadership levels. Following are some recommended areas of focus.

### UNDERSTAND AND EMBRACE THE MULTIPLIER EFFECT

Despite the disparity in overall numbers, financial institutions have an opportunity to shift the balance at an organizational level. We analyzed the data of our representative institutions to determine if having a greater number of women in the C-suite creates a positive, or multiplier, effect on the

number of women in senior leadership. Our analysis revealed a threefold increase in senior leadership for each additional woman added to the C-suite. This finding, along with Deloitte’s *Women in the boardroom, 5th edition* study, which found that “organizations with women in the top leadership positions have almost double the number of board seats held by women,”<sup>20</sup> suggests that having a greater share of women at the most senior leadership levels creates a tangible ripple effect across the organization.

It also gives credence to the familiar and powerful refrain, “If you see it, you can be it,” which many on our panel of executive women echoed. Knowing it can be done, as well as seeing and experiencing diverse representation at the highest levels of leadership, can motivate women as they climb the ranks. Additionally, women at the top may be positioned to advocate for other women rising

through the ranks. They also represent an attainable ideal for the next generation of women who, upon entering the workforce, may be weighing recruitment options.

“She did not mentor me. She did not sponsor me. But she absolutely inspired me. Because she was *there*. It was like seeing someone break the four-minute mile for the first time and forever after just knowing that it could be done.”

— Panel facilitator, “The future of women leaders in the financial services industry”

## IMPROVE TRANSPARENCY AND ACCOUNTABILITY

Actionable, measurable, and transparent diversity policies signal to employees, clients, and the broader community that attracting, retaining, and advancing women are priorities.

Our panelists noted that the diversity of their clients is rapidly changing—faster than their own firms, in some cases. Consequently, many clients view diversity in leadership as a requirement and review diversity policies and practices of the businesses that serve them before engagement. Lack of transparency or falling short of diversity expectations could lead to missed business opportunities.

New requirements at the state and federal level are also prompting institutions to disclose diversity initiatives. California was the first state to legally mandate public companies with principal offices in the state to have at least one female board member by the end of 2019.<sup>21</sup> The law also requires incremental increases by the end of 2021. Four other states are currently considering similar measures.<sup>22</sup> At the federal level, the House Committee on

Financial Services’ Subcommittee on Diversity and Inclusion, the first of its kind in Congress, plans to address the diversity levels, policies, and practices of the country’s largest banks.<sup>23</sup>

Companies still grappling with transparency and accountability can find examples of positive outcomes both within and outside the financial services industry. Westpac Banking Group, for instance, reached gender parity in its leadership ranks in 2017, after publicly declaring its goal and openly detailing its path to achieve it.<sup>24</sup> Salesforce, another example, publicly identified gender pay equality as a core value and actively worked to even the disparity.<sup>25</sup>

“Some of our line-of-business executives have tracked all categories of diversity at their leadership levels with great outcomes.”

— Panelist, “The future of women leaders in the financial services industry”

## INVEST IN PROGRAMS THAT SUPPORT WOMEN REENTERING THE WORKFORCE

Women are more likely than men to pause their careers to address family needs, pursue additional education, or for any number of other reasons.<sup>26</sup> Doing so can have lasting consequences when they choose to restart. Those within our panel who restarted their careers after a significant pause noted that they did so by relying on their personal networks or engineering their own paths back, which indicates there is still much progress to be made to support restarts.

In 2008, Goldman Sachs launched its Returnship program, the first in the financial services industry,<sup>27</sup> and many institutions have since developed similar initiatives. With more than 3 million women estimated to be seeking restart

**“As we work to advance progress for women now working within the financial sector, we should direct equal attention to inspiring the next generation of young women.”**

***Amanda Pullinger***  
*CEO, 100 Women in Finance*

opportunities,<sup>28</sup> restart efforts are making their way into inclusion and experienced hire recruiting programs. Several consultancies focused on restarts, such as Après, iRelaunch, and reachHIRE, have also launched in the last few years. These companies and others help large financial services institutions and other organizations develop restart channels within their inclusion programs and help identify candidates. They also work directly with women who are ready to restart, offering services to prepare them for the path back, as well as matching them to opportunities.

Still, more progress should be made. Of the 230 global firms in Bloomberg’s 2019 Gender-Equality Index, only about one-third reported having some form of a restart program for women in place.<sup>29</sup> Creating or expanding existing programs to support women who are pursuing a restart could be a differentiator within diversity program planning and lead to better leadership outcomes for women.

**SUPPORT AND ENABLE MENTORSHIP, SPONSORSHIP, AND PEER NETWORKS**  
Institutions should not underestimate the power of support and the value of networks in advancing women. Both mentorship and sponsorship, for instance, have often been instrumental to employee retention, higher employee success rates, and promotion readiness.<sup>30</sup> Mentors, who lend career advice, might be more critical earlier in a woman’s career, the panelists said. However, as she moves into more senior-level positions, having a sponsor, or someone with the personal capital to advocate for her advancement, typically takes on greater importance.

“Networking has strengthened my business relationships. I have developed a group of diverse professionals that I can now reach out to for support and guidance on a professional as well as personal level.”

— Panelist, “The future of women leaders in the financial services industry”

Sponsorship has also been linked to having a measurable influence on an employee's satisfaction related to their career progression.<sup>31</sup> Most panelists highlighted, however, that finding a sponsor throughout their careers was difficult. Thus, given how sponsorship can directly and positively impact the advancement of women, current financial leaders should reassess their existing efforts as sponsors and then look for ways to improve their support—such as coaching, strategizing, providing high-visibility opportunities, and making introductions to other leaders.<sup>32</sup>

Notably, our panelists also emphasized that greater gender diversity in leadership will require support from *all* leaders, including men. They asserted that the gender of sponsors wasn't as important as the sponsor's commitment to help advancement. Along with women, men can be allies and serve as champions of change as well.

Peer networks are also important and can impact leadership outcomes. Networks, both internal and external, give access to new ideas, fresh perspectives, and opportunities. Internal networks can connect women across all levels of the organization and provide an open forum for dialogue on the common issues they are facing and how to address them. External networks, meanwhile, yield broader perspectives and connections for women both within their industry segments and beyond them. A recent study found that women who secured high-ranking leadership positions were most likely to be well-connected within their peer network and have strong ties to

other connected women.<sup>33</sup> With this in mind, institutions can provide tools and guidance for how to build, access, and make the most of these valuable channels.

## Reaching higher

The first Women's Rights Convention in the United States was held in 1848, during which Elizabeth Cady Stanton released the Declaration of Sentiments. Modeled after the US Declaration of Independence, the document not only called for women's suffrage, but also for the opportunity for "one portion of the family of man" to participate in "profitable employments." It took 70 more years of campaigns and protests until the US Senate passed the 19th amendment, giving women the right to vote.<sup>34</sup>

Even today, much more can be done to create opportunities for women to participate at the highest levels of the US financial services industry. At the current pace, the share of women leaders is expected to reach almost one-third of total leadership roles by 2030. That's good progress. But if financial institutions reach higher to adopt the ideas set forth in this report, with the support of both women and men in the corner office, many could show even greater progress in the coming years. Achieving gender equity in leadership roles seems the right thing to do and also makes good business sense. This is a call to action for all leaders to help make sure it doesn't take another 70 years to get there. ●

## ABOUT THE PROJECT

The insights in this report are based in part on a crowdsourced exercise (“panel”) by Currnt on behalf of the Deloitte Center for Financial Services. The project, fielded over four days during July 2019, involved 20 senior-level women leaders representing banking, insurance, investment management, and commercial real estate firms. The project was designed to augment the quantitative analysis portion of the project by exploring the leaders’ insights, including how people and experiences inspire and shape leaders; the path to leadership for women; sponsorship, mentorship and inclusion programs; and perceptions about the attributes and skills required of future leaders.

The quantitative analyses reported in the “Not enough progress: What our data revealed” and “Understand and embrace the multiplier effect” sections are based on the Deloitte Center for Financial Services’ proprietary analysis and custom segmentation of 107 financial services institutions’ data from BoardEx. The 107 institutions represent the top 25 each in banking, investment management, insurance, and commercial real estate firms by asset size, in addition to select payments provider firms included in the banking segment. A cross-sectional association analysis was conducted at the organizational level to determine the multiplier effect. Where used throughout the report, “financial services” denotes the previously listed industry segments.

**ALISON ROGISH**, Deloitte Services LP, is a managing director for Client and Market Growth in the financial services industry. She is based in Richmond, Virginia.

**STACY SANDLER**, Deloitte Consulting LLP, is the national practice leader for Deloitte’s Retirement and Wealth Consulting practice and a principal in the Financial Services practice. She is based in San Francisco.

**NEDA SHEMLUCK**, Deloitte Services LP, is a managing director for Client and Market Growth in the financial services industry. She is based in San Francisco.

**PATTY DANIELECKI**, Deloitte Services LP, is a senior manager and chief of staff at the Deloitte Center for Financial Services. She is based in New York City.

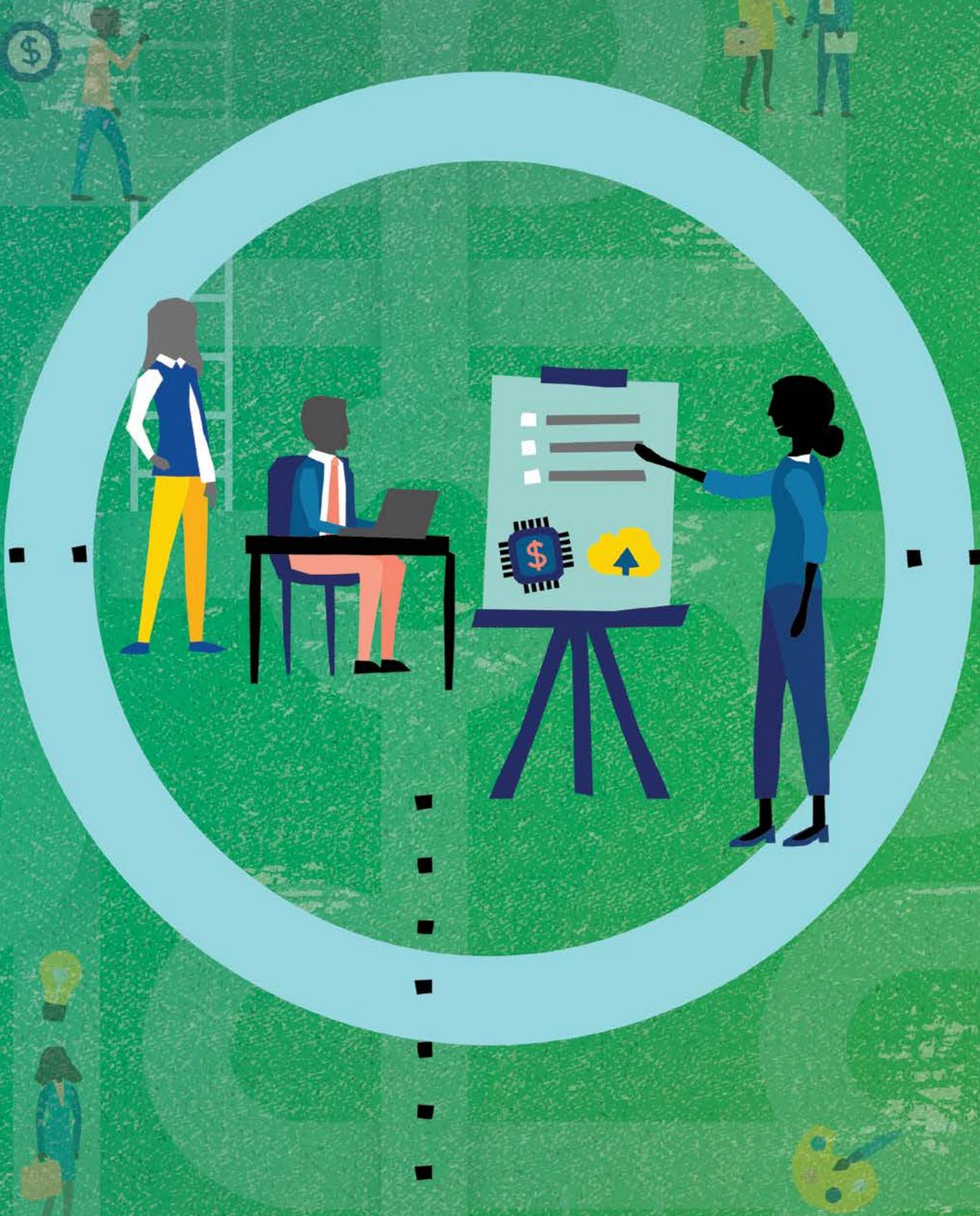
**TIFFANY RAMSAY**, Deloitte Services LP, is a senior market insights analyst at the Deloitte Center for Financial Services. She is based in New York City.

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**STRENGTH IN DIVERSITY**

# Paving diverse paths to technology leadership

**DIVERSITY AND INCLUSION IN TECH**

ANJALI SHAIKH, KRISTI LAMAR, AND RANJIT BAWA  
ART BY TRISTEN CLICK

It's no secret that new and emerging technologies are upending business as usual. We're seeing more and more companies with high-maintenance legacy systems moving to flexible cloud-based platforms.

Meanwhile, business and functional leaders are becoming more tech savvy, and technology leaders are expanding their understanding of the business and customer.

As on-site technology capabilities steadily shift to the cloud and outside the four walls of an organization, IT organizations' talent needs are also changing. Increasingly, organizations need an expanded set of softer skills to translate business needs into technology solutions, in addition to the deep technology expertise required to execute those solutions. CIOs and IT leaders consistently have difficulty finding enough individuals who possess the full range of high-tech and soft skills required to keep pace in today's complex, rapidly changing market.

But that may be a good thing.

Over the past decade, herculean efforts have been invested in attracting more diverse types of people into technology fields. However, the percentage of women graduating with computer science degrees has *dropped*—from 40 percent in the 1980s to less than 20 percent today.<sup>1</sup>

Here's the irony: As technology organizations' talent needs change, we find that the tech workforce is gradually becoming more diverse, even though computer science graduates remain predominately male. Perhaps that's because advances in technology are driving more IT

organizations to complement highly skilled technologists with colleagues who speak and understand the language of business to cover the gamut of new roles and responsibilities that technology teams are expected to deliver. Yes, IT still needs deep technologists, but it also should have people at all levels who think differently and bring a broader skill set and variety of experiences.

**IT still needs deep technologists, but it also should have people at all levels who think differently and bring a broader skill set and variety of experiences.**

As IT organizations increasingly embrace diverse mindsets, new paths to tech leadership are also opening up. Of course, many next-generation tech leaders continue to follow the traditional path that begins with a tech-focused education and continues as they rise through the technology ranks. But there's a new breed of tech leaders who come from diverse, nontechnical backgrounds where they developed critical thinking, problem-solving, communication, and other soft skills. Of course, technical skills are still fundamental, but this new breed of technologist is likely to have acquired their technology chops through work experiences, rather than a formal education in computer science or engineering.

## As technology changes, so do tech leaders

Many enterprises today are harnessing disruptive technologies—especially cloud and digital—to drive business transformation and growth. Ninety percent of organizations use cloud-based services, and they aren't putting on the brakes.<sup>2</sup> In fact, cloud investments are expected to double as a percentage of IT budget over the next three years.<sup>3</sup> The use of cloud has given rise to everything-as-a-service, enabling any IT function to become a cloud-based service provider for enterprise.

With this transition, enterprise technology is now, more than ever, an assembly of “not-invented-here” technologies, which can be rapidly applied to address business challenges and opportunities. Rather than building new technology solutions from scratch, more IT organizations are identifying and implementing cloud-based applications and products—leveraging “off-the-shelf” services to enable elastic compute, modern data structures, machine learning, IoT, facial recognition, and more—and combining them like building blocks to address business issues. Ranjit Bawa, Deloitte's US Cloud leader, says, “Tech leaders need to increasingly focus on ‘applied innovation’ or their ability to leverage ready-to-consume technology services, and apply them to their business use cases. This requires technology leaders to have a deep understanding of their business, an ability to apply technology solutions rapidly, and the financial acumen to drive strong ROI, as well as a societally responsible perspective. A deep background in technology is not critical, but intellectual curiosity, pragmatism, and bias for action are key.”<sup>4</sup>

This shift is helping enable IT departments to diversify skill sets to adjust to the mix of necessary

technology competencies. Data suggests that IT organizations will continue to reduce the percentage of full-time employees from 82 percent to 75 percent of staff.<sup>5</sup> While fewer full-time coders are needed, new roles—such as strategists and financial planners—are being created, which need soft skills for working with the business.

As they make hiring decisions, CIOs surveyed in Deloitte's 2018 global CIO survey expect three soft skills to be significantly more important than others:

- **Creativity.** IT talent will be needed to design products, services, and solutions that address business issues, develop engaging user experiences, think creatively to solve thorny business problems, and brainstorm innovative business ideas.
- **Cognitive flexibility.** Learning agility—including the ability to see different perspectives, learn new skills, and adapt to change—will be increasingly critical.
- **Emotional intelligence.** To effectively collaborate and influence people across multiple business functions, IT staff will need to manage interpersonal communication and relationships.<sup>6</sup>

In response to this shift, many tech leaders' primary role has been evolving from being a steward of technology to a partner in shaping the future of the business (see sidebar, “The changing faces of the tech executive”). Looking to the future, Lindsey Parker, chief technology officer (CTO) at DC government, predicts, “We're not going to have a tech team anymore; we're going to have a business team and there's going to be a technology element.”<sup>7</sup>

## THE CHANGING FACES OF THE TECH EXECUTIVE

Deloitte has identified four primary roles for tech executives, which we call the “four faces”:

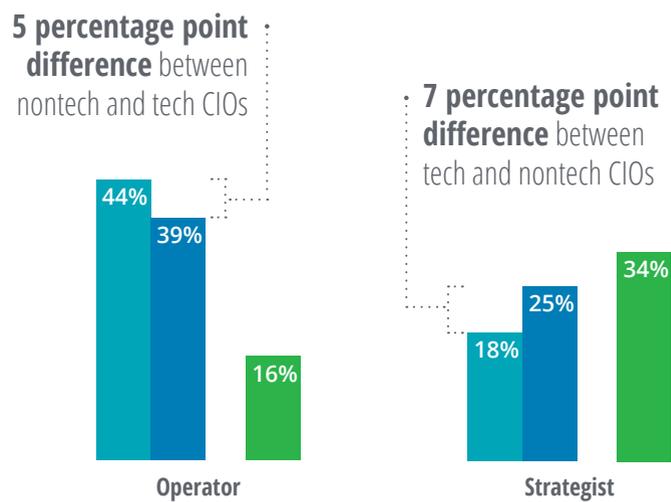
- **Operator:** Delivers efficient IT services and solutions to support the business
- **Technologist:** Assesses technologies and designs technical architectures to support the business
- **Strategist:** Partners with the business to align business and IT strategies and maximize value of tech investments
- **Catalyst:** Instigates innovation through transformational change to business architecture, strategy, operations, and technology

When new CIOs transition into the role, we ask them how they’re currently spending their time across these four faces and how they aspire to spend their time. A trend we’ve seen across all newly transitioning CIOs is a desire to spend more time as a Strategist and less as an Operator. CIOs from nontechnical backgrounds are closer in their desired time allocation to the Strategist and Operator than CIOs with technical backgrounds (figure 1). That may indicate that nontechnical CIOs come into the role with an advantage over their technical peers: They spend more of their day focused on the big picture and less on the operational side.

FIGURE 1

### CIOs without a tech background spend more time being a Strategist and less time as an Operator than their peers with tech backgrounds

- Current time allocation for CIOs with tech background
- Current time allocation for CIOs without tech background
- Future/ideal state of time allocation across all CIOs



Source: Deloitte analysis of 157 CIOs.

## Wanted: Technologists with diverse experiences

We're seeing increasing demand for technology leaders' soft skills—their ability to be business strategists, navigate C-suite and vendor relationships, and communicate effectively with their stakeholders—come up to par with the demand for their technical dexterity. According to a 2020 study conducted by Deloitte and WSJ Intelligence, 87 percent of CEOs agree that it is “more important now for technology leaders to understand business operations, strategy, and innovation than to have deep expertise in technology systems.”

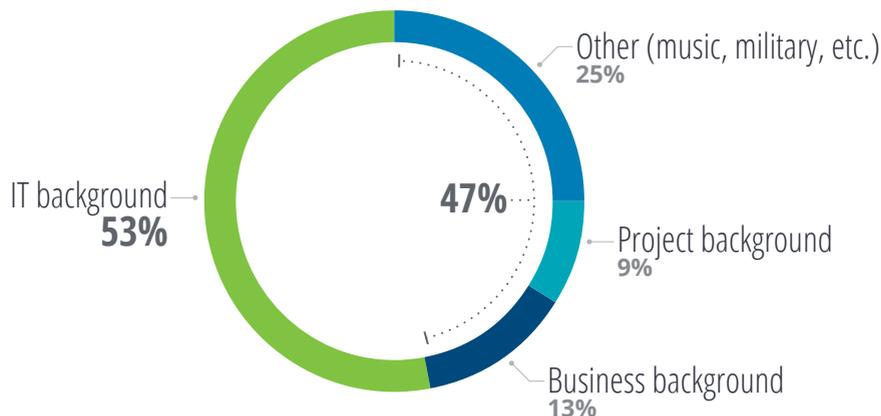
As a result, more companies are placing less emphasis on a degree and career in tech, and more on an individual's ability to understand and communicate how technology can help solve business problems and create value. Almost half of the recipients of the 2019 UK CIO 100 award, which recognizes the most transformational and disruptive CIOs in and from the United Kingdom, did not have

a technical/IT background prior to becoming CIO, while 53 percent reported treading a more traditional career path (figure 2). Those whose paths to the position were not rooted in tech were split among business (13 percent), project (9 percent), and a wide range of other (25 percent) backgrounds, from music to the military.<sup>8</sup>

One nontraditional tech leader is Rachel (Rae) Parent,<sup>9</sup> who is now head of enterprise change at T. Rowe Price. After graduating with a liberal arts degree, she was hired by a company that was looking for entry-level people with broad backgrounds to bring into their technology organization. Its hiring model was to look for people with strong communications and problem-solving skills and develop them for careers in software design and installation. Step one was learning how to program. Parent admits she was “probably the worst COBOL programmer ever,” but she developed the essential technical skills that allowed her to work with the business to understand their needs and translate them into software requirements.

FIGURE 2

### Almost half of the 2019 UK CIO 100 recipients did not have a technical/IT background prior to becoming a CIO



Source: Thomas Macaulay, “CIO career paths,” CIO Insights UK, June 4, 2019.

Today, Melissa Bell,<sup>10</sup> CIO at Danaher, leads its global IT organization, enabling the enterprise’s digital transformation. She credits her effectiveness to her liberal arts education, which taught her “how to learn”; that is, how to prioritize massive amounts of information, figure out what’s most important, and express those ideas clearly, along with her own thoughts. Her learning agility led to a consulting job where she worked in advisory, business transformation, and systems implementation—giving her a “mini-MBA” and exposure to technology.

And there are others. Mark Roellig<sup>11</sup> moved into the role of MassMutual’s chief technology and administrative officer from his position as the company’s general legal counsel. And Sally Gilligan<sup>12</sup> leveraged her economics education and supply chain leadership role to become the CIO at Gap Inc.

But this is a relatively recent trend. According to Parent, tech recruiters, particularly those looking to fill more senior-level roles, “can be very focused on computer science or engineering degrees earned early on, and as a result, can miss out on candidates with the different types of perspectives

provided by a nontraditional degree and on-the-job technology learning.” The idea that a nontechnical candidate can bring a broader perspective is still relatively new.

Still, 23 percent of the respondents to the 2020 Deloitte Global Tech Leadership survey have nontechnical educational backgrounds, as do an average 25 percent of their technology staff members (figure 3). As these leaders look to fill gaps in creativity and cognitive flexibility, they are bringing in people from nontraditional IT career paths, and increasing the diversity of perspectives.

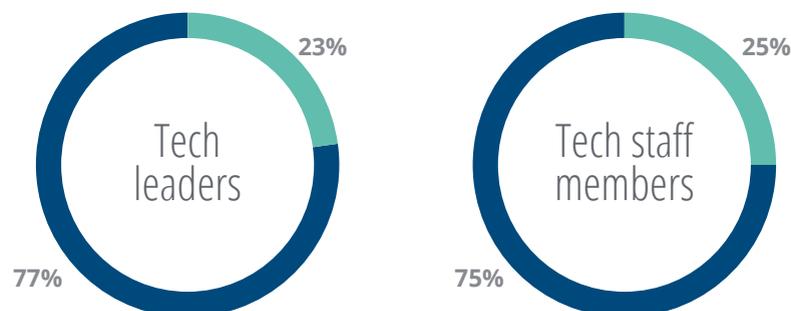
## The softer side of tech leadership

While tech leaders should still ensure IT’s operational reliability, their strategic role as an enabler for cloud and digital transformation often requires a broader skill set. Melissa Bell says, “You need good, deep technical skills, *and* you need soft skills, which I prefer to call ‘consulting skills.’ You need to really understand the business—its strategy, customers, challenges—

FIGURE 3

### Nearly a quarter of technology executives and their tech workforce have nontechnical education degrees

■ Have nontechnical education ■ Have technical education



Source: Deloitte Global Tech Leadership 2020 survey.

and build relationships to effectively influence transformation. Technology is moving so fast that learning agility is required to survive in this environment.”

Many of this new breed of tech leaders came to the role with a deep understanding of the business and its customers. Gilligan brought the ability to lead large organizations through transformational change. She brought her economics background and deep understanding of the customer and the business that she gained as a leader in Gap Inc.’s supply chain. She said, “For that reason, I was asked to lead our tech transformation, which requires bringing an organization through large-scale change.”

In Parker’s case, the mayor of the District of Columbia was looking for someone to lead the city’s IT organization who understood how to execute a campaign and get all stakeholders involved.

Parker’s policy background and work as a strategic communicator enabled her to apply her knowledge of governance to help IT become better organized. Parker said, “If you think about any technology project, that’s what it needs. You need to contemplate all of the users, their journeys, and how you’re going to bring them along as you change the tools that they use to drive their operations.”

Parent’s soft skills, learned through studying the liberal arts, help her to drive meaningful and actionable discussions with teams of technologists.

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## OUR TAKE: FILLING THE TECH GAP BY CREATING DIVERSE ROLES

*Ranjit Bawa, US Cloud leader, and Kate Kustermann Rivera, Cloud Capability Development leader, Deloitte Consulting*

Like many of our clients, Deloitte needs people with diverse mindsets and backgrounds to lead in today’s cloud-based tech environment. In addition to deep cloud tech skills, we also need people with communication and problem-solving skills and business acumen, who can develop effective strategies to apply cloud-based solutions to address our client’s business challenges and opportunities.

We know we cannot hire our way out of this problem; there simply are not enough cloud-skilled people in the market, period. That’s why we launched Deloitte’s Cloud Institute. By reskilling and upskilling some of our most promising professionals, we are building the industry’s most skilled cloud technology workforce to help lead the massive transformations our clients need to continue to grow and compete.

We created five role-based pathways: developer, engineer, architect, AI/analytics, and strategist. The first four require a strong tech background. But for the fifth—strategist—we look for professionals with a broader business background, often from our Human Capital and Strategy and Operations practice areas. They learn tech fundamentals and how to apply cloud-based technologies to deliver more value to our clients. Many of our modern delivery teams are cross-functional in nature, with technology and functional experts, that complement each other and together deliver a superior outcome.

The Cloud Institute launched about a year ago, with its first cohort completing the foundational curriculum. Advanced and master curriculums for each pathway will support and encourage the continuous learning that’s required in this rapidly changing tech space. The Cloud Institute is just one of the many tactics Deloitte is using to attract, motivate, and retain the top-tier talent we need to serve our clients.

She says, “Solid technical perspective is a critical part of problem-solving, but leaders also need to understand how to foster collaboration across diverse teams and make space for ideas that are not rooted first in technology.”

Of course, many technologists have developed these leadership skills, but people sometimes naturally tend to revert to their comfort zones. Parent says, “Sometimes the deeper technologists will resort to technology-first, whereas those who have had a variety of academic and professional experiences tend to ask questions of more stakeholders, collect multiple points of view, and make connections across technology and business teams.”

Roellig entered his tech leadership role at MassMutual without hands-on tech experience, but with lots of curiosity and willingness to learn. “At this point in my career, I’m probably not a very good lawyer or technologist, but I know how to lead large teams, particularly support teams that enable the overall organization.” He gained the essential technical knowledge he needed in his new role both internally, by spending time with and learning from his people, and externally, by reading and attending conferences with other technology leaders.

## Advice for building the next generation of diverse tech leaders

Our conversations with the featured technology leaders who come from nontraditional backgrounds generated the following practical suggestions for CIOs and other leaders who are

looking to fill IT talent gaps and build a more diverse and inclusive culture:

**Cast a wider net.** Bell finds diverse ideas and talent by building relationships outside her company and industry. She said, “I have a broad network working for me. I have relationships with multiple consultancies, local and national conference boards, and learning and development programs like Deloitte’s NextGen CIO Academy. So, I’m already meeting a wide range of folks before I even have a position to fill.”

**Look beyond the degree.** When developing, hiring, and retraining IT talent, consider the individual’s learning agility and other soft skills, which may matter more than educational background or formal work experience. Gilligan looks for “learning agility and a growth mindset. How do they approach a problem, and what are their critical thinking skills? Do they have the skills necessary and the learning agility to do a breadth of jobs? We look across a diversity of backgrounds and talents in order to find the best talent.”

**Seek diverse perspectives.** Gilligan invites new ideas from across her organization to understand how different people view the problem and how they might solve it. She says, “The solution you may have thought of may not be the optimum or best one. So, the more diversity of thought, the more likely you are to actually find the ideal solution.” Consider going even further by forcing yourself and your teams to take this to heart. Don’t just encourage diverse viewpoints but keep each other honest and track them.

**Create diverse roles.** It takes a broad breadth of roles to run an effective IT organization, from deeply technical roles, which require highly

# When developing, hiring, and retraining IT talent, consider the individual's learning agility and other soft skills, which may matter more than educational background or formal work experience.



specialized skills, to strategic and operational roles, which are less technical but require more interpersonal skills. Some companies, including Deloitte Consulting, are creating diverse roles and customized learning curriculums based on the technical and interpersonal/business skills required to be effective (see sidebar, “Our take: Filling the tech gap by creating diverse roles”).

**Upskill and reskill.** Organizations are finding that they cannot hire enough qualified people to fill the demand for certain specialized tech roles, such as in cybersecurity and cloud. Some are launching initiatives to upskill and reskill business and technology employees to fill critical high-demand roles.

**Learn a common language.** Some companies, including Danaher and Deloitte, are developing fluency programs. According to Bell, “It’s about tech fluency for business leaders, but also business fluency for tech leaders. The goal is to bridge the

gap between the two so they can talk the same language.”

Tech fluency programs for business professionals may also help tech leaders identify new talent that can fill strategic roles that align business issues with tech solutions.

**Don’t skip the basics.** Roellig encourages tech leaders with nontraditional backgrounds to “explore the core elements of technology. You probably want to know a little bit about coding, data analytics, algorithms, and how they are used. You don’t have to become an expert, but there is value in banging around on some of those analytical-type areas so at least you have some knowledge of what they are.”

**Broaden young minds.** Parker looks for opportunities to speak to young people—not just high school, but also elementary and middle school students. She shares her nontech background and lets them know that “you don’t have to be an engineer or have 50 advanced

degrees to be successful in tech. But you do need to work really hard at it and think about how to deliver what people want.”

## The time is now

It’s as if the stars have aligned to nudge technology organizations toward the broad-ranging benefits of diversity. As more technology capabilities move off-premise and into the cloud, IT organizations find that they need fewer full-time deep technologists. Simultaneously, they are creating new strategy-focused roles to align business goals with cloud-based technology solutions. These roles require business acumen and soft skills—creativity, cognitive flexibility, and emotional intelligence—that are more likely to be developed outside the traditional STEM education path and career.

As professionals with diverse experiences, education, and mindsets enter technology organizations, a new path to tech leadership is emerging. It’s not a coincidence that the diversity and inclusion initiatives that organizations have cultivated in recent years are beginning to pay off.

Diverse thinking is organically evolving from a “nice to have” to a “must have.” That doesn’t mean that technology leaders can back off. Our commitment to diversity and inclusion should remain top of mind to enable this new breed of tech leader to be effective in building bridges between the business and technology. Over time, we expect that there will be no distinction: All businesses will be technology-minded, and all technology organizations will be business-minded. ●

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*This article is part of an ongoing series of interviews with technology executives. The executives’ participation in this article are solely for educational purposes based on their knowledge of the subject, and the views expressed by them are solely their own. This article should not be deemed or construed to be for the purpose of soliciting business for any of the companies mentioned, nor does Deloitte advocate or endorse the services or products provided by these companies.*

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**ANJALI SHAIKH** is a senior manager and the experience leader for Deloitte Consulting LLP's US CIO Program. She is based in Costa Mesa, California.

**KRISTI LAMAR** is a managing director for Deloitte Consulting LLP's Technology & Innovation group and executive leader for the US CIO Program. She is based in Denver.

**RANJIT BAWA** is Deloitte Consulting LLP's US Cloud leader. He is based in New York City.



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## Order from chaos

### STARTUPS TACKLE ORGANIZING INDIA'S ROAD LOGISTICS INDUSTRY

India's logistics market is worth as much as US\$160 billion, and road logistics is a major player in it.<sup>1</sup> Yet most road logistics participants—truckers, transporters, retailers, and mechanics—complain of an inherent trust deficit, likely because of the opaque network of middlemen and small operators. As a result, the industry often faces acute inefficiencies: fragmented ownership, demand and supply mismatch, low utilization, low pricing, low returns, and low wages. High broker commissions and a lack of transparency don't help, either.

However, India's road logistics industry seems ripe for consolidation through digital transformation. A host of road logistics startups are taking on the challenge of managing inefficiencies by trying to organize this largely unorganized sector. They're doing so by using technology—and data. In addition to enabling digital freight-matching, they are also creating new business models.

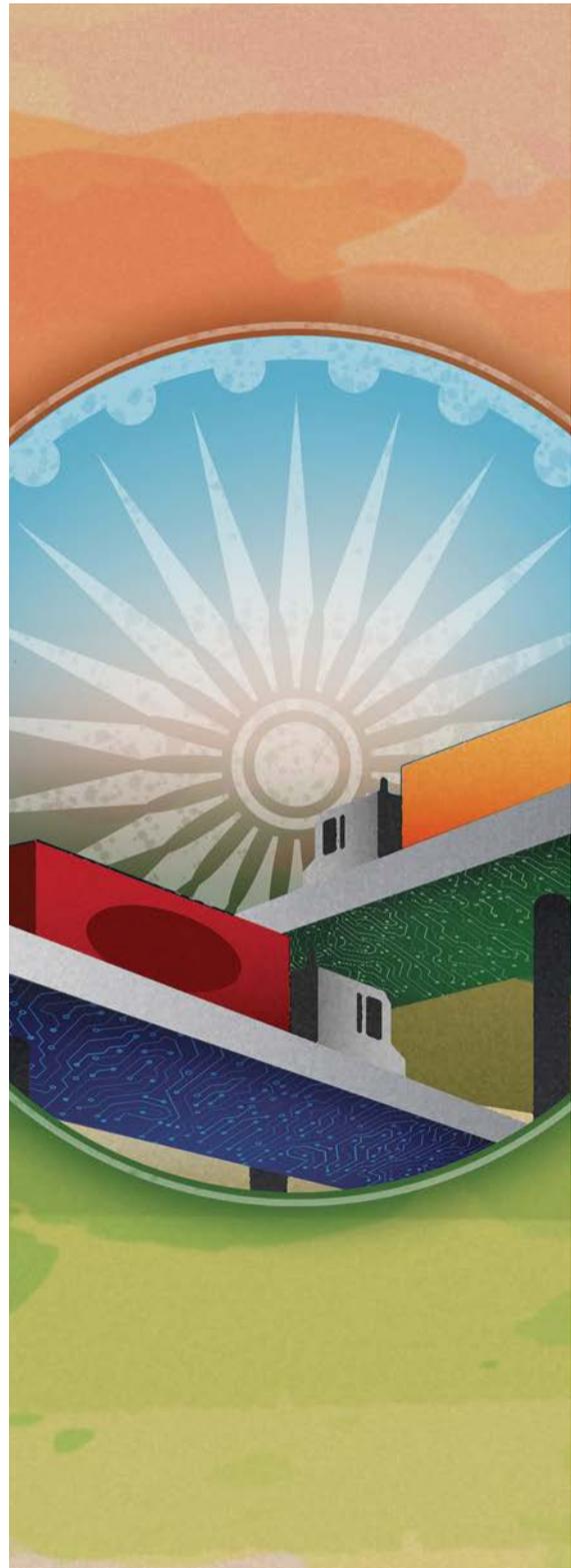


FIGURE 1

## Models to address the core business problems

- 1 Asset heavy + working capital heavy**

These startups own and control their own fleets and directly contract with shippers, creating the need to fund working capital. This model allows the highest level of control in meeting stringent service levels and turnaround times. Rivigo's core logistics offerings are an example of this model.
- 2 Asset light + working capital heavy**

These startups do not own trucks, but contract directly with shippers to fulfill shipments. This model involves some level of quasi-ownership—trucks that are exclusive to the platform in exchange for minimum payment guarantees. The Blackbuck freight platform and Rivigo Freight use this model.
- 3 Asset light + working capital light**

These startups neither own trucks nor take working capital risks. They are “digital brokers,” doing the same function that traditional middlemen perform, but with technology and at scale.

Source: Doblin, accessed January 8, 2020.

For example, value-added service platforms, operating either as standalones or as part of freight-matching marketplaces, could collect granular data on vehicle use, maintenance patterns, and even driver behavior. This data can then enable services targeted at truckers. For instance, some startups have been applying machine learning and predictive analytics on truck usage and maintenance records to predict when a part is likely to break down. This could enable preventive maintenance, saving truckers time and money.

Our analysis reveals the emergence of primarily three types of startups, each seeming to use a different mix of asset ownership and working capital risk to address core issues (figure 1).

As technology opens new pathways to success in India's road logistics industry, many traditional intermediaries such as transporters, retailers, and mechanics appear to be coming under threat. They will likely need to scale on the digital maturity curve by building and/or buying capabilities that work for them. To do so, they should consider:

- Maintaining an innovation portfolio that balances core, adjacent, and transformational innovation initiatives
- Including investments that proactively create value in growth areas that are new to the company
- Using multiple types of innovation (not just new product innovation) to create new customer experiences and businesses ●

To learn more, read the full report, *A time of reckoning: Road logistics in India*, on [www.deloitte.com/insights/india-road-logistics](http://www.deloitte.com/insights/india-road-logistics).

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## The essence of resilient leadership

page 8

1. Punit Renjen, *The heart of resilient leadership: Responding to COVID-19*, Deloitte Insights, March 16, 2020.
2. Henry A. Kissinger, "The coronavirus pandemic will forever alter the world order," *Wall Street Journal*, April 3, 2020.
3. António Guterres, "The recovery from the COVID-19 crisis must lead to a different economy," United Nations, March 31, 2020.
4. UN News, "5 reasons the world needs WHO, to fight the COVID-19 pandemic," April 9, 2020.
5. US National Institutes of Health, "NIH to launch public-private partnership to speed COVID-19 vaccine and treatment options," April 17, 2020.
6. Deloitte, *COVID-19 government response portal*, 2020.
7. Personal experience of colleagues of the author.
8. Russell Redman, "Nielsen: Coronavirus has CPG shoppers changing their ways," *Supermarket News*, March 11, 2020.
9. Joshua M. Epstein, "Are we already missing the next epidemic?," *Politico*, March 31, 2020.
10. Ibid.
11. Quoting US Defense Secretary Donald Rumsfeld's famous statement that "There are also unknown unknowns—the ones we don't know we don't know. And if one looks throughout the history of our country and other free countries, it is the latter category that tend to be the difficult ones." US Department of Defense, "DoD news briefing—Secretary Rumsfeld and Gen. Myers," February 12, 2002.
12. PYMNTS, "Turning retail solutions to crisis mitigation," March 5, 2020.
13. Personal experience of colleagues of the author.
14. Ibid.
15. Xinhua, "China Focus: Free online medical services help curb coronavirus outbreak," *Xinhuanet*, February 2, 2020.
16. Christian Bjørnskov, "How does social trust affect economic growth?," *Southern Economic Journal* 78, no. 4 (April 2012): pp. 1,346–68.
17. Stephen Knack, "Trust, associational life, and economic performance," in John F. Helliwell (Ed.), *The Contribution of Human and Social Capital to*

- 
- Sustained Economic Growth and Well-Being* (OECD and Human Resources Development Canada, January 2001).
18. Dietlind Stolle, "Clubs and congregations: The benefits of joining an association," in Karen S. Cook (Ed.), *Trust in Society* (New York: Russell Sage Foundation, 2003), pp. 202–44.
  19. Yann Algan, "Trust and social capital," in Joseph E. Stiglitz, Jean-Paul Fitoussi, and Martine Durand (Eds.), *For Good Measure: Advancing Research on Well-Being Metrics Beyond GDP* (Paris: OECD Publishing, 2018).
  20. Goodreads, "Stephen R. Covey > quotes > quotable quote," accessed April 19, 2020.
  21. Andy Crouch, Kurt Keilhacker, and Dave Blanchard, "Leading beyond the blizzard: Why every organization is now a startup," *The Praxis Journal*, March 20, 2020.
  22. Dina Gerdeman, "How the coronavirus is already rewriting the future of business," Harvard Business School, March 16, 2020.
  23. The Global Business Network (GBN, now part of Monitor Deloitte) was founded by Peter Schwartz, the author of *Art of the Long View*. Andrew Blau and Gopi Billa, former GBN colleagues, and Schwartz, who is now the senior vice president of strategy for Salesforce, collaborated to create these future-state scenarios.
  24. William Strauss and Neil Howe, *The Fourth Turning* (New York: Three Rivers Press, 1997).
  25. *Ibid.*, pp. 5–6.
  26. Deloitte, *COVID-19: The recovery of organizations and supply chains*, 2020.
  27. Deloitte, *COVID-19 economic cases: Scenarios for business leaders*, 2020.
  28. Deloitte, *COVID-19 government response portal*.
  29. Deloitte, *Stepping in: The board's role in the COVID-19 crisis*, 2020.
  30. Business Roundtable, "Business Roundtable redefines purpose of a corporation to promote 'an economy that serves all Americans,'" August 19, 2019.
  31. Business Roundtable, "Business roundtable CEOs are responding to COVID-19," accessed April 19, 2020.
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## Getting decision rights right

page 24

1. David Mallon and Timothy Davis, *The organization design maturity model*, Deloitte Consulting LLP, 2019.
2. Julie Hiipakka and David Mallon, *Fostering a learning culture: Why it matters now*, Deloitte Consulting LLP, December 12, 2018.
3. Companies that “excelled” and “performed poorly” in the five decision rights attributes were defined as those in the top and bottom quartiles of our sample, respectively.
2. Shana Lynch, “Andrew Ng: Why AI is the new electricity,” *Insights by Standard Business*, March 11, 2017.
3. A general-purpose technology (GPT) is a type of technology whose breadth of applications and spillover effects can drastically alter entire economies and social structures. Previous examples of GPTs include the invention of writing, the steam engine, the automobile, the mass production system, the computer, the internet, and, of course, electricity.
4. Lynch, “Andrew Ng: Why AI is the new electricity.”
5. Kevin Roose, “The hidden automation agenda of the Davos elite,” *New York Times*, January 25, 2019.

## Superminds, not substitutes

page 26

1. Barbara J. Grosz, “Some reflections on Michael Jordan’s article ‘Artificial intelligence—the revolution hasn’t happened yet,’” *Harvard Data Science Review*, July 2, 2019.
6. For a discussion on reimagining jobs and “reconstructing work,” see: Peter Evans-Greenwood, Harvey Lewis, and Jim Guszczka, “Reconstructing work: Automation, artificial intelligence, and the essential role of humans,” *Deloitte Review* 21, July 31, 2017; for more on the theme of redefining and redesigning work to create new sources of value, see: John Hagel, Jeff Schwartz, and Maggie Wooll, “Redefining work for new value: The next opportunity,” *MIT Sloan Management Review*, December 3, 2019; for a discussion on the business logic of focusing on

- 
- value creation rather than cost reduction, see: Jeff Schwartz et al., "Reframing the future of work," *MIT Sloan Management Review*, February 20, 2019.
7. Thomas W. Malone, *Superminds* (New York: Little, Brown Spark, 2018). For an interview with Malone, see: Jim Guszcza and Jeff Schwartz, "Superminds: How humans and machines can work together," *Deloitte Review* 24, January 28, 2019. Malone's and others' work in the emerging multidisciplinary field of collective intelligence is surveyed in the *Handbook of Collective Intelligence*, edited by Thomas W. Malone and Michael S. Bernstein (Cambridge, Massachusetts: MIT Press, 2015). *Superminds* explores the newer forms of collective intelligence that can emerge from groups of humans connected and otherwise augmented by digital and AI technologies.
  8. Personal communication from Thomas Malone to Jim Guszcza.
  9. For example, the AI pioneer Marvin Minsky served as an adviser to Stanley Kubrick's and Arthur C. Clarke's *2001: A Space Odyssey*. Perhaps that movie's most memorable character was HAL 9000, a computer that spoke fluent English, used commonsense reasoning, experienced jealousy, and tried to escape termination by doing away with the ship's crew. In short, HAL was a computer that implemented a very general form of human intelligence. Minsky and other AI leaders of the day believed that such general, human-imitative artificial intelligences would be achievable by the year 2001.
  10. David Gelles and David Yaffe-Bellany, "Shareholder value is no longer everything, top CEOs say," *New York Times*, August 19, 2019.
  11. Anne-Marie Slaughter, "Forget the Trump administration. America will save America," *New York Times*, March 21, 2020.
  12. It is commonly agreed that the field of AI originated at a 1956 summer conference at Dartmouth University, attended by such scientific luminaries as John McCarthy, Claude Shannon, Alan Newell, Herbert Simon, and Marvin Minsky. The conference's proposal stated: "The study is to proceed on the basis of the conjecture that *every aspect of learning or any other feature of intelligence* [emphasis added] 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 kinds of problems now reserved for humans, and improve themselves." See: John McCarthy et al., "A proposal for the Dartmouth Summer Research Project on artificial intelligence," *AI Magazine* 27, no. 4 (2006). Regarding the time frame, the proposal went on to state, "We think that a
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- significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it for a summer.”
13. Garry Kasparov, “The brain’s last stand,” keynote address at DefCon 2017, Kasparov.com, August 18, 2017.
  14. YouTube, “Jeopardy IBM challenge day 3 Computer Overlords clip,” video, July 28, 2012.
  15. Murad Ahmed, “Demis Hassabis, master of the new machine age,” *Financial Times*, March 11, 2016. This was not an isolated statement. Two days earlier, the *New York Times* carried an opinion piece stating that “Google’s AlphaGo is demonstrating for the first time that machines can truly learn and think in a human way.” See: Howard Yu, “AlphaGo’s success shows the human advantage is eroding fast,” *New York Times*, March 9, 2016.
  16. Gary Marcus and Ernest Davis, *Rebooting AI* (New York: Pantheon, 2019). For a relevant excerpt, see: Gary Marcus and Ernest Davis, “If computers are so smart, how come they can’t read?,” *Wired*, September 10, 2019.
  17. Steve Lohr, “Facial recognition is accurate, if you’re a white guy,” *New York Times*, February 9, 2018.
  18. The linguist Noam Chomsky famously observed that children can learn grammar based on surprisingly little data, and argued that knowledge of grammar is innate. This is the so-called “poverty of the stimulus” argument. For a modern discussion that points toward potential developments in third-wave AI, see: Amy Perfors, Joshua Tennenbaum, and Terry Regier, “Poverty of the stimulus? A rational approach,” MIT.edu, January 2006.
  19. In computer science, the phenomenon goes by the name “Moravec’s Paradox” after Hans Moravec, who stated that “it is comparatively easy to make computers exhibit adult-level performance on intelligence tests or playing checkers, and difficult or impossible to give them the skills of a one-year-old when it comes to perception and mobility.” See: Hans Moravec, *Mind Children* (Cambridge, Massachusetts: Harvard University Press, 1988).
  20. Alison Gopnik, “What do you think about machines that think?,” Edge, 2015. Gopnik also states, “One of the fascinating things about the search for AI is that it’s been so hard to predict which parts would be easy or hard. At first, we thought that the quintessential preoccupations of the officially smart few, like playing chess or proving theorems—the corridas of nerd machismo—would prove to be hardest for
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- computers. In fact, they turn out to be easy. Things every dummy can do like recognizing objects or picking them up are much harder.”
21. Steven Pinker, *The Language Instinct* (New York: Harper Perennial Modern Classics, 1994).
  22. Scott E. Page, *The Diversity Bonus: How Great Teams Pay Off in the Knowledge Economy* (Princeton, New Jersey: Princeton University Press, 2017).
  23. Garry Kasparov, “The chess master and the computer,” *New York Review of Books*, February 11, 2010.
  24. Malone provides a useful taxonomy for designing such human-machine partnerships. Computers can serve as *tools* for humans, *assistants* to humans, *peers* of humans, or *managers* of humans. (See: Malone, *Superminds*.) Malone also discusses these modes of collaboration in “Superminds: How humans and machines can work together,” *Deloitte Review* 24, January 28, 2019.
  25. A 2016 research report found that 80 percent of businesses were either using chatbots or planned to adopt them by 2020. Business Insider Intelligence, “80% of businesses want chatbots by 2020,” December 14, 2016.
  26. Kelley A. Wittbold et al., “How hospitals are using AI to battle COVID-19,” *Harvard Business Review*, April 3, 2020.
  27. This analysis was done by the economist James Bessen. See: James Pethokoukis, “What the story of ATMs and bank tellers reveals about the ‘rise of the robots’ and jobs,” blog, AEI, June 6, 2016.
  28. Ironically, the report is entitled, “How bots will automate call center jobs.” See Bloomberg, “How bots will automate call center jobs,” August 15, 2019.
  29. *Ibid.*
  30. Ziad Obermeyer and Ezekiel Emanuel, “Predicting the future—big data, machine learning, and clinical medicine,” *New England Journal of Medicine* 375 (2016): pp. 1,216–9, DOI: 10.1056/NEJMp1606181. The authors comment that, because their work largely involves interpreting digitized images, “machine learning will displace much of the work of radiologists and anatomical pathologists.”
  31. Tweet by Eric Topol, Twitter, 7:35 AM, November 16, 2017.
  32. Geff Hinton, “On radiology,” YouTube video, November 24, 2016.
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33. Eric Topol, *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again* (New York: Basic Books, 2019).
  34. Ibid.
  35. All quotes in the above paragraph are from Eric Topol, "Doctors and Patterns," *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again* (New York: Basic Books, 2019).
  36. James A.R. Marshall et al., "On optimal decision-making in brains and social insect colonies," *Journal of the Royal Society* 6 (2009): pp. 1,065–74, DOI: 10.1098/rsif.2008.0511.
  37. Bhavik N. Patel et al., "Human-machine partnership with artificial intelligence for chest radiograph diagnosis," *Nature Digital Medicine* 2 (2019). Interestingly, the authors report that the machine diagnoses had a higher true positive rate (sensitivity), while the human diagnosticians had a lower false negative rate (specificity).
  38. Herbert Simon, *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations*, 4th ed. (New York: Free Press, 1997).
  39. Daniel Kahneman et al., "Noise: How to overcome the high, hidden cost of inconsistent decision making," *Harvard Business Review*, October 2016.
  40. For example: Paul McCaffrey, "Daniel Kahneman: Four keys to better decision making," *Enterprising Investor*, June 8, 2018; Heloise Wood, "William Collins splashes seven figures on Kahneman's book about noise," *Bookseller*, March 20, 2018.
  41. For example: Miranda Bogen, "All the ways hiring algorithms can introduce bias," *Harvard Business Review*, May 6, 2019.
  42. For example: Ziad Obermeyer et al., "Dissecting racial bias in an algorithm used to manage the health of populations," *Science* 366, no. 6,464 (2019): pp. 447–53, DOI: 10.1126/science.aax2342.
  43. Upon joining the practice, Jim's reaction—similar to that of many of our clients—channeled the substitution view: "This is impossible: The data is way too sparse and messy to eliminate the need for human underwriters!" In fact, the solution was superminds, not substitution, in nature. To ensure effective human-algorithm collaboration, expert human judgment was infused into both the design and the daily operation of the solution. Underwriters used their domain and institutional knowledge to help the actuaries and data scientists to create data features and understand data limitations; the actuaries and data scientists carefully sampled and adjusted the historical data to mirror the scenarios in which the algorithm was to be applied. In addition, they collaborated with business owners to establish "guardrails" and
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business rules for when and how the algorithms should be used for various risks. In contrast to the extreme form of machine learning-based AI in which prior knowledge is thrown away in favor of algorithmic pattern-matching, human knowledge was infused into the solution at multiple steps. And in contrast with the substitution narrative, the solution was explicitly designed to meet the needs of human end users.

44. For further discussion of this conception of human-centered AI, see: Jim Guszczka, "Smarter together: Why artificial intelligence needs human-centered design," *Deloitte Review* 22, January 22, 2018.
  45. For example: Matissa Hollister, "AI can help with the COVID-19 crisis—but the right human input is key," World Economic Forum, March 30, 2020. The article notes: "AI systems need a lot of data, with relevant examples in that data, in order to find these patterns. Machine learning also implicitly assumes that conditions today are the same as the conditions represented in the training data. In other words, AI systems implicitly assume that what has worked in the past will still work in the future."
  46. For a broader discussion of AI ethics, see: Jim Guszczka et al., "Human values in the loop: Design principles for ethical AI," *Deloitte Review* 26, January 28, 2020.
  47. *Chicago Booth Review*, "Sendhil Mullainathan says AI can counter human biases," August 7, 2019.
  48. A physical analog to this discussion of human-machine "cognitive collaboration" for improved judgments and decisions is the concept of "cobots" developed by the prominent roboticist Rodney Brooks. Brooks and his collaborators have designed robots that can be trained without writing code, give human collaborators visual cues (such as animated "eyes" that move in the direction of a robot arm), and are designed to be safe for humans to collaborate with. See: Erico Guizzo and Evan Ackerman, "Rethink Robotics, pioneer of collaborative robots, shuts down," *IEEE Spectrum*, October 4, 2018.
  49. Slaughter, "Forget the Trump administration. America will save America."
  50. Atul Gawande, "The hot spotters: Can we lower medical costs by giving the neediest patients better care?," *New Yorker*, January 17, 2011.
  51. For example, CareLinx is a startup that uses algorithms to match caregivers with families. See: Kerry Hannon, "Finding the right caregiver, eHarmony style," *Money*, July 11, 2016.
  52. Hagel, Schwartz, and Wooll, "Redefining work for new value: The next opportunity"; Schwartz et al., "Reframing the future of work."
-

- 
53. David H. Autor, "Why are there still so many jobs? The history and future of workplace automation," *Journal of Economic Perspectives* 29, no. 3 (2015): pp. 3–30.

## Opportunity marketplaces

page 42

1. Amartya Sen, "Well-being, agency, and freedom: The Dewey Lectures 1984," *Journal of Philosophy* 82, no. 4 (April 1985): pp. 169–221, DOI: 10.2307/2026184; Edmund S. Phelps, *Mass Flourishing: How Grassroots Innovation Created Jobs, Challenge, and Change* (Princeton, New Jersey: Princeton University Press, 2013); *Economist*, "Coase's theory of the firm," July 27, 2017.
2. Amy C. Edmondson, *The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth* (Hoboken, New Jersey: John Wiley & Sons, 2018).
3. Sen, "Well-Being, agency, and freedom: The Dewey lectures 1984," pp. 169–221.
4. LinkedIn produces an opportunity index (see: LinkedIn, "The 2020 LinkedIn Opportunity Index," accessed May 11, 2020) that focuses on individual perceptions of opportunities about work and life in different regions of the world. We are proposing a somewhat different kind of index: a business-specific opportunity index that explores worker perceptions about the availability of, and their ability to pursue, desirable opportunities in their workplace.
5. Miriam Wallack, "Perks are out, internal mobility is in: What Gen Zs truly look for in the workplace," *Gloat*, March 20, 2019.

## Digital health technology

page 60

1. Deloitte Center for Health Solutions interview with AccuHealth executive, April 29, 2019.
2. *Ibid.*; Intel, *Improving healthcare with home-based monitoring and predictive analytics*, August 2018.
3. Interview with AccuHealth executive, April 29, 2019.

---

## Patient engagement 2.0

page 62

1. Mark Lush et al., "Patient engagement strategies in a digital environment: Life sciences companies respond to changing patient expectations," *Deloitte Review* 18, January 25, 2016.
2. Ryan Myers, Margaret Anderson, and Casey Korba, *Striving to become more patient-centric in life sciences: What it really takes to optimize patient trust and health outcomes*, Deloitte Insights, January 30, 2020.
2. Rural Health Snapshot, North Carolina Health Research Program. All differences in weighted population averages are statistically significant at the level of 5 percent.
3. Sarah Purdy et al., "Ambulatory care sensitive conditions: Terminology and disease coding need to be more specific to aid policy makers and clinicians," *Public Health* 123, no. 2 (2009): pp. 169–73.
4. Pew Research Center, "Mobile fact sheet," June 12, 2019; Melissa Majerol and William Carroll, *Medicaid and digital health: Findings from the Deloitte 2018 survey of US health care consumers*, Deloitte Insights, September 7, 2018.
5. CMS.gov, "CMS finalizes policies to bring innovative telehealth benefit to Medicare Advantage," press release, April 5, 2019; American Telemedicine Association, "Telehealth policy and reimbursement vary widely from state to state, ATA Report finds," July 19, 2019.
6. Alexis Skoufalos et al., "Rural aging in America: Proceedings of the 2017 Connectivity Summit," *Population Health Management* 20, no. S2 (2017): pp. S1–S10.
7. Rural Health Information Hub, "Telehealth models for increasing access to behavioral and mental health treatment," accessed October 17, 2019.

## Narrowing the rural-urban health divide

page 78

1. This is based on a true account of events faced by one family. We have changed names and other specific details to protect individuals' privacy.

- 
8. Jane Wishner et al., "A look at rural hospital closures and implications for access to care: Three case studies," Kaiser Family Foundation, July 7, 2016.
  9. Ibid.
  10. Rural Health Information Hub, "Rural data explorer," accessed October 17, 2019; HRSA Area Health Resources Files, 2014 and 2015. No statistical tests were run to compare rural and nonrural measures.
  11. Ibid.
  12. Kim Parker et al., "Views of problems facing urban, suburban and rural communities," Pew Research Center, May 22, 2018. Pew Research's analysis includes urban, suburban, and rural communities. Our table includes data on urban and rural communities only. Differences between urban and rural are statistically significant.
  13. Onyi Lam, Brian Broderick, and Skye Toor, "How far Americans live from the closest hospital differs by community type," Pew Research Center, December 12, 2018. Pew Research's analysis includes urban, suburban, and rural communities. Our table includes data on urban and rural communities only. Differences between urban and rural are statistically significant; longest average minutes refers to those whose travel time to the nearest hospital is above the 75th percentile for their community type.
  14. There are several different ways to measure rurality, and rural-urban comparisons using different definitions may yield different conclusions. In this table, data from the Rural Health Information Hub and from the North Carolina Health Research Program categorize counties as metropolitan and nonmetropolitan using the Office of Management and Budget metropolitan and micropolitan statistical area definitions. According to this definition, nonmetro counties include noncore (small rural) and micropolitan (large rural) counties. The Pew Research Center asked survey respondents to describe the area in which they live as rural, suburban, or urban and relied on these responses for classification purposes.
  15. The University of North Carolina at Chapel Hill, "Sheps Center for Health Services Research," accessed October 17, 2019. All differences in weighted population averages are statistically significant at the level of 5 percent.
  16. Rural Health Information Hub, "Rural data explorer," US Census ACS, 2011 and 2017 five-year estimates. No statistical tests were run to compare rural and nonrural measures.
-

- 
17. UNC, "Sheps Center for Health Services Research." All differences in weighted population averages are statistically significant at the level of 5 percent.
  18. Rural Health Information Hub, "Rural data explorer," CDC Diabetes County Data Indicators, 2006–2016. No statistical tests were run to compare rural and nonrural measures.
  19. Ibid.
  20. NPR, Robert Wood Johnson Foundation, and Harvard T.H. Chan School of Public Health, *Life in rural America—Part II*, May 2019.
  21. Ibid.
  22. Ibid.
  23. National Consortium of Telehealth Resource Centers (NCTRC), "About our consortium," accessed October 17, 2019.
  24. Rajendra Singh et al., "Sustainable rural telehealth innovation: A public health case study," *Health Services Research* 45, no. 4 (2010): pp. 985–1,004.
  25. Rural Health Information Hub, "Finger Lakes Community Health Telehealth Network," December 4, 2017.
  26. US Department of Veterans Affairs, "ATLAS: Offering veterans VA care closer to home," accessed October 18, 2019.
  27. Joshua Ball, "Nation's first Virtual Living Room Telehealth Center brings unique care to Appalachian veterans," *Kentucky Today*, February 3, 2018; Kay Miller Temple, "The power of three: Rural schools, healthcare providers, and a rural health association collaborate to expand primary care access using school-based telehealth," Rural Health Information Hub, May 29, 2019.
  28. Zoom, "Zoom for healthcare," accessed October 18, 2019.
  29. eVisit, "Welcome to the eVisit resources," accessed October 18, 2019.
  30. Rural Health Information Hub, "Health-e-Schools," October 9, 2019.
  31. Center for Rural Health Innovation, "The Center for Rural Health Innovation," accessed November 4, 2019.
  32. Center for Rural Health Innovation, "What is Health-e-Schools?," accessed October 18, 2019.
  33. Bonnie Darves, "Telemedicine: Changing the landscape of rural physician practice," NEJM Career Center, May 17, 2013.
  34. National Advisory Committee on Rural Health and Human Services, "Telehealth in rural America," March 2015.
-

- 
35. Michael Nochomovitz and Rahul Sharma, "Is it time for a new medical specialty? The medical virtualist," *Journal of the American Medical Association* 319, no. 5 (2018): pp. 437–8.
  36. Ken Abrams, Steve Burrill, and Natasha Elsner, *What can health systems do to encourage physicians to embrace virtual care? Deloitte 2018 survey of US physicians*, Deloitte Insights, July 18, 2018.
  37. Virtual visits are used in several departments at Carle, but one of the most widely used departments is Nutrition Services. Carle, "Patients can access virtual doctor's visits for themselves, their kids," September 21, 2015.
  38. NPR, Robert Wood Johnson Foundation, and Harvard T.H. Chan School of Public Health, *Life in rural America—Part II*.
  39. Neil Versel, "TytoCare gets FDA clearance for digital telemedicine stethoscope," MedCity News, November 1, 2016.
  40. Felix Matthews and Chris Shudes, "Three ways health care organizations can help boomers plug into virtual health," Deloitte's Life Sciences and Health Care blog, August 15, 2019.
  41. Leslie Read, "Health plans: What matters most to the health care consumer?," Deloitte, 2016.
  42. Federal Communications Commission, "Rural Health Care Program," accessed November 4, 2019.
  43. US Department of Agriculture, "ReConnect Loan and Grant Program," accessed October 18, 2019.
  44. Jon Porter, "Amazon will launch thousands of satellites to provide internet around the world," The Verge, April 4, 2019.
  45. MuniNetworks.org, "Community Network Map," accessed October 18, 2019.
  46. Rural Health Information Hub, "Applying for grants to support rural health projects," March 7, 2019.
  47. Shantanu Agrawal and Brock Slabach, "The drive to quality and access in rural health," *Health Affairs* (2018); Bipartisan Policy Center, *Reinventing rural health care: A case study of seven upper midwest states*, January 2018; United States Government Accountability Office, *Medicare value-based payment models: Participation challenges and available assistance for small and rural practices*, December 2016; Jacqueline LaPointe, "Flexibility, value-based payment key to rural hospital success," RevCycleIntelligence, January 26, 2018.
  48. Rich Daly, "Policy changes needed to sustain CAHs: Report," Healthcare Financial Management Association, January 17, 2018.
-

---

## The realist's guide to quantum technology and national security

page 94

1. Scott Aaronson, "Why Google's quantum supremacy milestone matters," *New York Times*, October 30, 2019.
2. Duncan Stewart, "Quantum computers: The next supercomputers, but not the next laptops," *Deloitte TMT Predictions 2019*, Deloitte Insights, December 11, 2018.
3. Wellener et al., *2019 Deloitte and MAPI Smart Factory Study*.
4. We further add that 19 percent of manufacturers report that they "haven't even thought about it."
5. Following each interview, we transcribed notes and recordings and coded each interview, using multiple coders, to identify key ideas expressed and allow themes to emerge from the diverse set of examined deployments and stakeholders. With this research, we continue a longer-term effort to document and develop a repository of data on smart factory technology deployments. As industry and adoption grow, our plan is to build a cache of narratives, experiences, and perspectives on how various organizations make smart factories work. In doing so, we expect to offer leadership and insight to our clients and communities during this important time of transformation.

## Implementing the smart factory

page 96

1. Paul Wellener et al., *2019 Deloitte and MAPI Smart Factory Study: Capturing value through the digital journey*, Deloitte Insights and MAPI, September 2019.
  2. For further information, visit Deloitte Insights' suite of articles on Industry 4.0 and digital supply networks.
  6. Deloitte interview (see "Our research approach"), July 29, 2019.
  7. Deloitte interview, July 29, 2019.
  8. Deloitte interview, August 1, 2019.
  9. Deloitte interview, August 16, 2019.
  10. Deloitte interview, July 31, 2019.
-

- 
11. Adam Mussomeli et al., *The digital supply network meets the future of work: People, machines, and a new era of collaboration*, Deloitte Insights, December 18, 2017.
  12. Gerald C. Kane et al., *Accelerating digital innovation inside and out: Agile teams, ecosystems, and ethics*, Deloitte Insights, June 4, 2019.
  13. Punit Renjen, *Industry 4.0: At the intersection of readiness and responsibility*, Deloitte Insights, January 20, 2020.
  14. Mark Cotteleer and Timothy Murphy, *The talent paradox: Technically advanced, intuitively limited*, Deloitte Insights, October 10, 2018.
  15. For more information on future roles in the smart factory, see Deloitte Insights' series on manufacturing personas.
  16. Wellener et al., *2019 Deloitte and MAPI Smart Factory Study*.
  17. Deloitte interview, July 29, 2019.
  18. Deloitte interview, July 31, 2019.
  19. Wellener et al., *2019 Deloitte and MAPI Smart Factory Study*.
  20. Mussomeli et al., *The digital supply network meets the future of work*; for more information on future roles in the smart factory, see Deloitte Insights' series on manufacturing personas.
  21. Renjen, *Industry 4.0*.
  22. Jessie Yeung, "Boston Dynamics' robot dog is now available for select customers," CNN Business, September 25, 2019.
  23. Adam Mussomeli et al., *Building a cognitive digital supply network: Augmenting automation in an AI world*, Deloitte Insights, June 14, 2019.
  24. Laks Pernekil et al., "The biopharma smart factory of the future," Deloitte, 2019.

## Private 5G networks

---

*page 108*

1. A survey by Gartner found that two-thirds of organizations planned to deploy 5G by 2020, predominantly for IoT communications and video. For more information, see: Gartner, "Gartner survey reveals two-thirds of organizations intend to deploy 5G by 2020," press release, December 18, 2018.

- 
2. Qualcomm, "Expanding 5G NR to industrial IoT," accessed October 3, 2019.
  3. Markus Fasse and Stephan Scheuer, "Carmakers want their own 5G networks," *Handelsblatt Today*, October 29, 2018.
  4. Solmaz Niknam, Harpreet S. Dhillon, and Jeffery H. Reed, "Federated learning for wireless communications: Motivation, opportunities and challenges," Cornell University, September 6, 2019.
  5. 5G delivers this capability via a single standard. In contrast, there are currently multiple industrial fixed ethernet systems: Sercos, PROFINET, and EtherCAT. For more information, see: 3GPP, "3GPP SA6 initiatives to enable new vertical applications," September 30, 2019.
  6. For more information on the differences between releases 15 and 16, see: *IEEE Spectrum*, "3GPP release 15 overview," accessed October 3, 2019.
  7. Gabriel Brown, *Ultra-reliable low-latency 5G for industrial automation*, Qualcomm, accessed October 3, 2019.
  8. Lauren J. Young, "Telecom experts plot a path to 5G," *IEEE Spectrum*, October 6, 2015.
  9. János Farkas et al., "5G-TSN integration for industrial automation," *Ericsson Technology Review*, August 27, 2019.
  10. Chantal Polsonetti, "Could 5G NR + TSN mean the end of industrial ethernet as we know it?," ARC Advisory Group, June 10, 2018.
  11. Yongbin Wei, "A new era in industrial production?," *New Electronics*, May 31, 2019.
  12. Light Reading, "How can CoMP extend 5G NR to high capacity & ultra-reliable communications?," July 11, 2018.
  13. Reuters, "Factbox: German industrial giants eye regional 5G licences," January 24, 2019.
  14. ASUS, "AX6000 dual band 802.11 ax WiFi router supporting MU-MIMO and OFDMA technology, with AiProtection network security powered by Trend Micro, built-in WFast game accelerator and adaptive QoS," accessed October 3, 2019.
  15. Huawei, "World's largest automated container port uses 5.8 GHz LTE," accessed October 3, 2019.
  16. Nokia, "Nokia's digitalization of its 5G Oulu factory recognized by the World Economic Forum as an 'Advanced 4th industrial revolution lighthouse,'" press release, July 3, 2019.
-

- 
17. Please see Deloitte TMT Prediction in the same series: *Robots on the move: Professional service robots set for double-digit growth*.
  18. 3GPP, "Study on positioning use cases," accessed October 3, 2019; 3GPP, "Service requirements for cyber-physical control applications in vertical domains," accessed October 3, 2019.
  19. Glastonbury Festival has 200,000 attendees plus staff. For more information, see Ben Wood, "The first 5G-enabled festival," CCS Insight, accessed October 3, 2019.
  20. National Instruments, "Unlicensed spectrum may be critical to 5G," *IEEE Access*, accessed October 3, 2019.
  21. GSMA, *The mobile economy 2019*, 2019.
  22. Vicki Holt, "Five expert insights into digital manufacturing and mass customization," *IndustryWeek*, July 19, 2018.
  23. Mike Dano, "This hospital is installing 5G for one big reason: Getting rid of wires," *Light Reading*, January 29, 2019.
  24. Harper Adams University, "Agricultural Engineering Precision Innovation (Agri-EPI) Centre," accessed October 3, 2019.
  25. NTT Docomo, "Smart construction powered by 5G & IoT," accessed October 3, 2019.
  26. Huawei, "KPN, Shell and Partners test industrial 5G applications in the port of Rotterdam," November 6, 2018.
  27. Xinhua, "China completes first 5G inspection of power lines," May 16, 2019.
  28. International Data Corporation, "Augmented reality and virtual reality headsets poised for significant growth, according to IDC," March 28, 2019; Andrew McDonald, "CCS: VR and AR device sales to drop in 2018 despite long-term promise," *Digital TV Europe*, December 3, 2018.
  29. The majority of VR units sold in 2019 were likely for use in consumer contexts, principally gaming. See: Shanhong Liu, "Unit shipments of virtual reality (VR) devices worldwide from 2017 to 2019 (in millions), by vendor," Statista, September 5, 2019.
  30. Jeremy Horwitz, "AT&T: Our 5G network is ready for 2880x1600 VR and 5ms latency games," *VentureBeat*, April 1, 2019.
  31. *Ibid.*
  32. Ericsson, "Troubleshooting made easier with augmented reality," January 12, 2018.
-

- 
33. Jayne Brooks, "UK's first 5G industrial trial suggests new technology could increase UK productivity by 2%," Total Telecom, June 18, 2019.
  34. Juan Pedro Tomás, "ABB pilots industrial AI application using 5G," Enterprise IoT Insights, June 7, 2019.
  35. Ericsson, "The world's first cellular IoT-based smart factory," accessed October 3, 2019.
  36. Chris Davies, "Mercedes reveals the 5G robot-filled factory for its most high-tech cars," SlashGear, November 16, 2018.
  37. Bosch Rexroth, "Bosch Rexroth invests in the factory of the future," press release, May 8, 2019.
  38. Dano, "This hospital is installing 5G for one big reason."
  39. *Network World*, "Intecom charts new strategy for future," June 26, 1989.
  40. Kevin Gu, "How does a business phone system work?," GenVoice, May 10, 2019; Johnson Hur, "History of PBX," BeBusinessed, accessed October 3, 2019.
  41. Mike Dano, "Nokia CTO: Private wireless could be 2x bigger than commercial wireless," Light Reading, May 30, 2019.
  42. Bundesnetzagentur, "Electronic communications services," accessed October 3, 2019.

## Marine plastic pollution

*page 124*

1. Laurent C. M. Lebreton et al., "River plastic emissions to the world's oceans," *Nature Communications* 8, no. 1 (June 7, 2017): pp. 1–10.
2. The term "blue economy" covers a wide range of interlinked established and emerging sectors, including all economic activities related to oceans, seas, and coasts. European Commission, *What is the blue economy?*, accessed November 22, 2019.
3. Vincent Viool et al., *The price tag of plastic pollution*, Deloitte Netherlands, 2019.
4. Ibid.
5. Ibid.

## The sustainability transformation

*page 126*

1. Unilever, "A new beginning ...," accessed May 17, 2020.
2. Unilever, "Unilever CEO announcement: Paul Polman to retire; Alan Jope appointed as successor," press release, November 29, 2018.
3. Global Opportunity Explorer, "CEOs must be activists: Paul Polman," February 5, 2019.
4. Adapted from Stockholm Resilience Centre, "Contributions to Agenda 2030," accessed April 18, 2020; United Nations, "Sustainable development goals," accessed April 23, 2020. The content of this publication has not been approved by the United Nations and does not reflect the views of the United Nations or its officials or Member States.
5. United Nations Climate Change, "Impacts of climate change on sustainable development goals highlighted at high-level political forum," July 19, 2019.
6. Sofia Sanchez Manzanaro, "COP25 in Madrid: UN Secretary-General Guterres says planet is 'close to a point of no return,'" Euronews, March 12, 2019.
7. Jon Hale, "10 sustainable investing stories of 2019," *Morning Star*, December 12, 2019.
8. UN News, "COP25: Global investors urge countries to meet climate action goals," December 9, 2019.
9. Larry Fink, "A fundamental reshaping of finance," BlackRock, accessed May 17, 2020.
10. Noton Rose Fulbright, "A new duty of care for the most significant companies in France," March 2017.
11. Stéphane Hallegatte and Stephen Hammer, "Thinking ahead: For a sustainable recovery from COVID-19 (Coronavirus)," World Bank Blogs, March 30, 2020.
12. Deloitte, "The Deloitte Global Millennial Survey 2019: Optimism, trust reach troubling low levels," 2019.
13. Ibid.
14. Lucy Handley, "Fast-fashion retailers like Zara and H&M have a new threat: The \$24 billion used clothes market," CNBC, March 19, 2019.
15. Thomas Franck, "Alternative meat to become \$140 billion industry in a decade, Barclays predicts," CNBC, May 23, 2019.

- 
16. Business Roundtable, "Business Roundtable redefines the purpose of a corporation to promote 'an economy that serves all Americans,'" August 19, 2019.
  17. Karen Weise, "Jeff Bezos commits \$10 billion to address climate change," *New York Times*, February 17, 2020.
  18. Rose Marcario, "Our urgent gift to the planet," LinkedIn, November 28, 2018.
  19. Fink, "A fundamental reshaping of finance."
  20. Ibid.
  21. Mark R. Kramer, "Larry Fink isn't going to read your sustainability report," *Harvard Business Review*, January 20, 2020.
  22. Leslie P. Norton, "CEO Larry Fink sounds cautiously optimistic note in letter to BlackRock shareholders," *Barron's*, March 30, 2020.
  23. European CEO, "Unilever CEO Paul Polman is redefining sustainable business," April 15, 2016.
  24. Matthew Taylor, Jonathan Watts, and John Bartlett, "Climate crisis: 6 million people join latest wave of global protests," *Guardian*, September 27, 2019.
  25. Climate Action 100+, "Global investors driving business transition," accessed May 18, 2020.
  26. Goldman Sachs, "Sustainable finance at Goldman Sachs," accessed May 18, 2020.
  27. Taylor Kuykendall, Ashleigh Cotting, and Declan Harty, "Investment giant BlackRock marks a major milestone in coal divestment movement," S&P Global, January 22, 2020.
  28. United Nations Environment Programme, "A decade of renewable energy investment, led by solar, tops USD 2.5 trillion," press release, September 5, 2019.
  29. Ørsted, "The most sustainable company in the world," accessed May 18, 2020.
  30. John Hagel and John Seely Brown, *Zoom out/zoom in: An alternative approach to strategy in a world that defies prediction*, Deloitte Insights, May 16, 2018.
  31. Shell Global, "Sky scenario," accessed May 18, 2020.
  32. Volkswagen, "Volkswagen plans 22 million electric vehicles in ten years," March 12, 2019.
  33. AtSource, "What is AtSource?," accessed May 18, 2020.
  34. LinkedIn, "LinkedIn portraits of purpose companies: Patagonia," accessed May 18, 2020.
-

- 
35. C. J. Mittica, "Patagonia shifts corporate sales strategy," Advertising Specialty Institute, April 3, 2019.
  36. Ellen MacArthur Foundation, "The jeans redesign," accessed May 18, 2020.
  37. Economics of Mutuality, "Kenyan president expresses support for Project Maua," May 2018.
  38. Danone, "Danone ecosystem fund," accessed May 18, 2020.
  39. IKEA, "IKEA will test furniture leasing in 30 markets during 2020," press release, March 4, 2019.
  40. Katherine White, David J. Hardisty, and Rishad Habib, "The elusive green consumer," *Harvard Business Review*, July–August 2019.
  41. John Hagel III, "Leveraged growth: Expanding sales without sacrificing profits," *Harvard Business Review*, October 2002.
  42. Nestlé, "What is Nestlé doing to tackle plastic packaging waste?," accessed May 18, 2020.
  43. Nestlé, "Nestlé inaugurates packaging research institute, first-of-its-kind in the food industry," press release, September 12, 2019.
  44. Deloitte, "Shaping strategies," 2014.
  45. Sustainable Food Policy Alliance, "Environment," accessed May 18, 2020.

## Measuring the business value of corporate social impact

---

*page 140*

1. Erica Volini et al., *Introduction: Leading the social enterprise—Reinvent with a human focus: 2019 Global Human Capital Trends*, Deloitte Insights, April 11, 2019.
2. Larry Fink, "A fundamental reshaping of finance," BlackRock, accessed May 5, 2020.
3. Kurt Dassel and Xi Wang, *Social purpose and value creation: The business returns of social impact*, Monitor Deloitte, 2016.
4. Ibid.
5. The RepTrak Company, *Raising the stakes on corporate responsibility*, October 25, 2018.

- 
6. Nielsen, "Consumer goods' brands that demonstrate commitment to sustainability outperform those that don't," press release, October 12, 2015.
  7. Computer Generated Solutions, "CGS survey reveals sustainability is driving demand and customer loyalty," January 10, 2019.
  8. The RepTrak Company, *Raising the stakes on corporate responsibility*.
  9. Ibid.
  10. Shane McFeely and Ben Wigert, "This fixable problem costs US businesses \$1 trillion," Gallup, March 13, 2019.
  11. Volini et al., *Leading the social enterprise*.
  12. Benevity, "Benevity study links employee-centric corporate goodness programs to big gains in retention," May 31, 2018.
  13. Adele Peters, "Most millennials would take a pay cut to work at an environmentally responsible company," *Fast Company*, February 14, 2019.
  14. Nate Dvorak, "Three ways mission-driven workplaces perform better," Gallup, May 4, 2017.
  15. Julie Lodge-Jarrett, "Ford's employee sentiment strategy: Ask/listen/observe," The Institute for Corporate Productivity, April 1, 2020.
  16. Nielsen, *Was 2018 the year of the influential sustainable consumer?*, December 17, 2018.
  17. Tensie Whelan and Randi Kronthal-Sacco, "Research: Actually, consumers do buy sustainable products," *Harvard Business Review*, June 19, 2019.
  18. Doblin, "Metrics: Measuring and managing innovation effectiveness," accessed March 6, 2020.
  19. We Mean Business, *The climate has changed*, September 2014.
  20. Center for Sustainable Business, "CSB ROSI™ methodology," NYU Stern School of Business, accessed May 6, 2020.
  21. Sustainability Accounting Standards Board, "Standards overview," accessed March 6, 2020.
  22. CDP, "World's biggest companies face \$1 trillion in climate change risks," June 4, 2019.
  23. World Business Council for Sustainable Development (WBCSD), *Applying enterprise risk management to environmental, social and governance-related risks*, October 22, 2018.
  24. The Sustainability Accounting Standards Board, "SASB Materiality Map," accessed March 6, 2020.
-

- 
25. WBCSD, *Applying enterprise risk management to environmental, social and governance-related risks*.
  26. Ibid; Ulrich Atz et al., "The return on sustainability investment (ROSI): Monetizing financial benefits of sustainability actions in companies," *Review of Business: Interdisciplinary Journal on Risk and Society* 39, no. 2 (2019): pp. 1–31.
  27. Center for Sustainable Business, "CSB ROSI™ methodology."
  28. Social & Human Capital Coalition, *Social & human capital protocol*, accessed May 6, 2020.
  29. WBCSD, *Applying enterprise risk management to environmental, social and governance-related risks*.
  30. CP Gurnani, "Sustainability and profitability can co-exist. Here's how," World Economic Forum, January 7, 2020.
  31. Michael E. Porter, George Serafeim, and Mark Kramer, "Where ESG fails," *Institutional Investor*, October 16, 2019.
  32. Global Sustainable Investment Alliance, "2018 global sustainable investment review," accessed May 6, 2020.
  33. Ibid.
  34. International Integrated Reporting Council, "International <IR> framework," accessed May 6, 2020; Natural Capital Coalition, "Natural Capital Protocol," accessed May 6, 2020; Social & Human Capital Protocol Coalition, *Social & human capital protocol*.
  35. Impact Management Project, "About," accessed April 18, 2020.
  36. Social Value International, "About us," accessed April 18, 2020.

## The future of fresh

---

*page 152*

1. Chris DuBois and Jonna Parker, "Top trends in fresh: Prepared food, hyperlocalization and new supply chains," IRI, January 2019.

## Within reach?

page 154

1. Rocio Lorenzo and Martin Reeves, "How and where diversity drives financial performance," *Harvard Business Review*, January 30, 2018.
2. Stephen Turban, Dan Wu, and Letian (LT) Zhang, "Research: When gender diversity makes firms more productive," *Harvard Business Review*, February 11, 2019.
3. Yoni Blumberg, "Companies with more female executives make more money—here's why," CNBC, March 2, 2018.
4. Erica Volini et al., *2019 Global Human Capital Trends*, Deloitte Insights, July 31, 2019.
5. US Bureau of Labor Statistics, *Women in the labor force: A databook*, December 2018.
6. Catalyst, "Pyramid: Women in S&P 500 companies," September 1, 2019.
7. Heather Doshay, "Three reasons why your diversity and inclusion programs are not working," *Forbes*, July 17, 2018.
8. Heather Stockton, Mariya Filipova, and Kelly Monahan, *The evolution of work: New realities facing today's leaders*, Deloitte Insights, January 31, 2018.
9. Volini et al., *2019 Global Human Capital Trends*.
10. Ibid.
11. Stockton, Filipova, and Monahan, *The evolution of work*.
12. Jack Zenger and Joseph Folkman, "Research: Women score higher than men in most leadership skills," *Harvard Business Review*, June 25, 2019.
13. Jeff Schwartz, Heather Stockton, and Kelly Monahan, *Forces of change: The future of work*, Deloitte Insights, November 9, 2017.
14. Zenger and Folkman, "Research: Women score higher than men in most leadership skills."
15. Stockton, Filipova, and Monahan, *The evolution of work*.
16. Alycia Sutor, "How diversity drives business development," GrowthPlay, November 15, 2018.
17. US House Committee on Financial Services, "Committee finds more work is needed to improve diversity at megabanks," press release, August 13, 2019.

- 
18. Catalyst, "Quick take: Women in financial services," May 21, 2019.
  19. Carrie Kerpen, "How will we reach gender parity in leadership? One workplace at a time," *Forbes*, December 11, 2018.
  20. Deloitte, *Women in the boardroom—5th edition*, March 7, 2017.
  21. Laura Weiss, "California board diversity mandate spreads to other states, Washington," Roll Call, July 19, 2019.
  22. Ibid.
  23. US House Committee on Financial Services, "Committee finds more work is needed to improve diversity at megabanks."
  24. Westpac, "Gender equality," accessed October 3, 2019.
  25. Juliet Bourke et al., *2017 Global Human Capital Trends*, March 1, 2017.
  26. Kim Parker, "Women more than men adjust their careers for family life," Pew Research Center, October 1, 2015.
  27. Beecher Tuttle, "Do banks' returnship programs really work? A look at where returnees are today," eFinancialCareers, October 3, 2018.
  28. Après, "About us," accessed August 1, 2019.
  29. Bloomberg, "Bloomberg gender-equality index doubles in size, recognizing 230 companies committed to advancing women in the workplace," January 16, 2019.
  30. Center for Creative Leadership, "Women need a network of champions," accessed October 3, 2019.
  31. Center for Talent Innovation, *The sponsor dividend*, January 8, 2018.
  32. Herminia Ibarra, "A lack of sponsorship is keeping women from advancing into leadership," *Harvard Business Review*, August 19, 2019.
  33. Emily Dreyfuss, "For women job seekers, networking like a man isn't enough," *Wired*, January 21, 2019.
  34. National Park Service, "Declaration of sentiments," accessed October 3, 2019.
-

## Paving diverse paths to technology leadership

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1. Erik Sherman, "Report: Disturbing drop in women in computing field," *Fortune*, March 26, 2015.
2. Bill Briggs et al., *Strengthen the core: 2018 global CIO survey, chapter 5*, Deloitte Insights, August 8, 2018.
3. Ibid.
4. Ranjit Bawa (US Cloud leader, Deloitte), phone interview with authors, February 3, 2020.
5. Bill Briggs et al., *Transfuse talent and culture: 2018 global CIO survey, chapter 4*, Deloitte Insights, August 8, 2018.
6. Ibid.
7. Lindsey Parker (CTO, DC Government), phone interview with authors, January 7, 2020.
8. Thomas Macaulay, "CIO career paths," CIO Insights UK, June 4, 2019.
9. Rachel (Rae) Parent (head of Enterprise Change at T. Rowe Price), phone interview with authors, January 13, 2020.
10. Melissa Bell (CIO, Danaher), phone interview with authors, January 30, 2020.
11. Mark Roellig (former chief technology and administrative officer, MassMutual), phone interview with authors, December 12, 2019.
12. Sally Gilligan (CIO, Gap Inc.), phone interview with authors, January 21, 2020.

## Order from chaos

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1. Jayajit Dash, "India's logistics industry to be worth \$215 bn by 2020–21: CARE Ratings," *Business Standard*, October 20, 2018.



Alex Nabaum



Rocco Baviera



David Vogin



Neil Webb



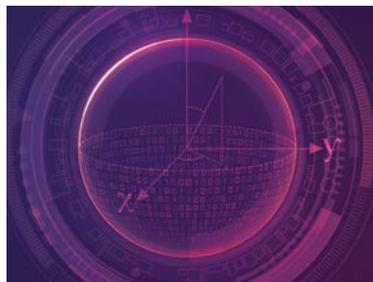
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Alex Nabaum



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Viktor Koen



Nicole Xu



Tristen Click



Kevin Weier

## THE END NOTE

### { What we said then }

*“Surviving and thriving in the uncertainty and turbulence that has characterized the first decade of this century requires unconventional thinking and calculated risk-taking. ... Risks must be managed, not simply avoided. They must also be analyzed for their complexity and interactivity. Anticipation and preparation are key to survival and success.”*

*Frederick Funston, Steve Wagner, and Henry Ristuccia,  
Risk intelligent decision-making: Ten essential skills for surviving and  
thriving in uncertainty, July 1, 2010*

### { What we think now }

“RISK MANAGEMENT HAS historically been the domain of unrewarded risks, such as compliance, regulations, or other mandated requirements. However, the last 10 years have seen a tremendous amount of innovation, including breakthroughs in identifying and monitoring for high-impact, low-probability risks. If you had a “risk intelligence” group back in December, that group could have been doing scenario planning for COVID-19 and communicating the potential risks to senior leaders and the board.

Often, organizations don’t get ready for low-probability, high-impact risks like pandemics because of important competing—and urgent—priorities. Nobody says they’re not important—they’re just not urgent, so addressing them keeps getting delayed.

There will probably be an uptick in executives paying more attention to these kinds of risks. The good news is that the tools, technologies, and risk specialists to do so are largely in place, and a lot of

thought has been given to this challenge. And the current environment is already driving a lot more innovation in risk management.

Risk professionals have an exciting opportunity to demonstrate how they can help organizations manage risk. They need to up their game and demonstrate how they can help executives uncover, monitor, and address high-impact, low-probability risks. But leadership needs to meet risk management halfway. The executive team and the board need to start proactively asking risk professionals how risk management can help with such risks.

Done right, risk management can help organizations deploy bold strategies by considering the risks associated with leaders’ chosen strategy, the strategy’s execution, and the choices they have not made. If a CEO or board is thinking anything, they should be asking their risk management people how they can help manage these risks. And if they don’t get a useful answer, they had better push on them harder. • ”



**MICHAEL KEARNEY**  
Chief marketing officer,  
Risk & Financial Advisory  
Deloitte & Touche LLP

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\*Source: Environmental Paper Network, [papercalculator.org](http://papercalculator.org).



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