Cognizant

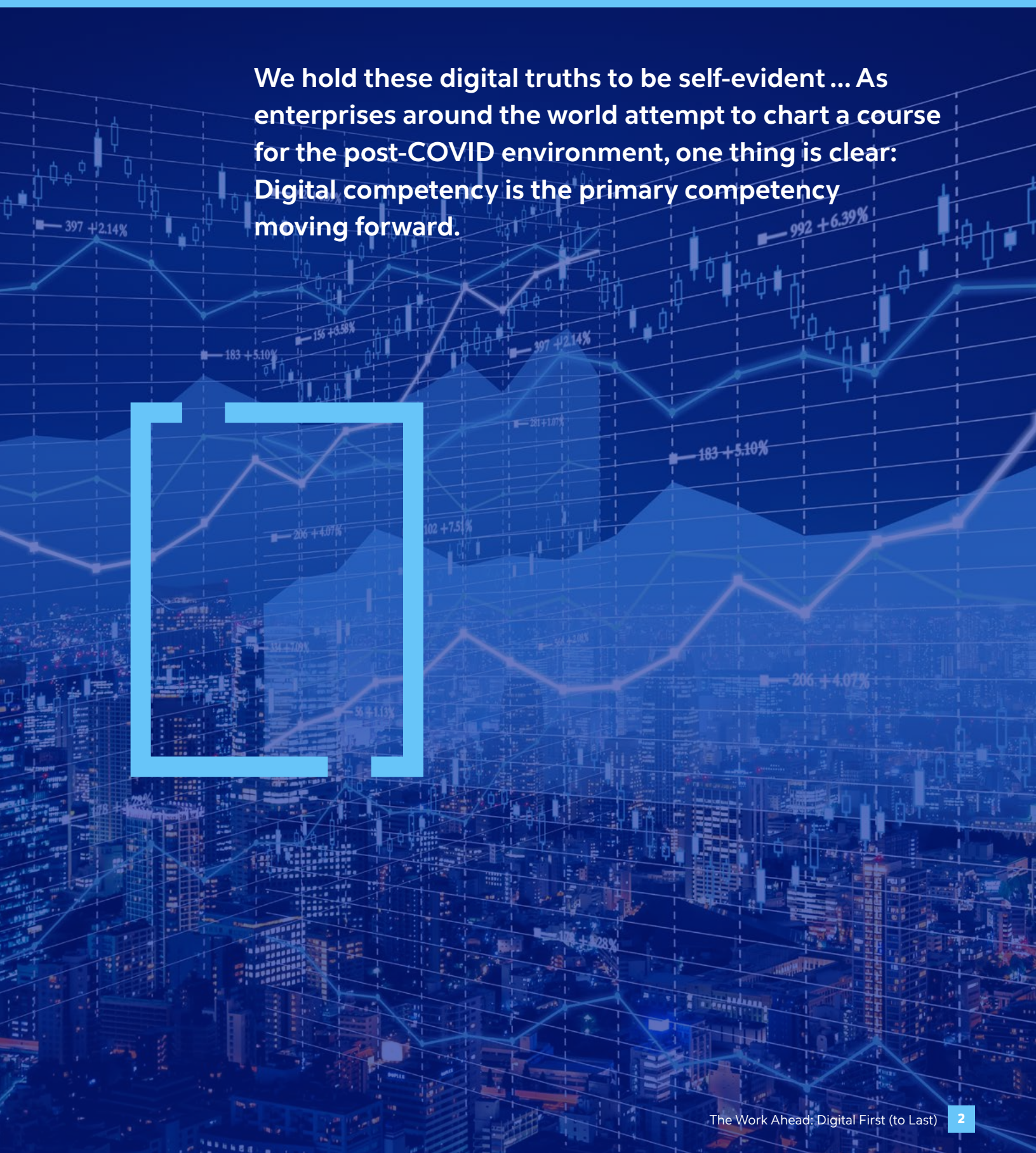
The Work Ahead: Digital First (to Last)

The Work Ahead is a research series providing insight and guidance on how organizations are evolving to the next stage of the digital economy. With the rise of new machines, new generations of talent and new business models based on insight and intelligence, the rules of global competition have changed. Now, these tectonic shifts are being further catalyzed and accelerated by the global pandemic. In this report, we outline the most significant trends and tactics for businesses throughout the world to be aware of, and act on, to ensure a successful future for the future of work.

THE WORK AHEAD

Introduction

We hold these digital truths to be self-evident … As enterprises around the world attempt to chart a course for the post-COVID environment, one thing is clear: Digital competency is the primary competency moving forward.



Since conducting our first Work Ahead study in 2016, the NASDAQ index has more than doubled; in contrast, the S&P 500 is up about 30%.[1] "Digital" has clearly won on the only score sheets that really matter. Organizations that rode the wave have done well, and those that didn't have fallen behind.

Today, digital is no longer a nice-to-have, an interesting adjunct to the main business. A fully developed, sophisticated and hyper-scale digital platform is the only means to ensure any commercial relevance and financial future in the next decade.

As 2020 began, this truth was obvious to some, but not all. As 2021 begins, it's completely self-evident. COVID-19 has exposed the pre-existing condition of many organizations around the world: that they were pre-digital enterprises, unfit for purpose in the modern world, holding on (just) through custom and inertia – their own and their customers'. As the world migrated online (in many aspects, permanently) during the spring and summer of last year, those that had laid the foundations for a fully digital future saw these investments pay off. Those who had hemmed and hawed saw their indecision become final.

As enterprises around the world attempt to chart a course for the post-COVID environment, one thing is clear: Digital competency is the primary competency for the Fourth Industrial Revolution.[2] As the next few years see wholescale transformation of the major pillars of society – how we learn, how we govern ourselves, how we heal, how we ensure financial security, how we protect ourselves, how we spread opportunity – few companies will be left standing that are not digital-first.

We partnered with Oxford Economics in the third quarter of 2020 to survey 4,000 executives at leading organizations around the globe and across industries to explore the increasing primacy of digital and assess what's next for the future of work (see methodology, page 27). In this report, we examine the role digital has played in separating winners from stragglers over the last five years, and present observations and recommendations on how the next waves of digitization will manifest over the next three to five years.

Five key themes emerge from our research and analysis:

1. **Software isn't just eating the world; it's already doing the washing up.** This famous quote from Marc Andreessen is now 10 years old – and he's still right.[3] But while the majority of respondents in our study agree, there are still holdouts who think if they hunker down for long enough, the digital wars will end, and they will be able to emerge from their hiding places and go back to business as usual.

2. **Artificial intelligence (as the engine) and data (as the fuel) are propelling enterprises forward to the next stage of their digital journey.** Amid all the hype about AI, it's still the great story of our time. Ranked by respondents as the technology having the greatest impact on work over the next three years, AI mastery is pivotal to becoming a modern business. By 2023, organizations that have acquired deep skills and expertise in deploying AI into mission-critical business processes will be well positioned to outperform, while those that are still struggling to make meaningful progress will be also-rans. (For more on this topic, see our report in this series focused specifically on AI, "The Work Ahead: The True Meaning of AI: Action and Insight.")[4]

3 **Leaders are redesigning business processes for human/machine teaming, taking on challenges that neither could do effectively alone.** Fears about AI and automation as "job destroyers" are markedly lower than in our 2016 study, with many more respondents than five years ago believing that digital technologies will protect them from being replaced by automation. Instead, a more nuanced (and accurate) view has emerged – that AI/automation is the route to achieving higher level human performance. Executives see that AI is about human augmentation rather than substitution, and that combined, humans and machines will reach new value thresholds, unobtainable in isolation. By making technology a partner in work, organizations can fundamentally reshape how the business operates, from customer and employee experience, to risk management, brand reputation, sales and innovation.

4 **A simplistic view of employees as mere labor "resources" is giving way to a richer, more complex vision of their value.** One of the most significant developments in business and society since our earlier Work Ahead study has been the growing discussion of the role "purpose" should play in business activity and the need to transition from so-called "shareholder" to "stakeholder" capitalism.[5] Respondents signaled that their organizations need to tune into demands for greater inclusion in the workplace, and prevent powerful companies from using technology to consolidate the rewards of work into the hands of the few.

5 **We are entering a new stage in our relationship with technology, with a tempered appreciation of its impact on work and society.** A decade into the era of "digital transformation," respondents voice a greater appreciation for the promise and peril inherent in modern technology. Average scores in our current study – both on the high and low ends – are lower relative to the 2016 study. While fewer think that killer robots will overwhelm mankind, fewer also think "digital" is a silver bullet. Rather, respondents more fully understand not only the power of the tools in their hands but also the hard work ahead for those hands. *People are very much in the loop.*

The findings in this report support our hypothesis that the era of "digital as theory" is over, and we are now deep in the era of "digital in practice." It is now patently clear that for the core tools and techniques of digital transformation that are now in some cases 20 years old (i.e., cloud computing), it's irrelevant to debate their relevance. The work ahead is clear; fine-tuning it is the work at hand.

The 2025 agenda: optimizing the modern business

While the pace of digitization over the last five years has been intense, it's nothing compared with what will be required going forward.

To last, enterprises need to be "digital first." In order to achieve this, they need to scrutinize every experience, workflow, process, system and technology across the organization and ask three key strategic questions:

1. **Is this fit for purpose in 2021?**
2. **Will it still be fit for purpose in 2023?**
3. **If we were building this (experience, workflow, process, system and technology) today, would we build it differently?**

One "no" to any of these three questions is a red flag; two, a burning platform. Answering "no" three times means the organization you work for today won't be worth working for in the years ahead.

While the pace of digitization over the last five years has been intense, it's nothing compared with what will be required going forward. How confident are you that your organization has the ability to integrate machines with existing business processes? Do you have clarity on how work will shift, what the new and valuable work will be? The future of your work and that of your organization will be shaped by **two inevitable and powerful forces**: the growing adoption of intelligent machines and the future partnership between humans and machines.[6] Striking a balance between the two will be the biggest opportunity and challenge for organizations.

The proverb "necessity is the mother of invention" has never been more true. In the face of the pandemic, how organizations adapt in the coming years will set the trajectory for their work ahead for the next generation. The stakes are as high as they've ever been.

This edition of the Work Ahead offers a global perspective on the next stage of the digital economy. We've structured the report into three main sections:

- **The future of work is no longer in the future:** An examination of the transition that has occurred since 2016, namely from seeing digital as theory to focusing on digital in practice.
- **There are no silver bullets for automagical results:** A look at the digital "hard yards" that many organizations are currently going through.
- **Skills, values and purpose in the 21st century:** An exploration of how organizations are recharting their futures for an era in which employees want more from their employers than simply a paycheck.

This global report will be followed by three regional reports, for North America, Europe and Asia Pacific, as well as 10 industry reports, including banking and finance, consumer goods, education, healthcare, insurance, life sciences, manufacturing, retail, transportation and logistics, and utilities. The Work Ahead 2021 builds on our previous Work Ahead research series published in 2016.

The future of your work and that of your organization will be shaped by two inevitable and powerful forces: the growing adoption of intelligent machines and the future partnership between humans and machines. Striking a balance between the two will be the biggest opportunity and challenge for organizations.

The future of your work is no longer in the future

Human work is undergoing a profound transformation, driven by the accelerating impact of AI, algorithms and automation entering into our daily working lives.

So much has changed since we conducted the first Work Ahead study in 2016. Then, it would have been ridiculous to think that a Chinese company – that didn't yet exist – would be the fulcrum of a geopolitical battle and revolutionize how companies sell and interact with their customers.

TikTok's rise – and impact – is a consequence of the "exponential digitization" happening all around us, now and in real-time. The company's mastery of AI is testimony to the significance of modern technology on the global stage.

The pandemic has only served to reinforce and accelerate this dynamic. Digital technologies and platforms, which in their infancy were seen as supporting existing business norms, are quickly supplanting old ways of doing things and becoming the *de facto* new business-as-usual. E-tailing has become commonplace as malls and department stores have gone into bankruptcy. The rise (and now normalcy) of online meetings will see airlines and hotels struggle to bounce back even after a vaccine is widely distributed.

The challenge now presented to business leaders is complex and multidimensional. What is clear is that human work is undergoing a profound transformation, driven by the accelerating impact of AI, algorithms and automation entering into our daily working lives.

Looking ahead, success in the 2020s will be about much more than investing in digital technologies and transformation programs. It's about building the capabilities needed to take advantage of new opportunities and mitigate the threats from a world in flux. Our analysis shows a shift from investment in IT infrastructure and general capability, to more sophisticated, productivity-enhancing technology and applications, including robotics, process automation and AI, and highlights how businesses are optimizing collaborative human-machine work.

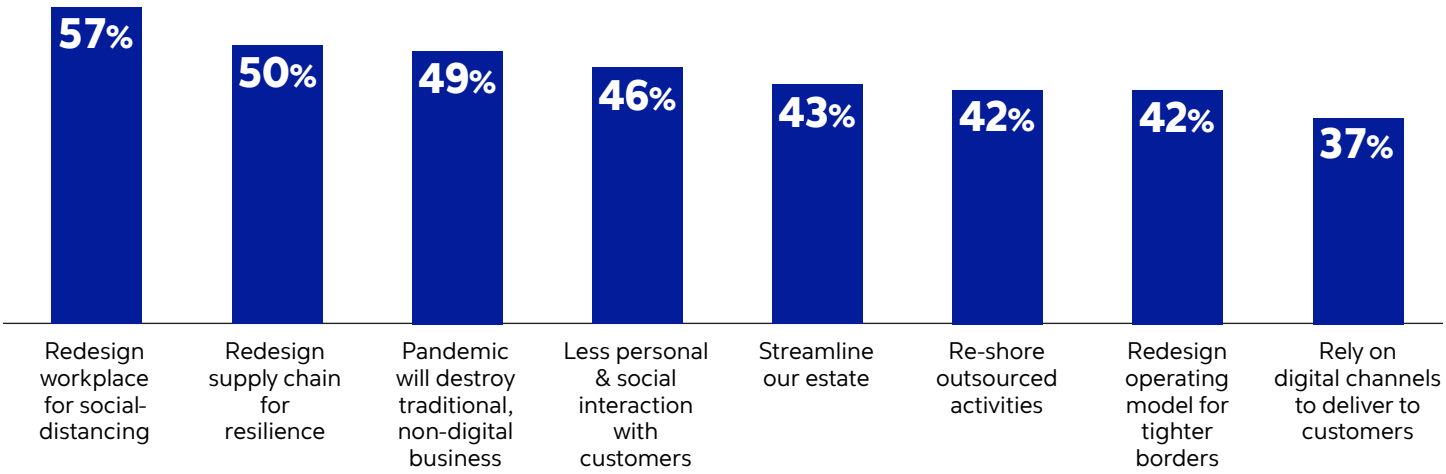
The rise of the modern business forged in the age of the virus

COVID-19 has written the future-forward script for the modern enterprise: Flexible, resilient and data-intensive ways of working that were begun before the pandemic are now indispensable for weathering both the crisis and what some believe will be a global mega-recession. Once the virus recedes, its lasting impacts will be plain to see, with a permanent shift in the long-term role of digitization and in the dynamics between employees and the organizations they work for.

While initially, a major focus will be on redesigning the workplace for social distancing as people slowly return to work (see Figure 1), the virus will force enterprises over the medium term to ask more strategic questions about how they undertake fundamental aspects of their mission.

The business impact of COVID

Respondents were asked about the likely impact of the global pandemic on their business and workforce in the medium term.
(Percent of respondents who agreed or strongly agreed with each statement)



Response base: 4,000 senior executives
Source: Cognizant Center for the Future of Work
Figure 1

As one respondent, a chief operating officer at a U.S. health insurer, said, "2020 is more about surviving. If we survive this, we can sustain our business way beyond the pandemic."

Nearly half of respondents (49%) expect the pandemic to destroy traditional, non-digital businesses and those that don't move online aggressively enough. A similar percentage (46%) expect less personal and social interaction with customers, and well over one-third (37%) say they'll need to rely on digital channels for customer interaction.

Digital touchpoints with customers, employees and suppliers are now essential survival tools, and any business armed with deft, data-driven capabilities has a head start for surviving the turbulent months and years ahead. As a chief operating officer at a U.S.-based global bank commented, "Even before COVID, we used to lay more emphasis on imparting digital skills to younger employees who join us fresh out of school. Our current rewards and recognition policy is pivoted toward new initiatives for digitization so that we can further unlock the power of data."

It's clear that those who survive – let alone thrive – in the work ahead will be those with data mastery at their core. Building a modern enterprise depends on it.

The office isn't dead – but it's also not the only place for the future of work

Amid the broader strategic questions on the minds of business leaders is how much physical space they'll need for the workplace of the future and to what degree they should further fortify remote work. Forty-three percent of respondents are set to review and streamline the provision of corporate real estate as the work-from-home boom continues. As a chief marketing officer at a technology business in Southeast Asia noted, "45% of our employees will likely choose to work remotely post-COVID-19 vs. 30% before the pandemic/lockdown. The critical competencies of our employees are to collaborate digitally."

Tellingly, most executives responded to our survey from their home office – a very different scenario from 2016, when most responded from the workplace. In the last few months, forecasts about the future of the office have oscillated wildly between "the office is dead" and "its death is greatly exaggerated." Respondents, however, tend to be in the latter camp (see Figure 2, next page).

The potential for remote work remains highly concentrated in a handful of sectors, such as tech, insurance, media and entertainment, and banking and finance – and even in these industries, less than half of respondents believe staff will spend more time working from home. Understandably, in areas such as hospitals and manufacturing, only a very small minority believe remote work will play much of a role going forward because work is very much location dependent.

However, the work-from-home trend has accelerated so much in recent months that it would be illogical not to imagine a significant and possibly permanent change in the role of the traditional office.

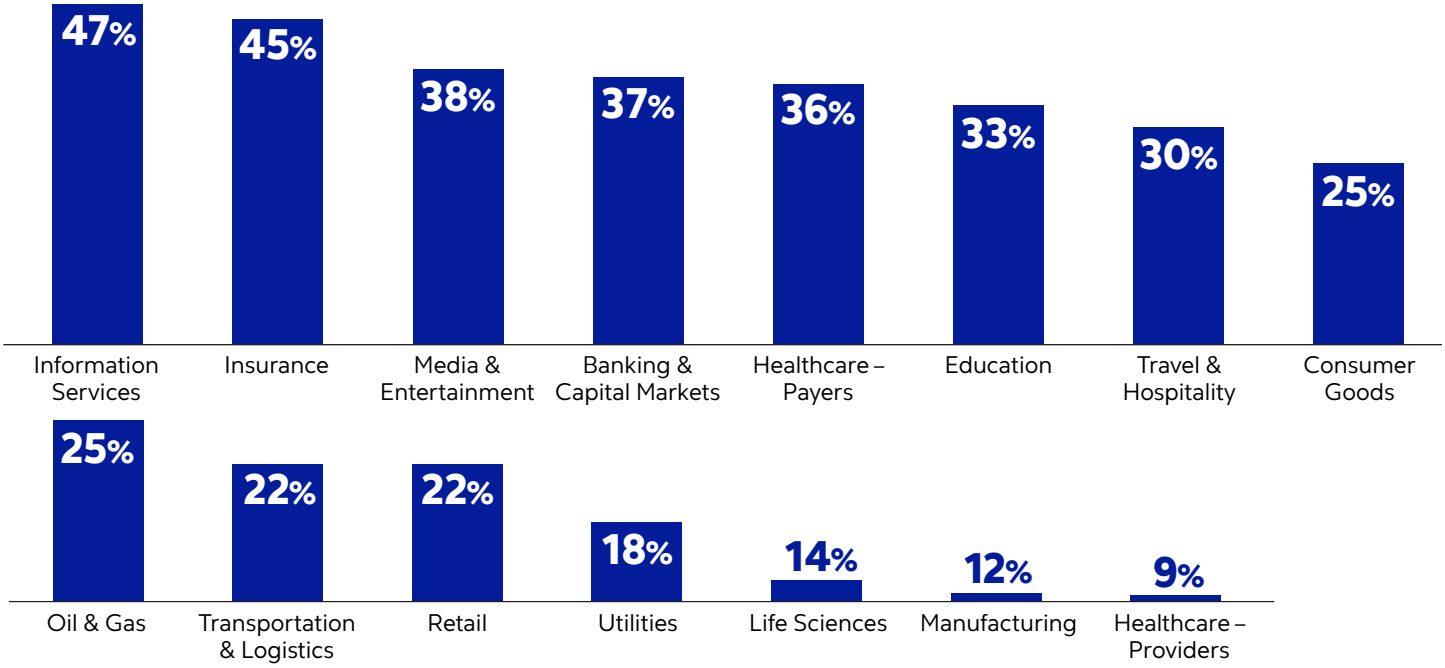
As towns and cities emptied of people following the pandemic lockdowns, business leaders discovered that not only did their teams continue to be productive, but their own work satisfaction also increased. A world of work without planes, trains and automobiles meant less bodily wear and tear, less jetlag and markedly increased efficiency. A number of executives in our interviews commented on how much they prefer holding

49%

Nearly half of respondents expect the pandemic to destroy traditional, non-digital businesses and those that don't move online aggressively enough.

How the work-from-home boom will play out

Respondents were asked whether their employees would spend more time working from home as a result of the pandemic. (Percent of respondents who agreed or strongly agreed)



Response base: 4,000 senior executives
Source: Cognizant Center for the Future of Work
Figure 2

multiple video calls with clients, prospects and staff in a single day rather than having to spend more time traveling to meet people in person.

Already, many progressive organizations are acting on these realizations. Pinterest **recently paid $90 million** to cancel its lease obligation for the construction of extensive new offices in San Francisco, where it will retain its current headquarters, in response to the trend toward a "more distributed workforce."[7] **Twitter**, **Facebook**, **Google** and even British banking stalwart **Barclays** are questioning whether a portion of their workers can continue to work from home indefinitely and, in doing so, whether they need acres of office space in expensive downtown locations.[8]

That productivity didn't suffer and that a lot of employees prefer the WFH arrangement suggests that many temporary shifts will become permanent and an option for employees. The infrastructure to facilitate working from home is ubiquitous but still has much room for improvement (please don't imagine Zoom is as good as it gets – see **StreamYard** and **Mmhmm** for a glimpse of the future of meetings).[9]

For many, the office will remain a fixture of their working lives. But the virus has created alternatives to that approach and shown that there is life (and work) beyond the cubicle.

Crisis on top of exponential transformation

As Shakespeare wrote, trouble seldom strikes as "single spies, but in battalions."[10] COVID hit at a time when many 20th century organizations around the world were struggling to retool for relevancy in markets operating at 21st century speed. In the U.S., millennials now outnumber Baby Boomers (72.1 million to 71.6 million) **according to the U.S. Census**, and are the prime audience for the big-ticket items that drive economies forward.[11] Yet far too many household brand-name companies have yet to respond to millennials' expectations that getting a mortgage or filing an insurance claim should be as easy as selecting a hotel on sites like Booking.com or buying a car from an online business like Carvana. They simply don't get how quickly customer expectations can switch as competitors blindside them with outstanding experiences stemming from a digital-first offering.

Alone and in combination, innovations in AI, blockchain, natural language processing and 5G communications are ushering in a decade of change that will make the years since our last Work Ahead report series look tame by comparison. To that end, we asked respondents to select one business process that has been augmented (or improved) by the application of technology, and to then say which technology tools were used. As Figure 3 reveals, technology tools that do the heavy lifting on consuming and acting on huge volumes of process data are the most widely used, with over 70% of respondents having implemented data analytics or AI as full implementations or pilots. With increasingly automated processes, data is continuously growing and changing and in need of sifting, organizing and analysis to convey meaning. Machine learning, data analytics and process automation tools working alone or in tandem enable leaders to see meaning from their data at scale.

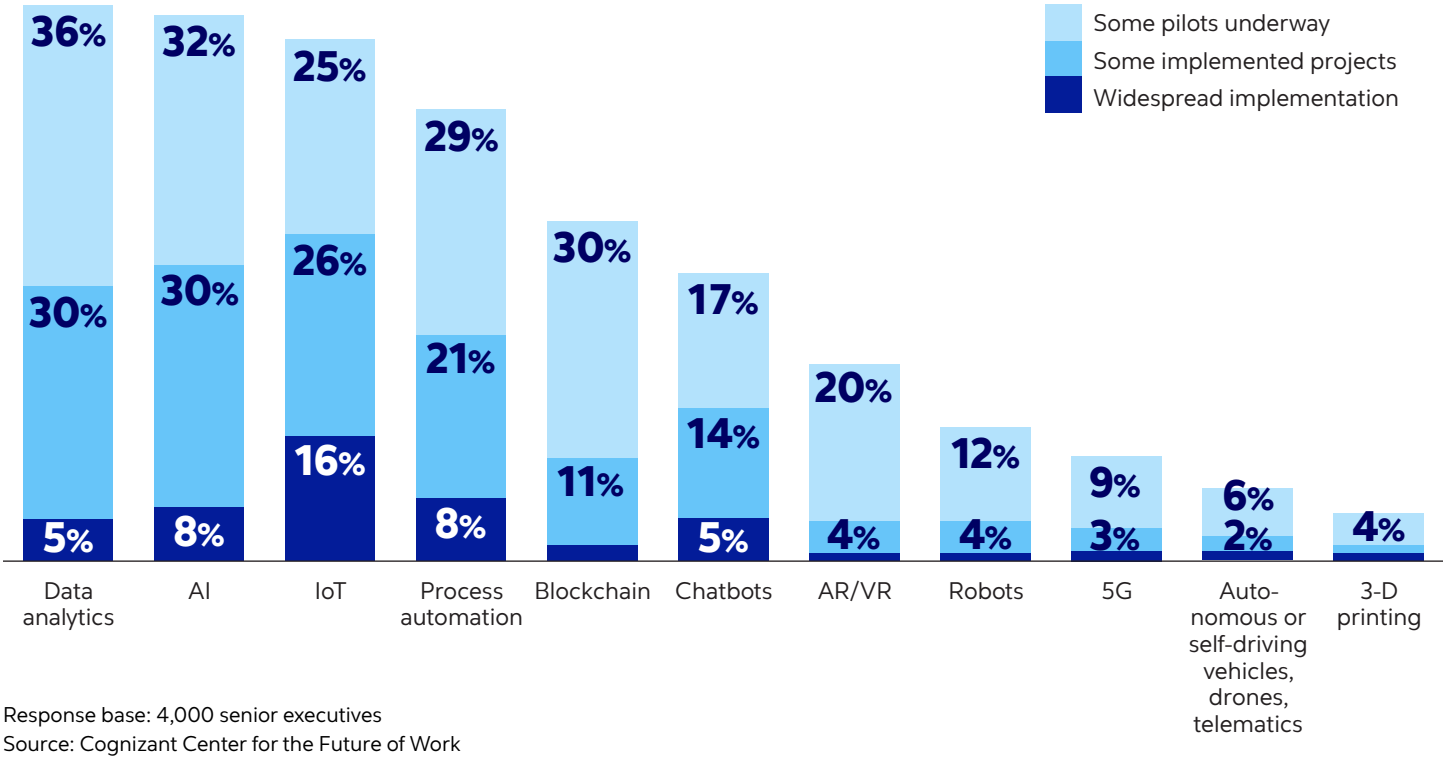
Of all the technologies, Internet of Things (IoT) systems are seeing the highest percentage of full deployments, at 16%, and are the third most widely used, with 67% of respondents at some stage of implementation. It's likely that respondents expect IoT to trigger more data-oriented technology investments in the future as these sensors generate growing amounts of data and are used to control a variety of physical systems, creating a "flywheel" effect. IoT will become increasingly powerful as the major cloud service providers (AWS, Microsoft Azure, etc.) get even better at connecting disparate hardware and software solutions.

Although 5G is still at an early stage of adoption (only 9% of respondents have a 5G pilot underway currently), over time the "mesh of machines" created by IoT and 5G will serve as the foundation for new levels of functionality and possibility. As a chief marketing officer at a telecom organization in Malaysia put it, "Mobile will explode and IoT too ... we expect huge demand that identity solutions like blockchain can best address. With a very limited talent pool of this technology, I believe there would be a huge demand for this in the coming three to four years."

Cognitive technologies support three business needs: process automation, data analysis and the use of "chatbots" to engage with customers and employees. These are somewhat low-hanging fruit when it comes to AI initiatives, both in terms of ease of implementation and rapid ROI. In our study, 38% of

Exploding process data demands a technological response

Respondents were asked about the progress made in using each technology to augment business processes.
(Percent of respondents naming each implementation phase)



Response base: 4,000 senior executives
Source: Cognizant Center for the Future of Work
Figure 3

respondents are using machine learning and deep learning to provide much more data-intensive and detailed insights, with the analytics models predicted to improve over time. Now, employees can pull insights from millions of customer interactions, for example, and use machine learning and AI to make ongoing and accurate predictions concerning consumer needs and desires.

Machines matter everywhere

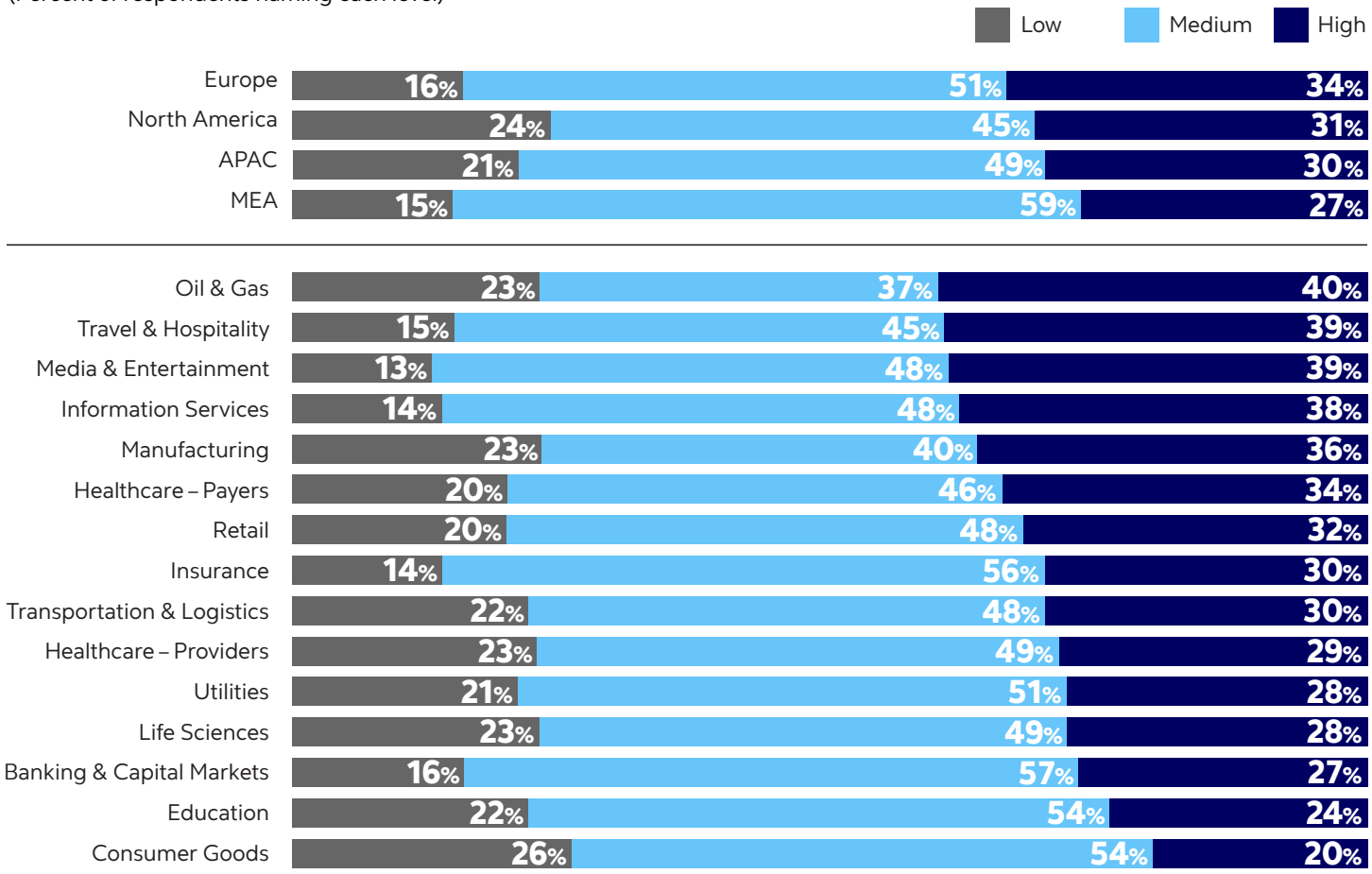
Among regions and sectors, there is relatively little differentiation regarding the shift toward digitization (see Figure 4). Europe leads the U.S. in its transference of workloads to machines, but only within a statistical margin of error.

Similarly, consumer goods companies in our study seem further behind on their journey to shift processes to machines than media and entertainment businesses, with half as many of the former believing they've made good progress as the latter. But in truth, these differences aren't so much radical as a scorecard of progress.

What our findings do illustrate is that, no matter the region or industry, the digital argument has won, and every industry in every part of the world is accelerating a transition that has no reverse gear. For every business, the direction of travel is the same – the only debate is the rate.

The balance of work shifts toward machines

Respondents were asked to estimate the amount of work conducted by machines vs. human employees.
(Percent of respondents naming each level)



Response base: 4,000 senior executives
Note: Totals sometimes do not sum to 100% due to rounding.
Source: Cognizant Center for the Future of Work
Figure 4

Quick Take

Understanding the modern enterprise

The concept of "digital transformation" has been a rallying cry in executive circles for over 10 years now. Fast forward to early 2021, and the bloom of the transformation rose has faded. Despite huge sums of money, time and attention being devoted to the effort, many businesses have struggled to materially improve their situation. Customer interfaces are still underwhelming and frustrating, internal systems are still complex and inefficient – drowning in people and work-arounds – and core technology infrastructures are still full of boxes and cables and software that shouldn't be seen outside the Mountain View, Calif., Computer History Museum. Amid all the day-to-day to-do lists and dashboards and review calls and status updates, what is missing is a clear sense of destiny – of what a modern business is and how it operates.

It's time to offer an explanation – not a vision – of what a modern business is and put it in simple black-and-white terms that everyone can instinctively understand so that everyone can play a part in building it and that inspires those in seats 1A *and* 27B.

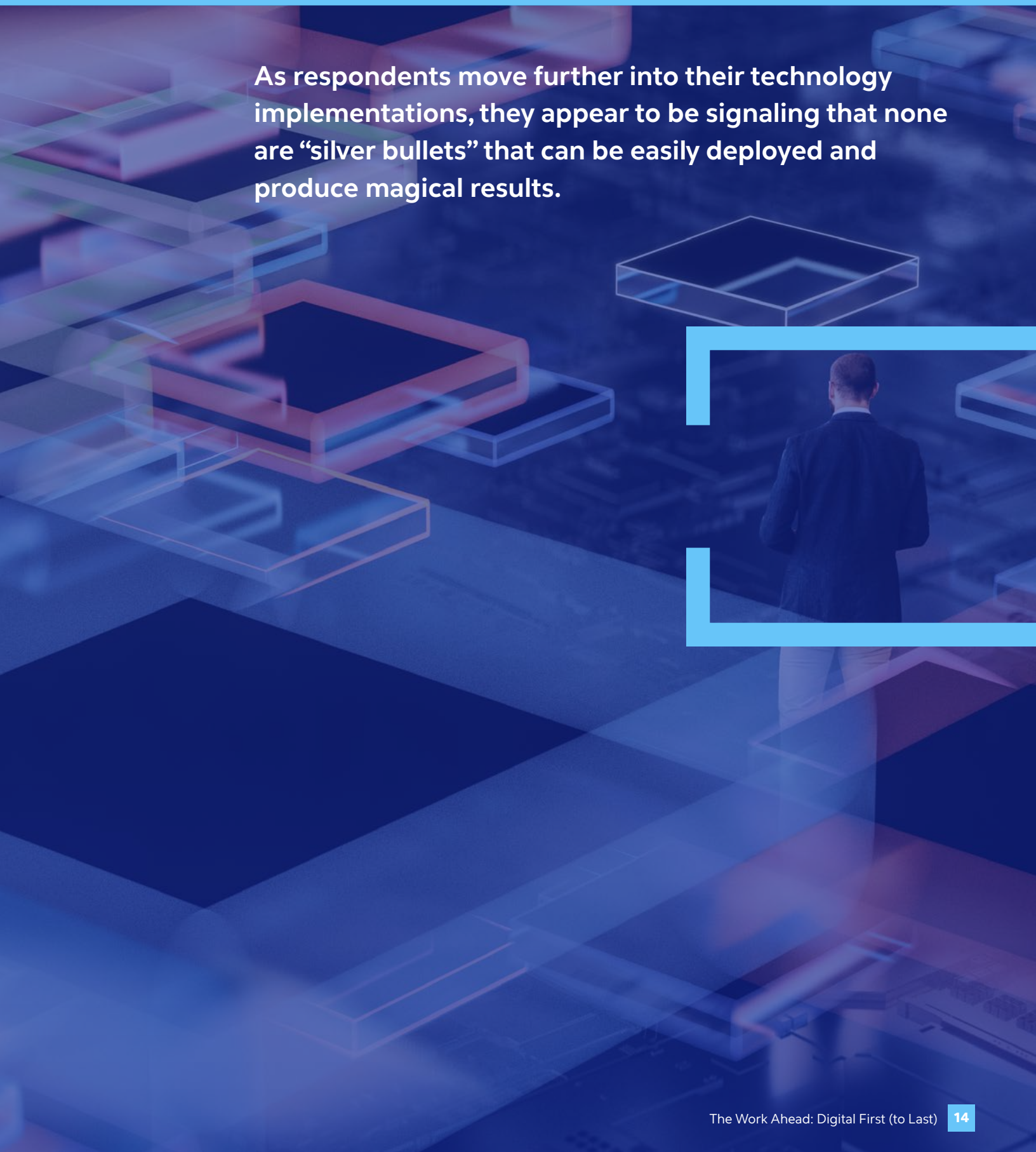
Of course, in a global economy of $80 trillion, with companies operating in thousands of markets with millions of niches, the idea of one platonically ideal modern business is improbable. But there are certain high-water marks observable right now that everyone understands – the user experience of HotelTonight, the buying experience of Allbirds, the one-click sales technology of Shopify, the presentation layer of Apple News, the voice interface of Google, the next-best-action agent of Waze, the banking experience of Revolut, the check-in process at the Schiphol Airport's YotelAir …

The job of the modern business leader is to mix these inspirational cross-industry examples with ones specific to the particular race their organization is trying to win. What does the employee onboarding process in a modern business look like, and how does it operate? How do we write software in a modern business? How does a modern business resolve a customer complaint without lowering its net promoter score or seeing the issue flashed around the world on Twitter? What does the lobby or workplace of a modern business look like? What does the CEO of a modern business wear? Where should it be based? How much IT infrastructure does it really need to own?

The simple and painful truth is that after a decade in which the power of the digital transformation message has waned and has left some asking, "What's beyond digital? What's next?", the actual answer is "digital." Much more digital. Decades' more digital. Digital for the rest of your working life – be you 55 or 25. Digital aimed at building and operating a modern business. The modern business that you probably don't work in today. That you know is not long for this world. That is being crawled over by a 32-year-old finance hot-shot from Wharton, eager to perform his next corporate colonoscopy. That is an OK(ish) place to work but is never going to be on the cover of a magazine.

There are no silver bullets for automagical business results

As respondents move further into their technology implementations, they appear to be signaling that none are "silver bullets" that can be easily deployed and produce magical results.



The implications of an increasingly digitized world are uppermost in executives' minds. With competitive dynamics shifting as "software eats everything," new markets emerging in previously "unconnected" parts of the world, and new pools of talent and labor supply, businesses need to re-address every aspect of the resulting opportunities (and threats).

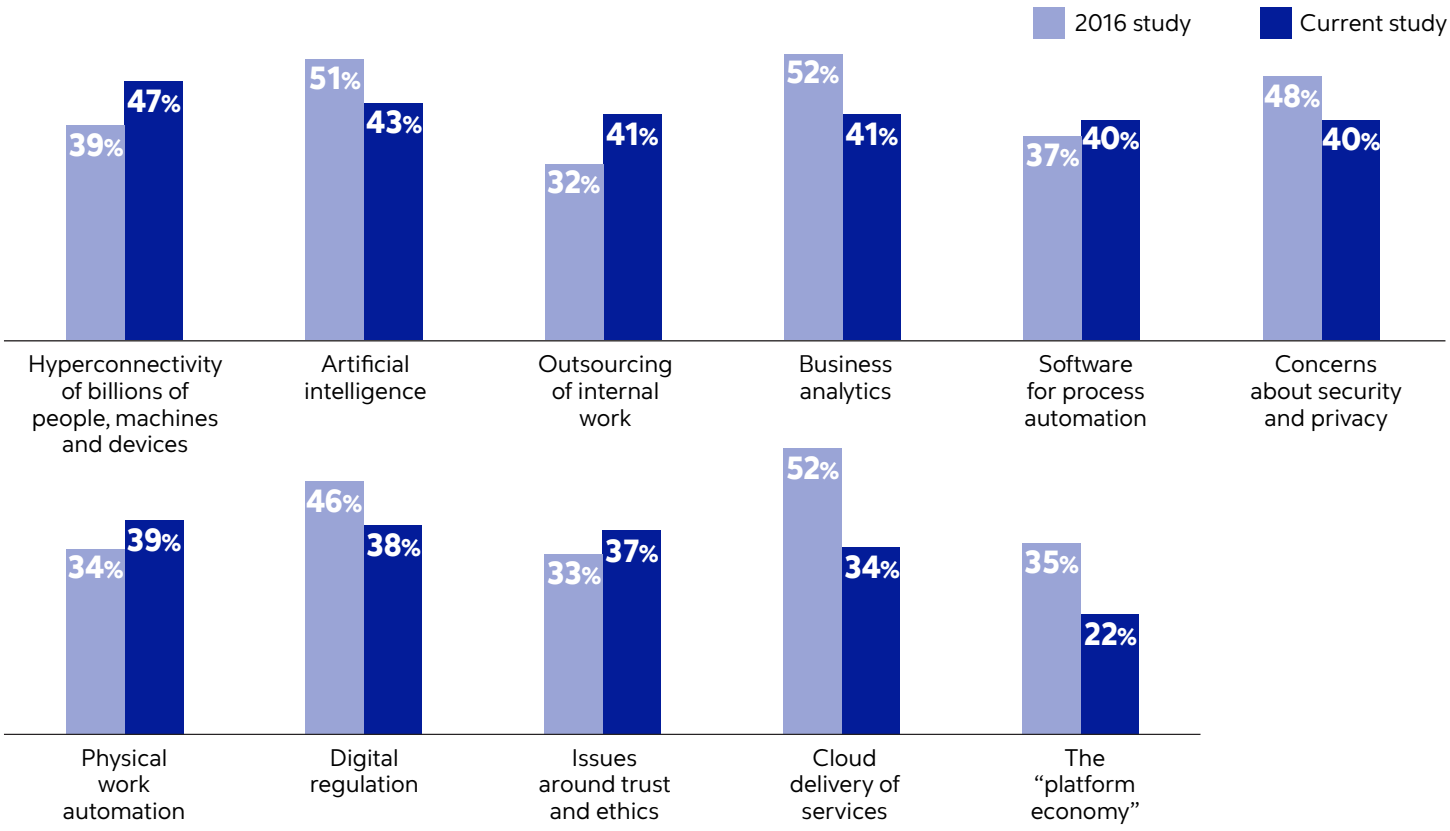
While the possibilities of these dynamics were very much in play in 2016, the last five years have shown just how real and material they are.

At the core of such digitization are the 3@s – AI, automation and analytics – ideas that were a brave new world for many organizations in our previous study but are now core curriculum for every organization to stay in business in the great post-COVID reset. This brave new work ahead rests on a mastery of the new "means of production," similar to how automobile companies in the 1930s had to grapple with the impact of Ford's production line innovations. After dragging their feet and debating how seriously they should take the 3@s, there is now no doubt that they are mission-critical.

However, this year's study also reflects a sense of tempered expectations about the impact of these technologies (see Figure 5). Although respondents named AI as a top technology or trend with the greatest impact on their business (second only to hyperconnectivity), the overall scores for technology impact have mostly declined compared with our last study, particularly for the cloud. As respondents move further into their implementations of these technologies, they appear to be signaling that none – including the 3@s – are "silver bullets" that can be easily deployed and produce magical results.

Tempered expectations: The highs are lower, and the lows are higher

Respondents were asked to rate the impact of several forces on work by 2023.
(Percent of respondents citing high impact)



Response base: 4,000 senior executives (current study); 2,000 senior executives (2016 study)
Source: Cognizant Center for the Future of Work
Figure 5

Rather, they are sophisticated, complex tools that need detailed understanding, practice and perfecting – just as sophisticated, complex tools always have.

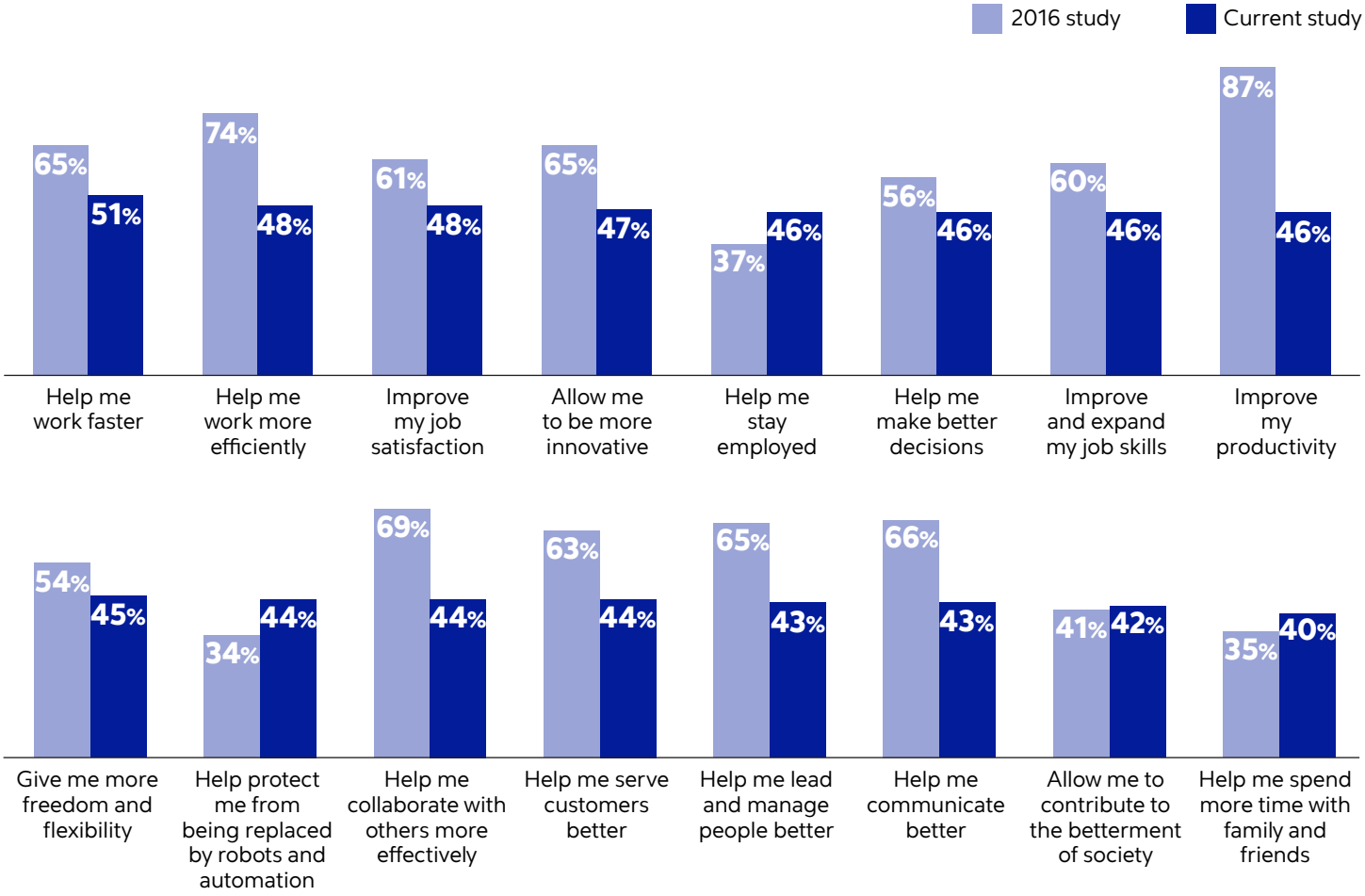
Developing this more mature appreciation for what digital technologies can do is an important step of the journey for every organization, from inflated expectations to a plateau of productivity. The cloud, in particular, can be regarded simply as "table stakes" for any organization seeking to modernize, given how mature and commonplace the technology now is.

As automation anxieties fade, complexity concerns soar

Both the promise and peril of modern digital technology appear to have been mitigated between 2016 and today. While fears of the "new machines" were heightened as we undertook our previous study, these concerns have grown somewhat more muted, as more respondents today agree that digital technologies will positively impact their employment, whether by protecting them from being replaced by robots and AI or helping them stay employed (see Figure 6).

Dampened fears vs. heightened concerns

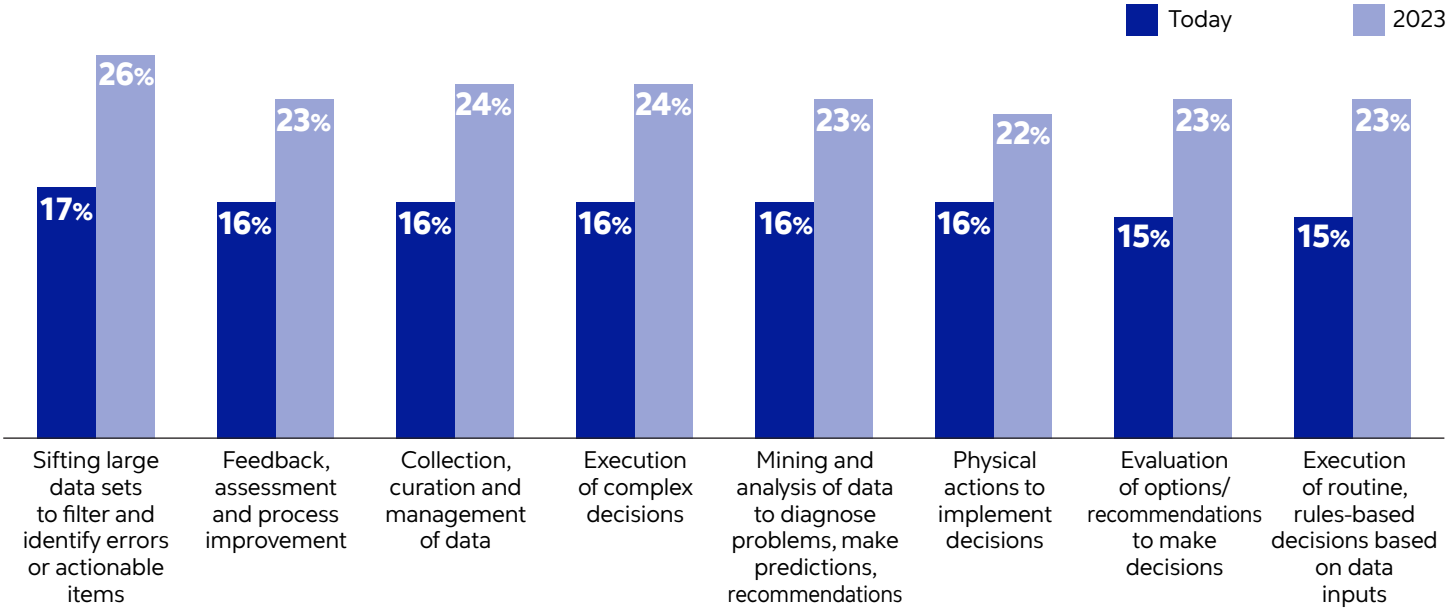
Respondents were asked whether they agree or disagree with statements about the impact of digital technologies on their job between now and 2023. (Percent of respondents who agree)



Response base: 4,000 senior executives (current study); 2,000 senior executives (2016 study)
Source: Cognizant Center for the Future of Work
Figure 6

The march of the machines continues

Respondents were asked to what extent the following activities are executed by machines vs. employees, now and in 2023.
(Percent of work respondents said is or will be conducted by machines)



Response base: 4,000 senior executives
Source: Cognizant Center for the Future of Work
Figure 7

Pre-COVID, there was little indication that the need for humans at work was subsiding; employment levels in most G7 countries were at record highs. It's no wonder that "automation anxieties" are much muted in this study, by about 10 percentage points.

What's surprising, however, is the decline in respondents' belief that digital technologies increase personal efficiency and productivity – in the range of 30 to 40 percentage points. This finding reflects the reality that most of us are experiencing post-pandemic: that we're working longer hours, working more intensely and juggling more demands, and that additional layers of technology – instant messaging, videoconferencing, collaboration platforms, now all the norm in our immersive, work-from-home age – seem to be making many of us less efficient and less productive. *We're so busy communicating, there's no time to do any work …*

This year's study reflects a more sober perspective that while AI and its kin are not job destroyers, they also won't make the job any easier. Instead, work is becoming harder and more complex, and humans are still very much in the loop.

Partners in performance: people and machines as complementary, not competitive

In fact, human work is set over the next few years to undergo a profound transformation as AI, algorithms and automation rebalance the relative contributions of human workers and machines to processes and tasks. The ratio of work performed by humans vs. machines continues to tip in favor of machines, particularly in the areas of data organization, complex decision support and rules-based decision making (see Figure 7).

With data organization – which encompasses data cleansing and data modernization – machine learning systems are used to prepare data to ensure it's accessible, reliable and timely enough to be of business value. A reality for most large organizations is that they are surrounded by data – drowning in it – but struggle to determine which data is relevant. Given the high volumes, this is beyond a human-scale problem and better handled by machine-learning software. Over the next three years, machines will perform over one-quarter of this task, as opposed to 17% currently.

The second and third areas where machines will take on a bigger role are in decision support. The percent of both complex and routine decisions executed by machines will grow a similar amount, from 16% to 24% for the former, and from 15% to 23% for the latter. Again, this trend reflects the fact that while humans struggle to process large data sets, algorithms can take on the heavy lifting of meaningfully consuming data. Just as most stock trading is now commonly undertaken by machines, most other complex decision making will be done more quickly and effectively by machines going forward. Data analysis is now moving beyond human scale, and new collaborative approaches are needed for revealing insights that lead to good decisions.

Partnering with the future

To that end, organizations that make their technology a "partner-in-work" can generate significant opportunities that extend beyond pure efficiency; they can begin to fundamentally reshape how the business performs – with benefits for customers and employees alike. "We use new tools to increase consumer engagement and create quality content while providing best-in-market service to the client," said the CEO of a Swiss media & entertainment company. Another, the CMO of an Australian insurance organization, commented that "the key reason to augment work was to ensure our employees had more control over their time and work-life balance while allowing better management decisions and providing enhanced productivity."

It's highly unusual for a tech-driven business improvement to increase speed, enhance quality and reduce costs at the same time, but the application of data analytics, AI, automation and IoT offers that possibility.

A key area where respondents expect benefits from human/machine teaming is customer experience, with a doubling in the percent of respondents expecting to see increased progress in the next three years (see Figure 8, next page). An executive based in the Middle East from the travel and hospitality sector remarked that, "AI, data analytics and other technologies generate customer insights, such as retrieving personas and customer likes and dislikes. One project in the UAE resulted in a 12% increase of revenue during the pilot phase, and when rolled out, that rose to 15%."

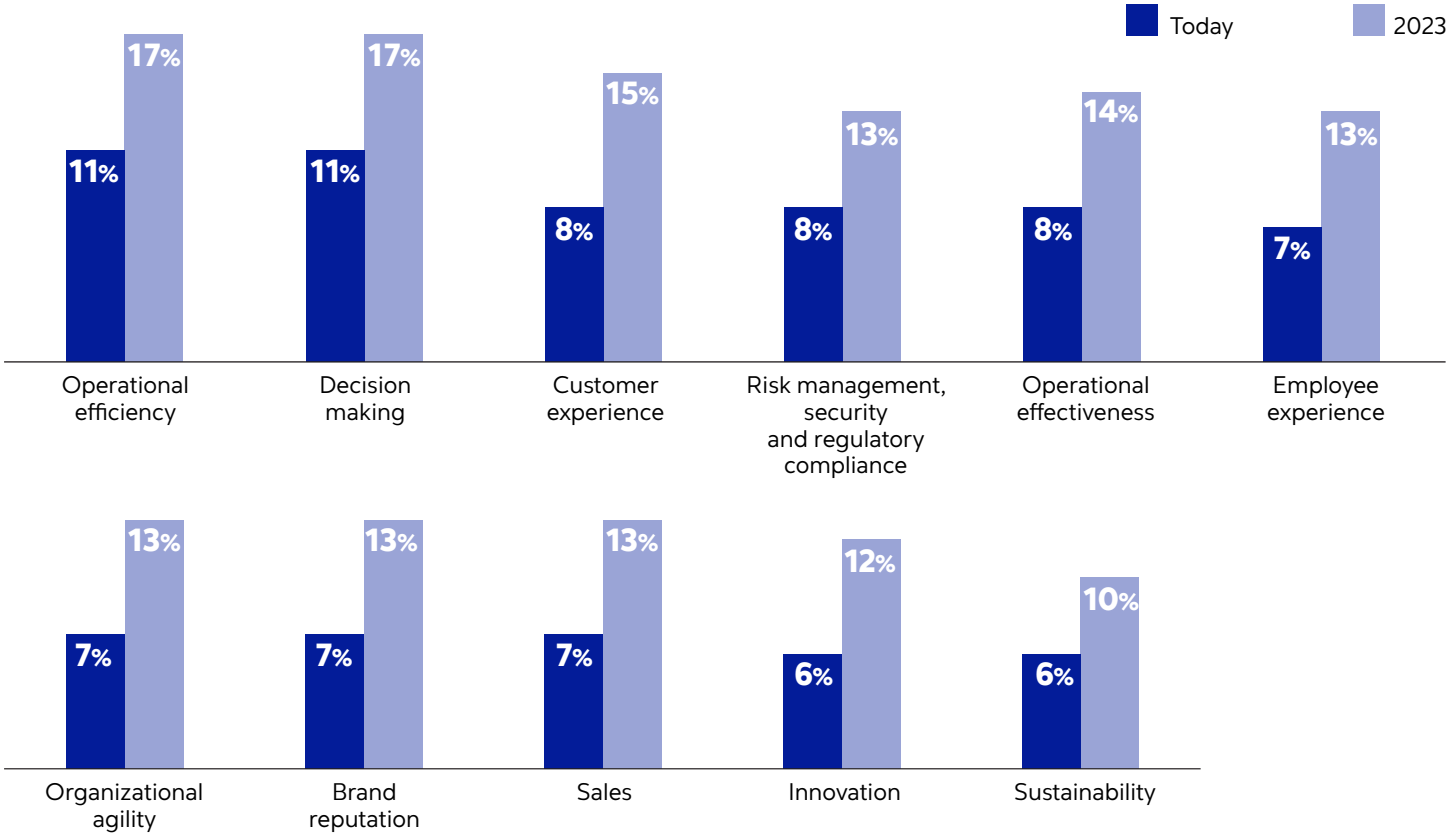
Other areas expected to surge via human/machine teaming are employee experience, organizational agility, brand reputation, innovation and sales, all of which are connected and interdependent.

Cost savings is yet another benefit cited by respondents. "AI can remove inefficiencies from our supply, reducing the 'supplier tail' by more than 72% in the last 12 months," said a CFO from a U.S. life sciences company. "We were able to generate a savings of $12 million annually in the last year." The bottom line is hard to argue with.

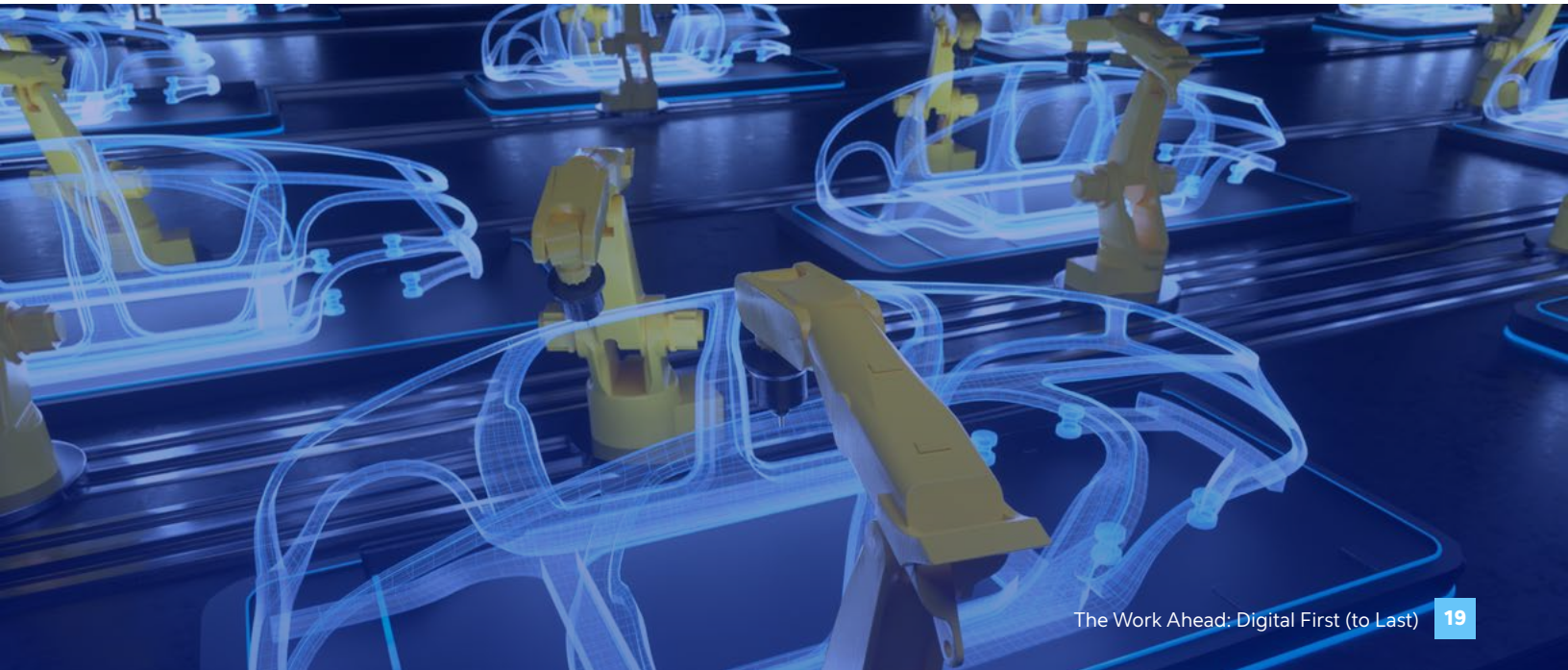
Organizations that make their technology a "partner-in-work" can generate significant opportunities that extend beyond pure efficiency; they can begin to fundamentally reshape how the business performs – with benefits for customers and employees alike.

Workforce augmentation improves outputs across multiple dimensions

Respondents were asked about the progress they expect to make by 2023 in the following areas.
(The mean percent increase today and in 2023)

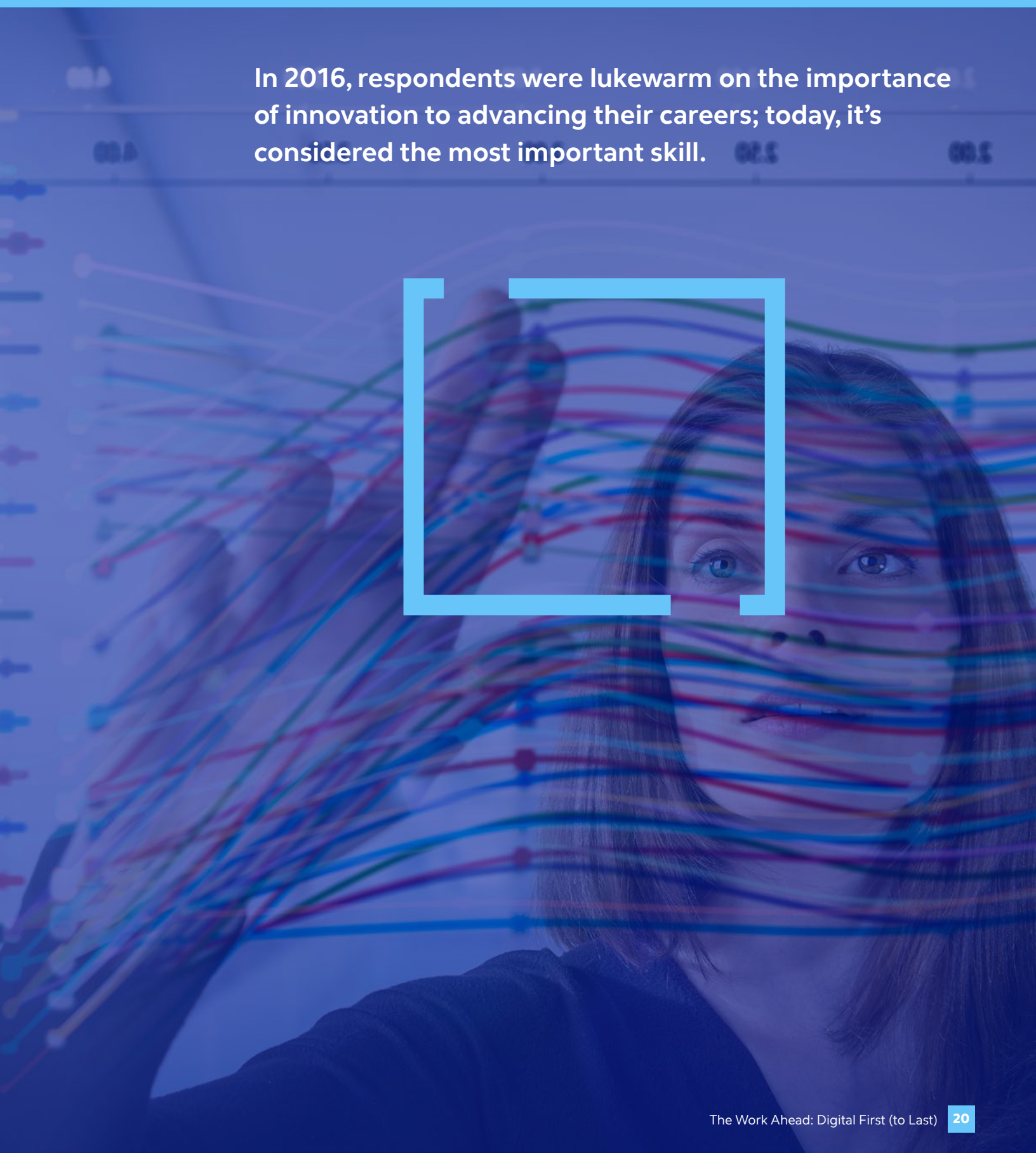


Response base: 4,000 senior executives
Source: Cognizant Center for the Future of Work
Figure 8



Skills, values and purpose in the 21st century

In 2016, respondents were lukewarm on the importance of innovation to advancing their careers; today, it's considered the most important skill.



Technology is reshaping not just how we work but also the way we think about our work. This is especially true as the lines between work and home blur (accelerated by COVID) and we seek greater meaning from work in a time of existential questioning. If machines can do more work as time goes on, and if humankind sees itself as more than machines, then it raises the question: How do we continue to be valued and valuable?

Central to answering this question is the concept of "upskilling" – of having skills and capabilities that cannot be supplied by even the smartest of machines. This is as true for those in the boardroom as for those on the factory or showroom floor.

This is clearly uppermost in the minds of respondents. In 2016, respondents were lukewarm on the importance of innovation to advancing their careers; today, it's the most important skill (see Figure 9). In a time of intense disruption and change, the ability to create new and better ways of working is regarded as paramount.

In contrast, the skill that has fallen the furthest in the last five years is "global operating skills." Again, this is a reflection of how much the world has changed in the four years since the last U.S. presidential administration. Pre-2016, faith in the underlying concept of globalization was accepted as conventional wisdom; after a period of voracious criticism, however, this belief has atrophied. Instead, many executives have been dealing with anti-globalization tides, and have been focused on bringing supply chains back into their country of domicile. This trend has been strengthened by the COVID crisis; many organizations have realized how exposed their supply chains are when substantial operating capacity is distributed geographically. This finding could signal a period of re-domestication, which will require less emphasis on the skills needed to operate in a globalized world (see Quick Take, next page).

Skills shift from planning and analysis to innovation and decision-making

Respondents in our two studies were asked whether each skill was more or less important today for succeeding at work.
(Percent of respondents naming each skill as more important)

2016	IMPORTANCE	Current Study
Strategic thinking **(64%)**	1	**(40%)** Innovation
Global operating **(62%)**	2	**(39%)** Decision-making
Leadership **(61%)**	3	**(35%)** Leadership
Analytic **(60%)**	4	**(34%)** Analytic
Innovation **(59%)**	5	**(30%)** Strategic thinking
Selling **(58%)**	6	**(30%)** Communication
Decision-making **(58%)**	7	**(28%)** Customer care
Customer care **(55%)**	8	**(27%)** Selling
Communication **(49%)**	9	**(26%)** Interpersonal
Learning **(46%)**	10	**(20%)** Learning

Response base: 4,000 senior executives (current study); 2,000 senior executives (2016 study)
Source: Cognizant Center for the Future of Work
Figure 9

In tandem, "strategic thinking" has declined in relative importance, falling from second-ranked to the fifth most important skill. While there will always be a need for strategic thinking in the business world, this could be a reflection that the importance of high-level, "big-picture" thinking about relatively stable and well-understood operating conditions is becoming subservient to disruptive ways of thinking. The world is changing faster than ever – the only response is to disrupt others before they disrupt you.

In a machine age, the purpose of human work grows in importance

Leaders' views of employees as mere labor resources are giving way to a richer, more complex understanding of the value employees offer. In turn, employees' simplistic views of their jobs – and job satisfaction – as being a function of remuneration are also eroding. The value of work now crosses many different vectors: business value, employee value, customer value and societal value. What the pandemic has done is catalyze the change in relationship between employees and the organizations that employ them (see Figure 10, next page).

Quick Take

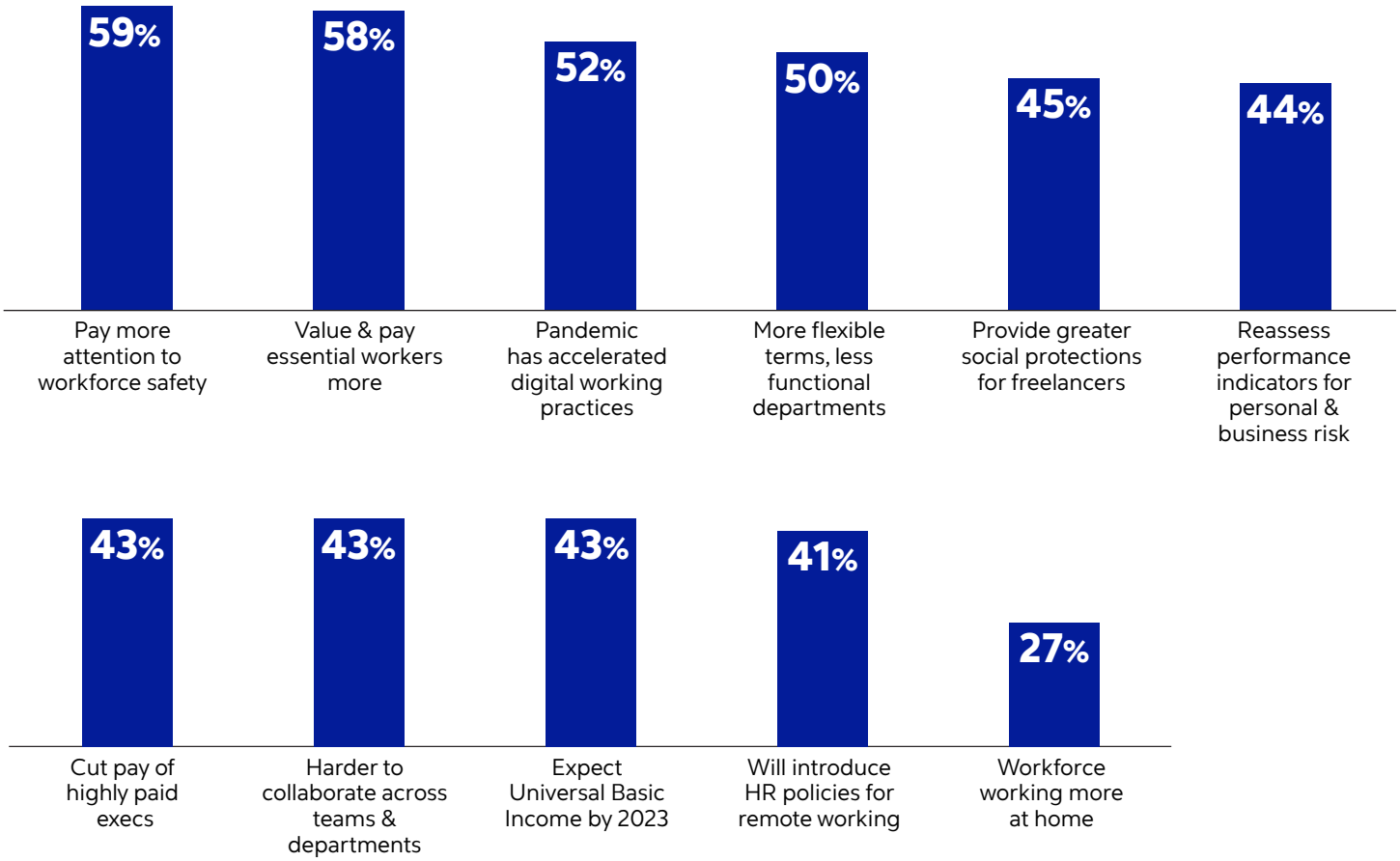
Justin Time meets *Justin* Case

A further aspect of the modern business that has been brought into the spotlight during the last 12 months is the need for enhanced resiliency. The West's over-reliance on China and its large supply of low-wage workers has been thrown into sharp relief during the existential shock of 2020. Half of our respondents expect to substantially reconfigure their supply chains to create more "slack" in systems that were exposed as brittle and full of risk.

Executives, it seems, plan on more stockpiling, excess capacity and duplicated systems, and are willing to tolerate greater levels of inefficiency to this end. Even before the virus, the subtext of ongoing U.S./China trade discussions put political pressure on U.S. companies (and others) to re-examine and rebalance the structure of their supply and production networks. While the integration of supply chains was in decline before the pandemic, it's now accelerating, with 42% of respondents expecting to redesign their operating models in a world of tighter borders. "Just-in-time" models of manufacturing and distribution – prominent for the last few decades – will be superseded by a new focus on "just-in-case" approaches.

The pandemic resets the employer/employee dynamic

Respondents were asked whether they agreed or disagreed with the following statements about the pandemic's impact on their business and workforce in the medium term. (Percent of respondents who agree or strongly agree)



Response base: 4,000 senior executives
Source: Cognizant Center for the Future of Work
Figure 10

When asked to predict how the pandemic would impact their business and workforce over time, respondents pointed to employee safety (59%) and worker recognition (58%) as top areas of focus. While employee compensation and safety are understandably top of mind right now, however, these priorities may fade over time as new economic and labor dynamics shape workforce strategies. Designing new compensation models when millions of workers have faced layoffs, furloughs or other uncertain employment futures will prove daunting.

In the longer term, however, respondents indicated that digital working practices (52%) will increase, as will organizational agility (50%) as teams form across functional boundaries (i.e., product and marketing specialists will work alongside commercial experts, data scientists and UX specialists on a common strategic goal or aligned with a customer journey).

Changes to the value employees gain from work are demonstrated by the 45% of respondents who expect greater social protections for freelancers (better access to pay and benefits); meanwhile, 43% expect a drop in pay, generally, for highly paid executives. Respondents also revealed their acceptance of the work-from-home reality as a result of the pandemic, with leaders expecting to adjust their HR policies to account for more flexible approaches to remote work (41%).

The end of the beginning

The modern business of today is still – for 90% of organizations in the Fortune 500 by our estimates – a work in progress.

Large quantitative studies like this one are often somewhat lagging indicators – they show clearly what happened yesterday. This study, however, shows just how far we've come and how fast we're now moving on the back of a major shock to the world economy. Digital's second act is here.

When the COVID-19 pandemic first struck, most companies faced a sudden challenge: The business, operating and technology models they'd previously relied on proved insufficient as the disruption intensified. Leaders had to scrutinize everything, from how and where employees worked, to how they engaged with customers, to which products and services were viable as customer needs and behaviors switched, literally, overnight (and they won't go back). It quickly became clear that those organizations with data mastery at their core were best able to pivot, adapt and reinvent themselves on-the-fly.

Rapidly changing customer habits, along with a raft of new business models and a revised competitive landscape, have resulted in new threats and opportunities that demand organizational responses. Businesses large and small don't just need a plan for the future of their work – they also need to act on it.

The Cognizant Center for the Future of Work team went into this project expecting – and hoping – that we'd uncover evidence that the journey to the future of work is accelerating. The good news (for all of us) is that our study not only surfaces this evidence but also supports the expectation that the destination is still uncertain – as seen in the shifting employee-employer dynamic, which is a harbinger of a heightened sense of purpose when it comes to the work ahead. It's imperative to make the right decisions over the coming months and quarters. As we said in our last Work Ahead study in 2016, "We believe many managers will be asked two questions: Did you see the changes coming? And, if so, what did you do about it?"

The job for business leaders is to mix inspirational cross-industry ideas and examples, and challenge people on what their work will look like one, two, three or even 10 years from now.

Recommendations

Building a modern business is the work you should be focused on today and tomorrow – anything else is a waste of time. Don't call it digital transformation anymore if that term rubs you the wrong way. Call it being relevant. Call it being fit for the future. But recognize that most businesses are not modern businesses and that, soon, there will be no choice but to be one.

Scrutinize everything because it's going to change. The pandemic is a catalyst for reengineering how the business operates, from how and where employees work, to how they engage with customers, to which products and services are now viable as customer needs and behaviors continue to change. These changes are not temporary – they represent the way business gets done now and in the future. The Fourth Industrial Revolution kicked off before the pandemic and is now accelerating at speed.

Make technology a partner in work. Technology is the core curriculum for modern work. Innovations in AI, blockchain, natural language processing, IoT and 5G communications are ushering in decades of change ahead and will drive new levels of functionality and performance. The job for business leaders is to mix inspirational cross-industry ideas and examples, and challenge people on what their work will look like one, two, three or even 10 years from now. The hard work begins by harnessing and perfecting these powerful, sophisticated tools to reach new levels of productivity, creativity and resilience.

Build new workflows to reach new performance thresholds. Success depends on how well businesses blend and extend the strengths of their people with the capabilities of machines. New workflows need to be constructed so that the most predictable, rote and repetitive activities can be handed off to software, while humans specialize in using judgment, creativity and language. Start reshaping the jobs of today into the jobs of tomorrow by looking at tasks, teams, needed talent, required infrastructure and the trust needed to make human/machine teaming a reality. Prepare the workforce for these profound changes in how they work.

Make digital competency the prime competency for everyone. No matter what type of work needs to be done, it must have a digital component. Levels of digital literacy need to be built out even among non-technologists, including the specialized skills that focus on the 3@s (AI, automation and analytics). Reset how the organization uses data by establishing data tribes with squads of data stewards, data engineers and data modelers swarming around a specific challenge or a customer touchpoint. Institute a digital culture in which every employee is eager to use and apply these new data services within their roles. Tie it to consistent messaging from the top to ensure the strategy aligns with a business goal.

Begin a skills renaissance. The future workforce needs to include big data specialists, process automation experts, security analysts, human-machine interaction designers, robotics engineers, blockchain specialists and machine learning experts. But these skills aren't easy to acquire. As businesses experience severe skills shortages, they'll need to work harder to retain and engage workers. Better rates of pay, new mechanisms to tie reward to performance, and new upskilling and career models will signal a shift in attitudes between employers and employees.

Employees want jobs, but they also want meaning from jobs. Almost everyone experiences meaningful work at some time or another, but they still must engage in rote, repetitive and predictable tasks that are more suited to software. How can businesses use intelligent algorithms to take increasing proportions of tasks off workers' plates, allowing them to spend their time creating value? This search for meaning stretches beyond the individual tasks of the job to what the organization itself stands for, with inclusivity, equality and sustainability now part of the answer. Work gives collective meaning to the actions we take, engages the self, helps other people and sustains civilization itself.

The final word

Digital transformation is not even half done. The First Industrial Revolution lasted 90 years; the Second Industrial Revolution, 100; and the Third Industrial Revolution – the information revolution – that started in the 1970s has now given way to the Fourth Industrial Revolution. This one has a long way to go. There's at least another two generations of workers whose work ahead will be making their businesses modern businesses. Turing's Cathedral is far from finished.[12]

Of course, many are jaded about the concept of digital transformation. But the truth is that the manifest destiny of machines is just that – manifest. Unrelenting, unforgiving and unstoppable. The modern business of today, full of those machines, is still – for 90% of organizations in the Fortune 500 by our estimates – a work in progress. In another decade, after modern businesses have stretched their competitive lead, a non-modern business will be no more than an antique – a nice-looking old MG that gets taken out for a spin on a Sunday morning, not a high-performance car used to win the ultimate race.

Digital transformation is not even half done. The First Industrial Revolution lasted 90 years; the Second Industrial Revolution, 100; and the Third Industrial Revolution – the information revolution – that started in the 1970s has now given way to the Fourth Industrial Revolution. This one has a long way to go.

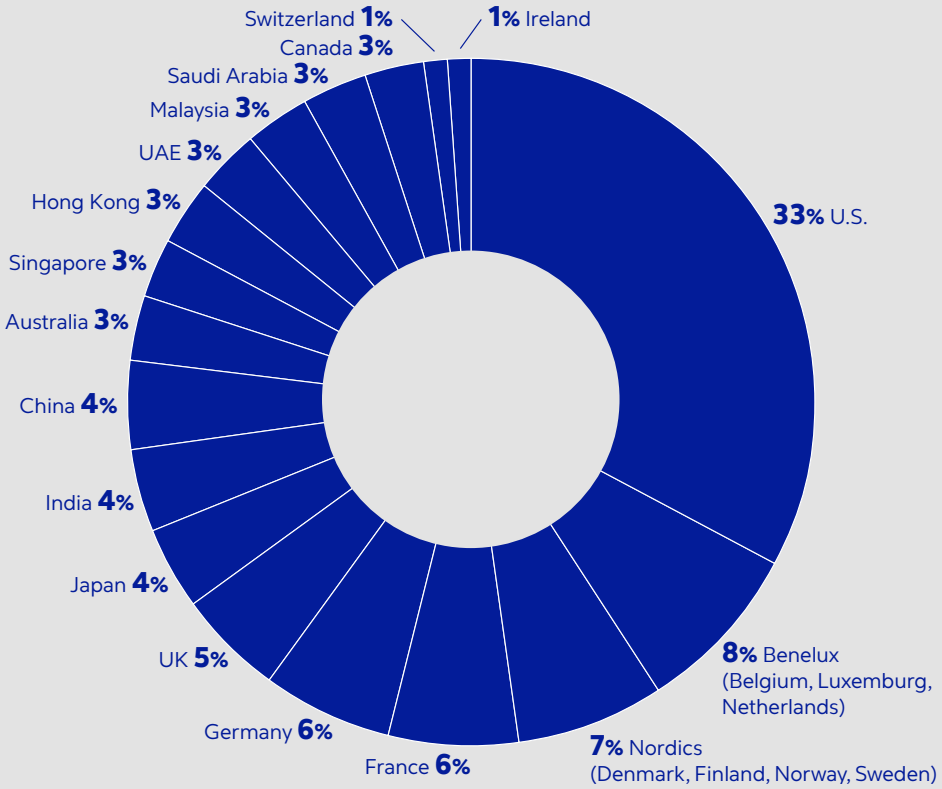
Methodology

Cognizant commissioned Oxford Economics to design and conduct a study of 4,000 C-suite and senior executives. The survey was conducted between June 2020 and August 2020 via computer-assisted telephone interviewing (CATI). Approximately one-third of the questions were identical to those included in the 2016 Work Ahead study, allowing us to compare responses and track shifting attitudes toward technology and the future of work.

Respondents were from the U.S., Canada, UK, Ireland, France, Germany, Switzerland, Benelux (Belgium, Luxemburg, Netherlands), Nordics (Denmark, Finland, Norway, Sweden), Singapore, Australia, Malaysia, Japan, China, Hong Kong, India, Saudi Arabia and UAE. They represent 14 industries, evenly distributed across banking, consumer goods, education, healthcare (including both payers and providers), information services, insurance, life sciences, manufacturing, media and entertainment, oil and gas, retail, transportation and logistics, travel and hospitality, and utilities. All respondents come from organizations with over $250 million in revenue; one-third are from organizations with between $250 million and $499 million in revenue, one-third from organizations with between $500 million and $999 million in revenue, and one-third with $1 billion or more in revenue.

In addition to the quantitative survey, Oxford Economics conducted 30 in-depth interviews with executives across the countries and industries surveyed. Interviewees who responded to the survey have a track record of using emerging technology to augment business processes. The conversations covered the major themes in this report, providing real-life case studies on the challenges faced by businesses and the actions they are taking, at a time when the coronavirus pandemic was spreading around the world and companies were formulating their strategic responses. The resulting insights offer a variety of perspectives on the changing future of work.

Respondents by geography



(Percentages may not equal 100% due to rounding)

Respondents by role

- **13%** Vice President
- **13%** Chief Operating Officer
- **13%** Director reporting to senior executive
- **13%** Senior Vice President
- **12%** President
- **12%** Chief Executive Officer
- **12%** Chief Financial Officer
- **12%** Other C-suite Officer

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Ben Pring is the Head of Thought Leadership at Cognizant, and co-founded and leads Cognizant's Center for the Future of Work. He is a co-author of the best-selling and award-winning books *What To Do When Machines Do Everything* (2017) and *Code Halos; How the Digital Lives of People, Things, and Organizations are Changing the Rules of Business* (2014). His latest book, *Monster: Taming the Machines that Rule Our Lives, Jobs, and Future*, will be out in March 2021.

Ben sits on the advisory board of the Labor and Work Life program at Harvard Law School. In 2018, he was a Bilderberg Meeting participant.

Ben joined Cognizant in 2011 from Gartner, where he spent 15 years researching and advising on areas such as cloud computing and global sourcing. In 2007, he won Gartner's prestigious Thought Leader Award. Prior to Gartner, Ben worked for a number of consulting companies, including Coopers and Lybrand.

Ben's expertise in helping clients see around corners, think the unthinkable and calculate the compound annual growth rate of unintended consequences has made him an internationally recognized authority on leading-edge technology and its intersection with business and society. His work has been featured in *The Wall Street Journal, Financial Times, The London Times, Forbes, Fortune, MIT Technology Review, The Daily Telegraph, Quartz, Inc., Axios, The Australian* and *The Economic Times.*

Based near Boston since 2000, Ben graduated with a degree in philosophy from Manchester University in the UK, where he grew up.

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Endnotes

1 Paul Roehrig and Benjamin Pring, "The Work Ahead: Mastering the Digital Economy," Cognizant, www.cognizant.com/FoW/the-work-ahead.pdf.

2 Klaus Schwab, "The Fourth Industrial Revolution: What It Means, How to Respond," World Economic Forum, Jan. 14, 2016, www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/.

3 Marc Andreessen, "Why Software Is Eating the World," *The Wall Street Journal*, Aug.. 20, 2011, www.wsj.com/articles/SB10001424053111903480904576512250915629460.

4 "The True Meaning of AI: Action & Insight," Cognizant, November 2020, www.cognizant.com/whitepapers/the-true-meaning-of-ai-action-and-insight-codex6204.pdf.

5 Klaus Schwab, "Davos Manifesto 2020: The Universal Purpose of a Company in the Fourth Industrial Revolution," World Economic Forum, December 2019, www.weforum.org/agenda/2019/12/davos-manifesto-2020-the-universal-purpose-of-a-company-in-the-fourth-industrial-revolution/.

6 For more on this topic, see Malcolm Frank, Paul Roehrig and Benjamin Pring, *What To Do When Machines Do Everything*, Wiley, February 2017, www.amazon.com/What-When-Machines-Everything-Algorithms/dp/111927866X.

7 Katie Dowd, "Pinterest Pays $89.5 Million to Terminate San Francisco Office Lease," SF Gate, Aug. 30, 2020, www.sfgate.com/business/article/Pinterest-terminate-SF-office-lease-88-Bluxome-15525421.php.

8 Elizabeth Dwoskin, "Americans Might Never Come Back to the Office, and Twitter Is Leading the Charge," *Washington Post*, Oct. 1, 2020, www.washingtonpost.com/technology/2020/10/01/twitter-work-from-home/?arc404=true. Kate Conger, "Facebook Starts Planning for Permanent Remote Workers," *The New York Times*, May 21, 2020, www.nytimes.com/2020/05/21/technology/facebook-remote-work-coronavirus.html. Jennifer Elias, "Google Will Try 'Hybrid' Work-from-Home Models," CNBC, Sept. 23, 2020, www.cnbc.com/2020/09/23/google-ceo-sundar-pichai-considering-hybrid-work-from-home-models.html. Stefania Spezzati, Matthew Miller and Annmarie Hordern, "Barclays Wants Eventual Return for Staff Working from Home," Bloomberg, July 29, 2020, www.bloomberg.com/news/articles/2020-07-29/barclays-wants-office-return-for-60-000-staff-working-from-home.

9 StreamYard website: www.streamyard.com. MmHmm website: www.mmhmm.app/.

10 From William Shakespeare's Hamlet: www.phrases.org.uk/meanings/407600.html.

11 Richard Fry, "Millennials Overtake Baby Boomers as America's Largest Generation," Pew Research Center, April 28, 2020, www.pewresearch.org/fact-tank/2020/04/28/millennials-overtake-baby-boomers-as-americas-largest-generation/.

12 For more, see George Dyson's *Turing's Cathedral*, Vintage, December 2012, www.amazon.com/Turings-Cathedral-Origins-Digital-Universe/dp/1400075998.

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Cognizant (Nasdaq-100: CTSH) is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 194 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at www.cognizant.com or follow us @Cognizant.

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