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Automation and the future of work in the US biopharma industry

The US biopharma industry has been slower than some others to embrace enterprise-wide automation. As it accelerates adoption, it will radically alter the future of work for its employees.

by Laura Bremme, Lucia Darino, Brandon Parry, and Kai Xiang Teo

For years, business and technology leaders have forecast the revolutionary impact of automation technologies such as robotics, smart workflows, advanced analytics, data visualization, natural-language processing, and cognitive agents. These tools have a huge potential to drive efficiencies and foster innovation while profoundly changing ways of working. We see benefits at scale in many industries, from airline check-in at kiosks, to robots fulfilling warehouse orders, to text mining of documents during legal discovery.[1]

The biopharma industry has been relatively slow to adapt and embrace these technologies, despite having a large amount of data it could leverage, such as healthcare databases with patient and provider data from more than 300 million US patients (Exhibit 1). While this delay might be because of the heavy reg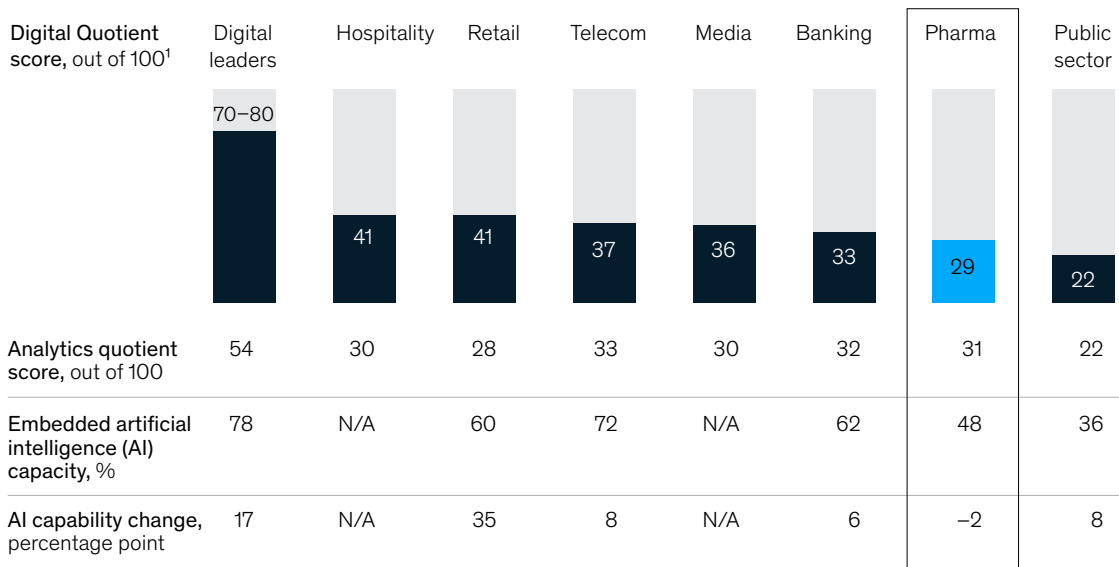ulation of the industry, other regulated industries, such as banking, are making massive strides and unlocking the capabilities of the technology at a much faster rate. Today in financial services, robotic process automation (RPA) supports account closures and payments, machine learning analyzes and defends against cyberattacks, and cognitive agents enable consumer self-service for products and services such as new credit card applications.

In biopharma, some companies have experimented with automation, and there are many examples of success—for instance, RPA in operational maintenance and chatbots for patient self-service support. But these have been limited in scope and represent only a fraction of the overall opportunity. On the following pages, we will lay out why it is time for biopharma companies to automate, what the impact is likely to be, and how to move forward.

Exhibit 1

Some biopharma companies have experimented with automation, and there are many successful examples.

Biopharma industry's digital maturity relative to other industries

Digital Quotient score, out of 100[1]	Digital leaders	Hospitality	Retail	Telecom	Media	Banking	Pharma	Public sector
	70–80	41	41	37	36	33	29	22
Analytics quotient score, out of 100	54	30	28	33	30	32	31	22
Embedded artificial intelligence (AI) capacity, %	78	N/A	60	72	N/A	62	48	36
AI capability change, percentage point	17	N/A	35	8	N/A	6	−2	8

[1]Digital Quotient takes into account analytics capabilities and artificial-intelligence embedding.
Source: McKinsey Digital and Analytics Quotient; "McKinsey Global AI Survey: AI proves its worth, but few scale impact"

[1] Michael Chui, James Manyika, and Mehdi Miremadi, "Four fundamentals of workplace automation," *McKinsey Quarterly*, November 2015, McKinsey.com.

The time to automate is now

The biopharma industry is at the point where it can wholeheartedly embrace automation. Automation has grown beyond specific applications delivering incremental efficiency gains; it is a way for a company to change its competitive positioning. Several conditions make automation desirable at this time:
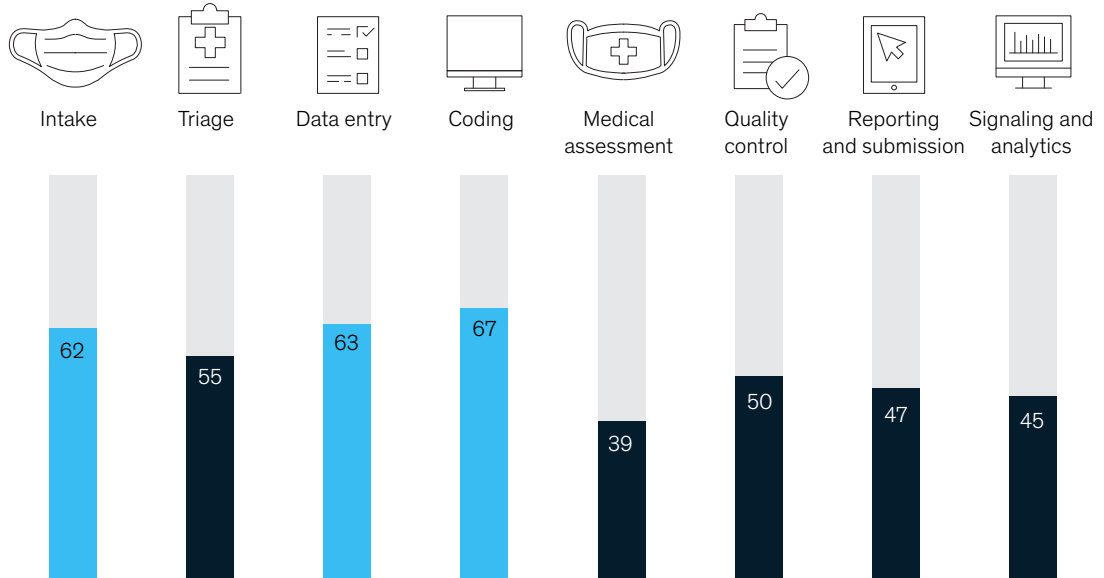
— *Renewed urgency to contain costs.* McKinsey analysis shows that general and administrative (G&A) expenses in the biopharma industry equal about 7 percent of total revenue—1.5 to 2.0 percentage points higher than in comparable sectors. Managers face public and investor expectations as well as internal pressure to bring that number down. Companies that are steadily migrating toward improved G&A, leveraging automation to their advantage in processes such as record-to-report in finance, have an advantage when prices are depressed. Automation can break the linear relationship between workload growth and cost. And opportunities to further leverage intelligent automation—RPA in operational maintenance, smart digital workflows in the care pathway to support patients and physicians, machine learning and artificial intelligence (AI) in drug discovery to visualize interactions with targets and predict a molecule's likelihood of success— will drive further value creation. The potential impact is significant: best-practice pharma companies that have fully automated tasks have G&A spending as low as 3.5 percent of revenue.

— *Ever more accessible technology.* Falling costs of data storage and processing, advances in mathematics, and ever more available data have made robots and cognitive agents more usable and accessible. For example, companies can use AI to optimize spending between commercial channels and employ chatbots to support call-center personnel for customer service and e-detailing.

— *Increased confidence in the benefits to core processes.* Domain expertise has developed among companies and value-chain partners, such as clinical-research organizations (CROs), resulting in more nuanced approaches and solutions to workflows and increased confidence in a recipe that works. For example, in regulatory and pharmacovigilance (PV), what was previously a one-solution-fits-all approach has evolved to a more refined perspective of the specific steps in regulatory submission and end-to-end labeling that can be automated (Exhibit 2). In particular, experts and business leaders believe that within PV, they can expect to start realizing business value from AI and automation initiatives within the next three to five years.

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Exhibit 2

Manual case-processing steps are expected to be 40 to 70 percent automated.

Potential automation by process step during intake,[1] % of respondents

Intake	Triage	Data entry	Coding	Medical assessment	Quality control	Reporting and submission	Signaling and analytics
62	55	63	67	39	50	47	45

Question: In your estimation, how much of each case-processing step could be automated? (n = 25)
Source: Customer survey; expert interviews

Improved employee engagement and better business outcomes. Advanced analytics has provided a platform for companies to develop new recruiting strategies, build capabilities, and develop talent. For example, a pharmaceutical company leaped from third place to first in market share[2] by using automation and advanced analytics to develop the skills of its workforce. This led to a 200 percent increase in the speed of acquisition and development of critical skills and a 40 percent reduction in attrition for employees with valuable skills.

Impact of automation on jobs and skills

Our research, conducted by McKinsey Global Institute (MGI) in 2019–20, examines how automation may affect the biopharma industry in the United States under slow, medium, and fast rates of adoption.[3] The results suggest four main categories of impact:

— *Repetitive activities automated.* By 2030, more than 60 trillion US work hours could be affected by technologies such as machine learning and RPA. Activities affected include assembling products, collecting benefits-enrollment data, and processing labeling data.

— *Jobs lost.* In a medium scenario, assuming about 15 percent adoption of automation, up to 400 million full-time equivalents (FTEs) could be displaced globally. In a rapid-adoption scenario, job losses could be as high as 800 million FTEs.

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[2] In a McKinsey database of five million companies.

[3] In our research, we broke down all occupations in the US pharmaceutical and medical-products industry into activities and capabilities, then estimated the automation potential for each, based on available or expected future technologies. At the time when available technologies made all capabilities possible to automate, new technologies were considered to have replaced the role. For more information, see "AI, automation, and the future of work: Ten things to solve for," McKinsey Global Institute, June 2018, McKinsey.com.

Production workers such as manufacturing technicians and packaging operators will be most affected, because their work is low skilled and repetitive. In biopharma manufacturing, 30 percent of the workforce could be displaced by automation by 2030. The three demographic groups anticipated to be most affected would be males, people aged between 35 and 50, and those with educational qualifications below a bachelor's degree (Exhibit 3).

— *Jobs gained.* As automation technologies take over activities, the disruption will lead to a change in overall occupation mix, increasing demand for 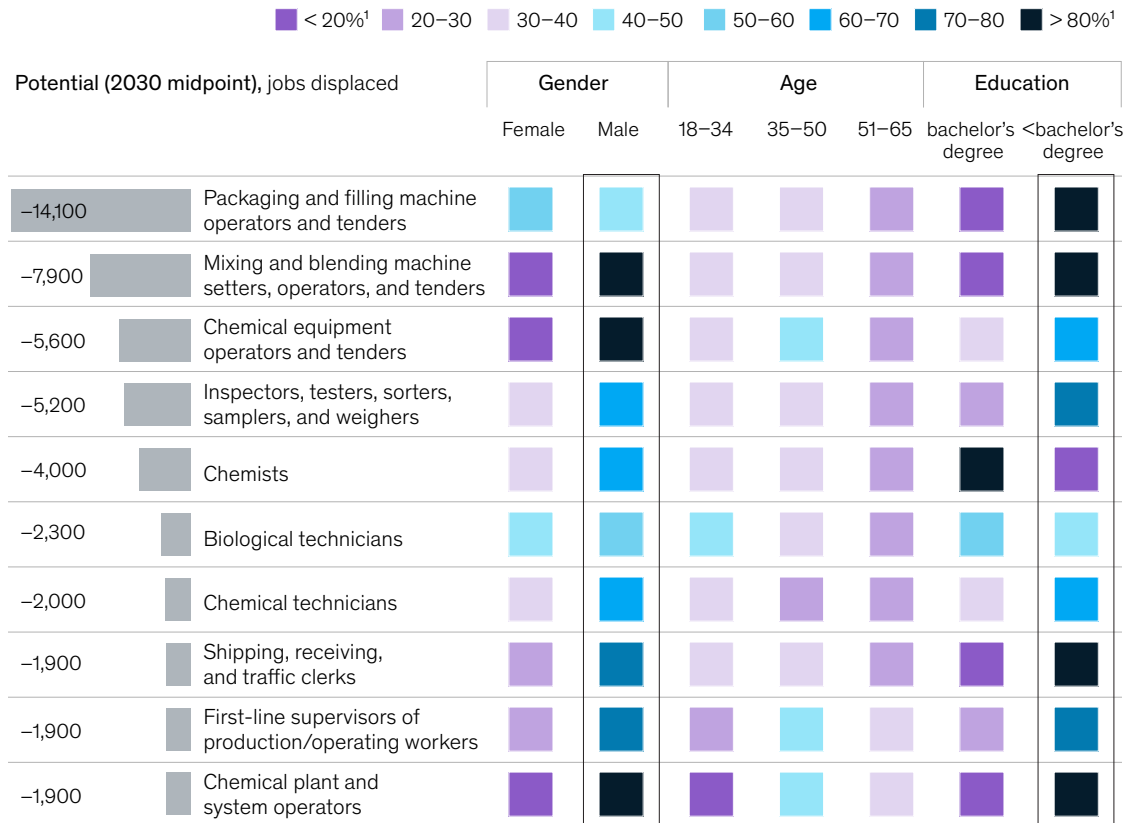specialized personnel, such as digital-trial leads, bioinformatics specialists, and patient advocates and care coordinators. Research shows that 0.5 percent of jobs are created through new occupations every year. Many other new occupations that we cannot yet imagine will emerge and may account for as much as 10 percent of jobs created by 2030.

— *Jobs changed.* Partial automation will become more prevalent as machines complement human labor in the workplace, especially with more predictable physical activities. Automation can also divert resources from time-consuming tasks to areas of higher value and complexity, further supporting the importance of upskilling in

Exhibit 3

Automation could displace some 87,000 of today's approximately 284,000 biopharma employees by 2030.

Biopharma industry's potential automation displacement, %

Legend: ■ < 20%[1] ■ 20–30 ■ 30–40 ■ 40–50 ■ 50–60 ■ 60–70 ■ 70–80 ■ > 80%[1]

Potential (2030 midpoint), jobs displaced		Gender		Age			Education	
		Female	Male	18–34	35–50	51–65	bachelor's degree	<bachelor's degree
−14,100	Packaging and filling machine operators and tenders							
−7,900	Mixing and blending machine setters, operators, and tenders							
−5,600	Chemical equipment operators and tenders							
−5,200	Inspectors, testers, sorters, samplers, and weighers							
−4,000	Chemists							
−2,300	Biological technicians							
−2,000	Chemical technicians							
−1,900	Shipping, receiving, and traffic clerks							
−1,900	First-line supervisors of production/operating workers							
−1,900	Chemical plant and system operators							

[1]Measured by comparing the % of persons with demographic factor in an occupation relative to the total US workforce.
Source: Bureau of Labor Statistics; McKinsey automation model

socioemotional and technical skills. For example, where AI algorithms can interpret diagnostic scans with a high degree of accuracy, doctors can focus their attention on diagnosing patient cases, identifying suitable treatment, and providing care (Exhibit 4). Automation is inextricably linked to future-of-work trends—such as fundamental societal shifts, lower workforce-transition costs, and greater connection—that will shape how jobs will change over time.

The way forward: A road map for adaptation

Companies know they need to strengthen their skill sets for this journey. Forty-five percent of companies say their organizations already face skills gaps, and an additional 41 percent will face shortfalls in the next five years.[4] To acquire the skills they need, 50 percent would consider reskilling their existing workforce, but a majority (60 percent) would still prefer to hire externally. For an automation journey to be productive for a company and meaningful for its people, a planned and sustained transformation of the workforce is necessary. Our research and experience tell us that this transformation has three critical components: scouting the right capabilities, shaping the work, and shifting the workforce.[5]
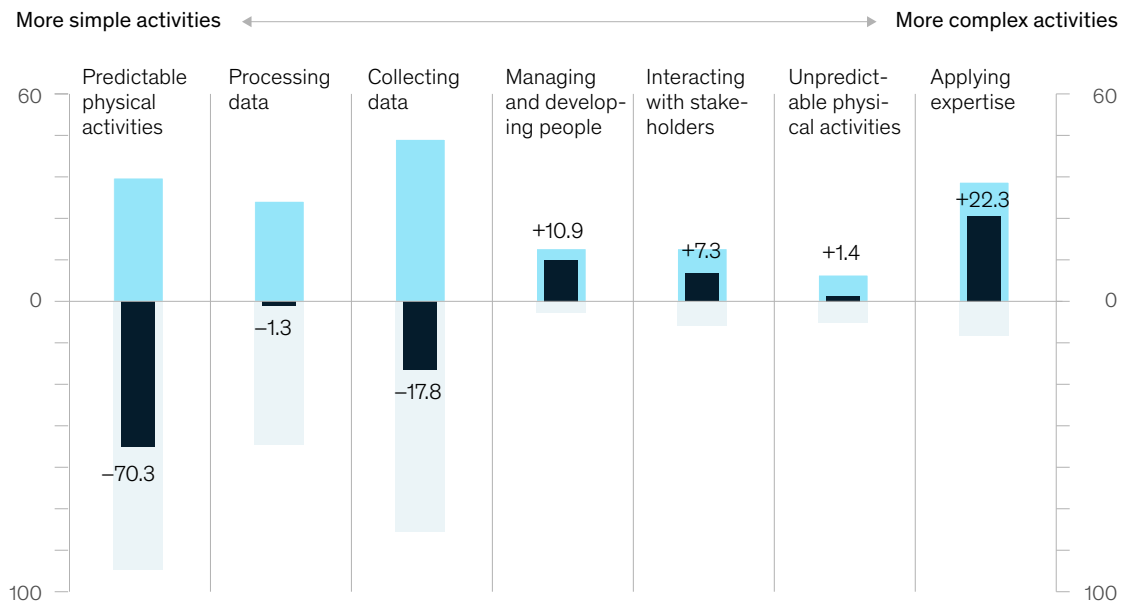
Scouting the potential, assessing gaps, and reviewing readiness

First, the company needs to determine where automation can create the most value in the organization, driving productivity, growth, and innovation in parallel (Exhibit 5). For example, analytics in R&D could be applied to identify compounds with the highest chances of success, in

Exhibit 4

Automation and artificial intelligence will fundamentally reshape activities and skills.

Total change in US work hours, by activity type, by 2030, trillion   ▨ Hours lost   ▨ Hours gained   ■ Net

More simple activities ← → More complex activities

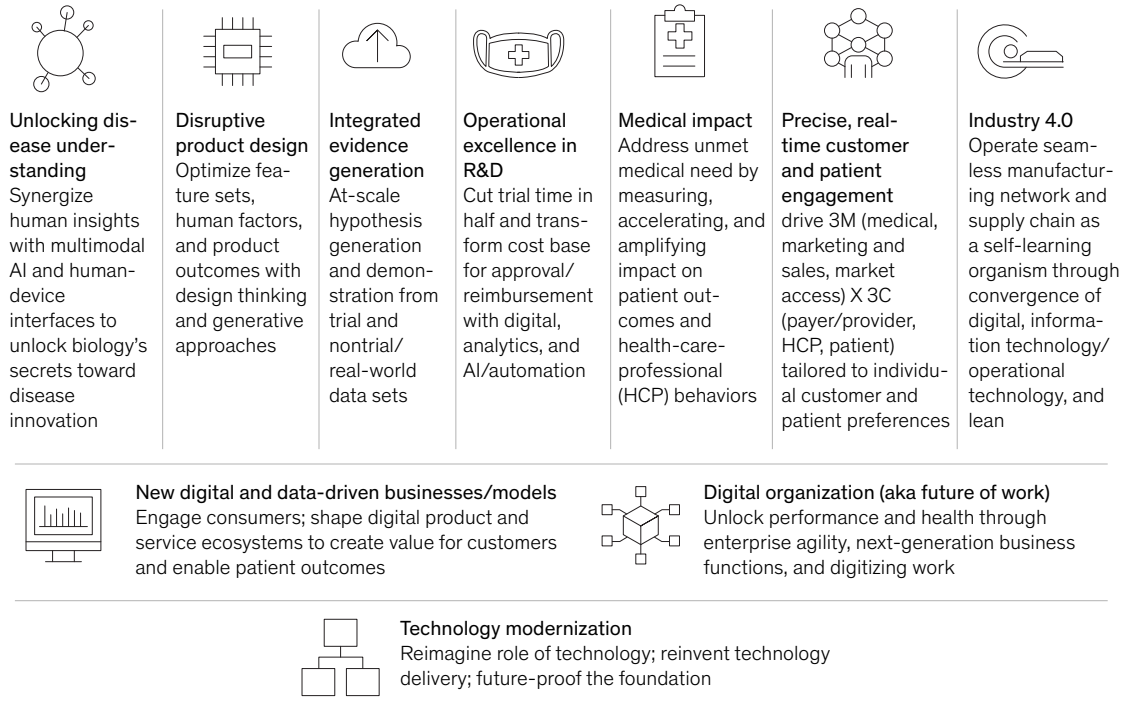|	Predictable physical activities	Processing data	Collecting data	Managing and developing people	Interacting with stakeholders	Unpredictable physical activities	Applying expertise
Net	−70.3	−1.3	−17.8	+10.9	+7.3	+1.4	+22.3

Note: Some occupational data projected into 2016 baseline from latest available 2014 data.

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[4] "Beyond hiring: How companies are reskilling to address talent gaps," February 2020, McKinsey.com.
[5] Bryan Hancock, Kate Lazaroff-Puck, and Scott Rutherford, "Getting practical about the future of work," *McKinsey Quarterly*, January 2020, McKinsey.com.

Exhibit 5

Across the organization, automation can drive productivity, growth, and innovation.

Biopharma battlegrounds

Unlocking disease understanding Synergize human insights with multimodal AI and human-device interfaces to unlock biology's secrets toward disease innovation	**Disruptive product design** Optimize feature sets, human factors, and product outcomes with design thinking and generative approaches	**Integrated evidence generation** At-scale hypothesis generation and demonstration from trial and nontrial/real-world data sets	**Operational excellence in R&D** Cut trial time in half and transform cost base for approval/reimbursement with digital, analytics, and AI/automation	**Medical impact** Address unmet medical need by measuring, accelerating, and amplifying impact on patient outcomes and health-care-professional (HCP) behaviors	**Precise, real-time customer and patient engagement** drive 3M (medical, marketing and sales, market access) X 3C (payer/provider, HCP, patient) tailored to individual customer and patient preferences	**Industry 4.0** Operate seamless manufacturing network and supply chain as a self-learning organism through convergence of digital, information technology/operational technology, and lean

New digital and data-driven businesses/models
Engage consumers; shape digital product and service ecosystems to create value for customers and enable patient outcomes

Digital organization (aka future of work)
Unlock performance and health through enterprise agility, next-generation business functions, and digitizing work

Technology modernization
Reimagine role of technology; reinvent technology delivery; future-proof the foundation

clinical trials to select optimal patient cohorts, and in commercial to improve patients' adherence to medication. Understand how automation may affect the nature of jobs and roles and what skills you will need to achieve your aspirations.

Shaping the work and developing the right infrastructure

Simplify and strengthen existing business processes before determining how to automate, outsource, or offshore them. Then use strategic workforce planning to identify the roles and skills needed to drive your business aspirations. A high-impact workforce plan will be enriched with scenario planning to anticipate how broadly and quickly automation may affect activities across the value chain. To ensure a holistic approach to addressing talent gaps, consider reskilling, upskilling, redeployment, hiring, contracting, and, where needed, releasing talent thoughtfully.

In operations, for example, around 50 percent of manufacturing operators and QC techs have needed more training in technical skills and have experienced less manual paperwork as a result of automation. However, data-driven decision making has to date reached only 10 to 15 percent of shop-floor workers, indicating an unfulfilled need to upskill workers to make better decisions.

In R&D, a company can undergo an end-to-end R&D process reimagination through smart workflow automation and cognitive agents to reduce trial time, minimize handoffs, and reduce waiting time and bottlenecks. It can then leverage workforce planning to reskill and train the relevant teams to understand and manage these automated workflows.

In PV, 80 percent of simple postmarketing cases can be automated. This will catalyze several changes in the PV function, such as increased collaboration with more standardized data and processes and new regulatory guidelines for automation, data management, and signal detection.

Shifting the workforce at scale

To realize automation at scale requires an agile operating model that reimagines how work is done and value created, bringing together subject-matter expertise, process-reengineering capabilities like lean and design thinking, and automation technologies. For example, companies are implementing agile teams so they can rapidly understand changing patient needs and test new products and solutions. A coordinating transition hub (Exhibit 6) redesigns roles and redirects and reskills talent to work productively with the latest technologies. For instance, medical-affairs experts, trained in how to manage data securely in the cloud, could be asked to shift their focus from medical writing to evidence generation and site support —at scale.

These investments must be accompanied by a change-management engine that helps the organization evolve more quickly, creating a compelling case for change and reinforcing commitments a company makes to the talent it engages in the process. Examples of change-management activities include role modeling by senior leaders of new ways of working, systems redesigned to change ways of working and mindsets, and performance incentives to encourage, for instance, process reimagination, agile working, technology adoption, capability building, and innovation.

Getting started

There are three ways to jump-start the transition:

— Scout the full business, and prioritize phases based on value at stake.

— Scout, shape, and shift a therapeutic area or function with short-term opportunities by increasing its literacy in new technologies.

Exhibit 6

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Reimagine infrastructure for skilling at scale

Candidate assessment	Future role allocation	Reskilling-program delivery	Program and impact measurement
• Rooted in one source of truth on #/skills	• Internal job and project database for interim and full-time needs	• Consolidate existing learning-and-development resources and/or external partnerships	• Program (process and outcome) dashboards
• Selection criteria based on tailored assessment	• Online skills matching	• Learning journeys' design/ iteration/management	• Ongoing skill supply and demand tracking
• Delivers fair/ transparent process	• Global talent recruitment	• Management of learning platform and facilitators for delivery	
	• Experts/training for managers to support candidates on decision making	• Overview and management of project and on-the-go learning	
	• Matching logic: timing of skill needs vs availability of talent/ ability to reskill		

— Leverage the recent disruptions caused by the COVID-19 crisis to reimagine part of the business, using shape and shift.

Future-proofing the workforce will require significant investment. For example, one global company scouted and prioritized automation at scale in its back-office function as part of its next-generation operating model. By quickly developing and testing use cases, the company shaped a set of successful pilots for the rest of the organization, including chatbots for patient self-service support and machine learning to reduce outstanding payments and improve working capital. It then increased the benefit by centralizing service delivery for multiple regions into a center of excellence run by employees upskilled in automation capabilities.

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Companies are today in a position to take inspiration and embrace lessons learned from early movers in other industries. The long-awaited benefits of automation—higher productivity, improved employee engagement, and better business outcomes—are there for the taking, and it is time to move quickly.

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