



# Creating pathways for tomorrow's workforce today

Beyond reskilling in manufacturing

The skills shortage that Deloitte and The Manufacturing Institute have been tracking for the past 19 years continues to trouble manufacturers, threatening to impede the current growth in the manufacturing industry. Deloitte and The Manufacturing Institute have embarked on their fifth Skills Gap study to understand the depths of today's talent shortage in manufacturing, how technology and automation are shaping future jobs, the rising imperative to expand diversity and inclusion efforts in manufacturing to obtain equity for all represented ages, abilities, ethnicities, genders, races, and sexual orientations, and what measures manufacturers could take to solve today's shortage while preparing their future workforce for success.

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# Executive overview

**T**HE MANUFACTURING INDUSTRY netted a loss of 578,000 jobs during the pandemic-challenged year 2020—a figure that represents nearly six years of job gains,<sup>1</sup> and yet, at any given moment in the past six months, nearly 500,000 jobs have remained open in manufacturing.<sup>2</sup> In fact, the National Association of Manufacturers (NAM) Manufacturers' Outlook Survey continues to find that “attracting and retaining a quality workforce” is one of the top business challenges among respondents.<sup>3</sup> How is this possible, given that the unemployment rate remains stubbornly high?<sup>4</sup>

One of the top challenges manufacturers face today remains the skills gap in US manufacturing. In 2018, our headline was “The jobs are here, where are the people?”<sup>5</sup> That was in the context of historically low unemployment rates.<sup>6</sup> Fast forward three years and, amid a global pandemic and the first US recession in more than a decade, it would appear the same headline stands.

There are nuanced differences in today's environment that are important to understand, as they highlight some key challenges manufacturers face: sourcing, training, and retaining talent. This report highlights some key findings from the 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study, including:

- US manufacturing is expected to have 2.1 million unfilled jobs by 2030.
- The pace of digital transformation in the manufacturing industry will likely continue to redefine work for humans.

- The economic impact of protracted job openings in manufacturing is significant.
- Diversity, equity, and inclusion (DEI) is an imperative for manufacturers.
- Manufacturers should create pathways to tomorrow's jobs today.

Adding to the impact of the pandemic on manufacturing over the past year, DEI has risen to the forefront of the manufacturing industry. Manufacturers of all sizes are taking the National Association of Manufacturers' Pledge for Action in the industry by 2030.<sup>7</sup> The simple demographic arithmetic demands that organizations cannot have a robust talent strategy without a robust DEI strategy. Manufacturers are moving quickly to build a workforce management strategy that expands diversity in their talent pipeline, fosters an inclusive culture that will retain diverse talent, and upskills their workforce for tomorrow.

## METHODOLOGY

Deloitte and The Manufacturing Institute have conducted their fifth manufacturing talent study in more than a decade. The study includes two separate online surveys, fielded between December 2020 and February 2021, of more than 800 US manufacturers, interviews with executives from manufacturing organizations of all sizes and across all sectors, extensive analysis of secondary data on labor supply and demand, and economic projections from Deloitte's economic team.

# The problem defined

## Manufacturing faces a workforce shortage

**A**T THE HEART of practically any production environment is the choreographed interplay between human and machine. Production lines hum with a symbiotic array of machines and the people that oversee their operations. Despite an influx of more than 2.7 million industrial robots in use worldwide<sup>8</sup>—including fixed robotic arms, moving co-bots, and autonomous-guided vehicles moving materials and finished goods—humans are still needed to help produce the vast majority of goods the industry makes worldwide. Throughout the executive interviews conducted during this year’s study, a resounding distress signal kept repeating itself: “We can’t find the people to do the work.”<sup>9</sup> This sentiment is backed up with data: Seventy-seven percent of surveyed manufacturers anticipate there will be ongoing difficulties in attracting and retaining workers in 2021 and

beyond.<sup>10</sup> Unpacking this reality further reveals two important aspects that define the immediate shortages the industry faces—the challenge filling entry-level positions and the difficulty finding skilled talent.

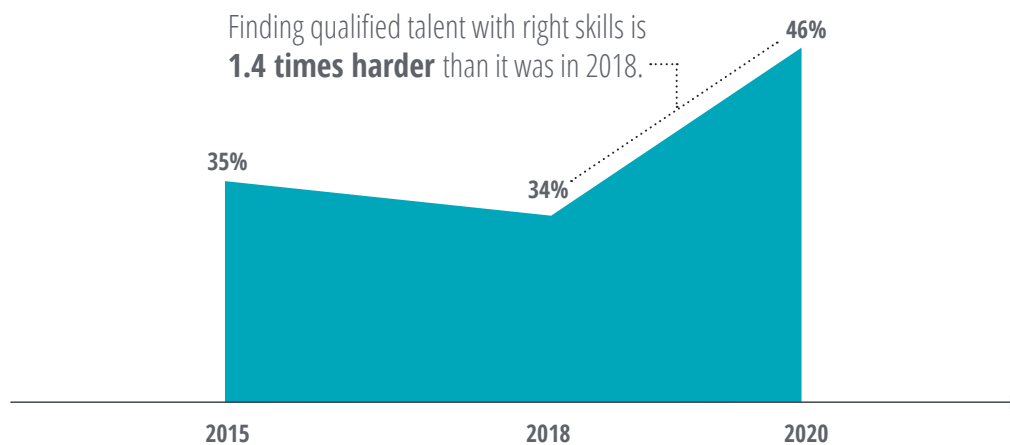
### Getting entry-level employees in the door

First, many manufacturers can’t fill entry-level production associate positions. These are the jobs that do not require technical know-how or industry knowledge, such as team assemblers, production work helpers, and hand-held tool cutters and trimmers.<sup>11</sup> Rather, they require a person who has a basic level of “human capabilities,” such as following directions, willingness to learn, and

FIGURE 1

### Finding qualified talent is harder than it’s been

Share of open positions manufacturers are finding difficult to fill due to skill mismatch



Source: Deloitte analysis of data from multiyear Deloitte and The Manufacturing Institute skills research studies.

follow-through. These entry-level positions could be filled by people recently displaced from other industries (hospitality, food services) or high school graduates, and starting wages in manufacturing are notably higher than local minimum wage levels (median wages for team assemblers is US\$15.55, double the minimum federal wage of US\$7.25 per hour).<sup>12</sup> But applications are not pouring in for them (see the

side bar, “The manufacturing workforce conundrum”). And there is no indication whether this trend will reverse. In fact, US manufacturing executives surveyed believe that finding the right talent is now 36% harder than it was in 2018. As one executive worried, “Is there a point when we run out of production workers or a point when we have to consider moving to a different location?”

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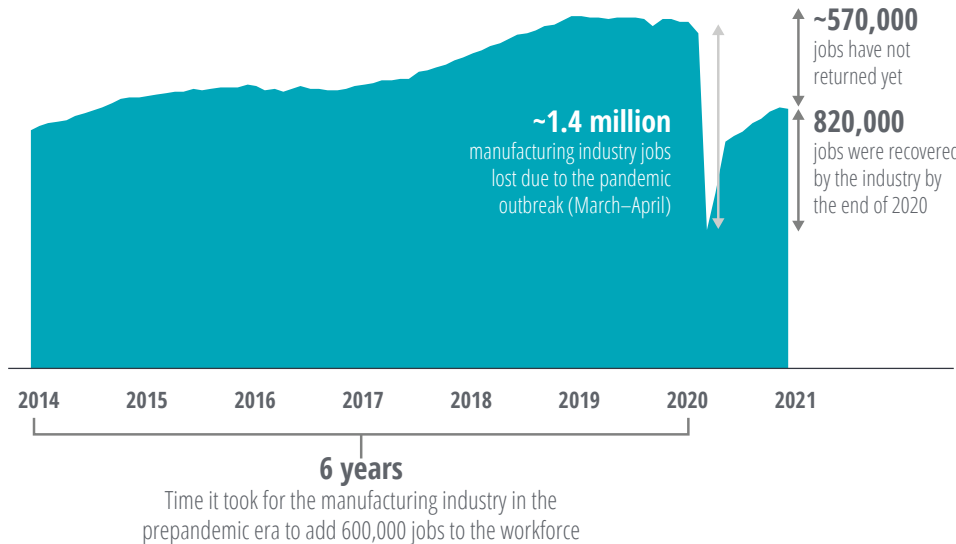
### THE MANUFACTURING WORKFORCE CONUNDRUM: THE UPHILL BATTLE TO GET PEOPLE BACK TO WORK

The pandemic outbreak initially erased ~1.4 million US manufacturing jobs, undoing more than a decade of manufacturing job gains.<sup>13</sup> Though the industry was able to hire back 820,000 of these jobs by the end of 2020, the remaining 570,000 have not returned, although there currently stand close to 500,000 job openings (figure 2).<sup>14</sup>

FIGURE 2

#### Manufacturers are yet to recover 41% of the jobs lost due to the pandemic

■ Total employment



Source: Deloitte analysis of data from the Bureau of Labor Statistics.

An analysis of the fastest-growing manufacturing occupations during the next decade reveals that five out of six of these occupations require a skill set that spans human and technology aspects, but often does not require formal postsecondary education.<sup>15</sup> The situation further highlights how manufacturers are not able to fill what can often be entry-level positions.

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# The rising challenge of filling skilled positions

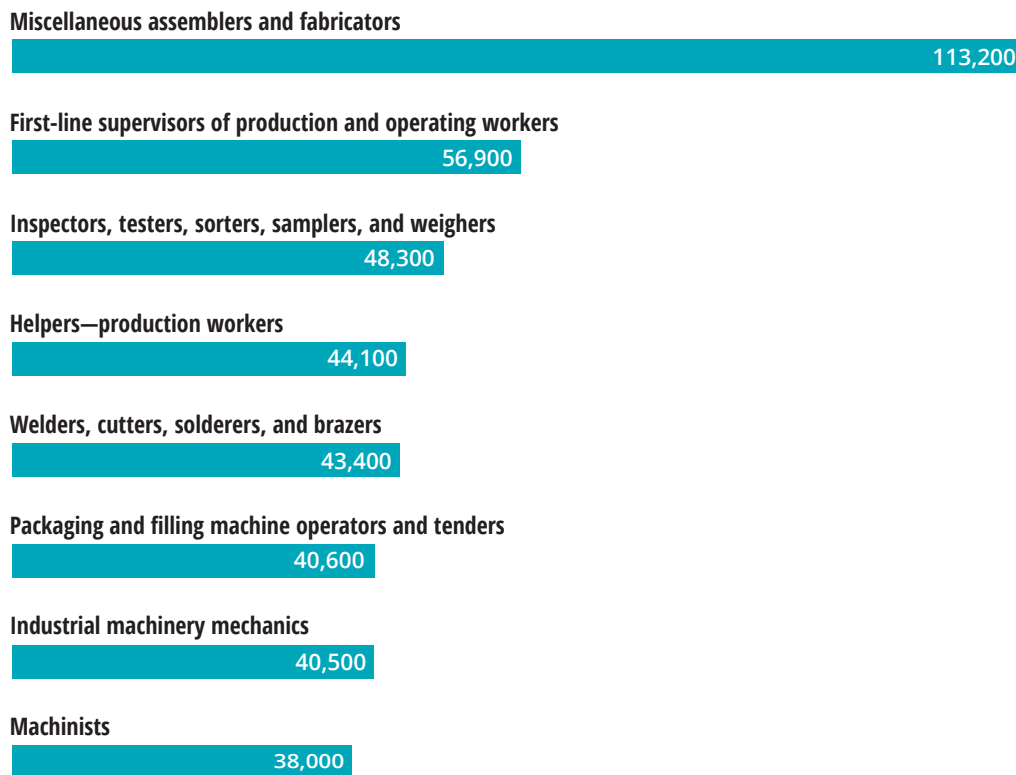
**T**HE SECOND ASPECT defining the current shortage is that manufacturers increasingly have difficulty filling middle-skill jobs. These jobs typically require some level of technical training or applied skills. Examples include computer numerical control (CNC) machinists, welders, and maintenance technicians. At the higher end of experience, some of these jobs require more specialized skills. Unlike the first category, these jobs cannot typically be filled

immediately with someone from another industry or recently graduated from high school. Rather, they often require a hands-on, applied training program that can take between several months to more than a year. Some also require licensing and certification. Figure 3 highlights some of the critical middle-skill roles going unfilled today in manufacturing with projected job openings during 2019–2029.

FIGURE 3

## Inability to fill key middle-skill roles looms large for manufacturing companies

Manufacturing middle-skill occupations with the highest projected job openings during 2019–2029



Note: Only those jobs considered where at least 50% are employed by manufacturing industry.

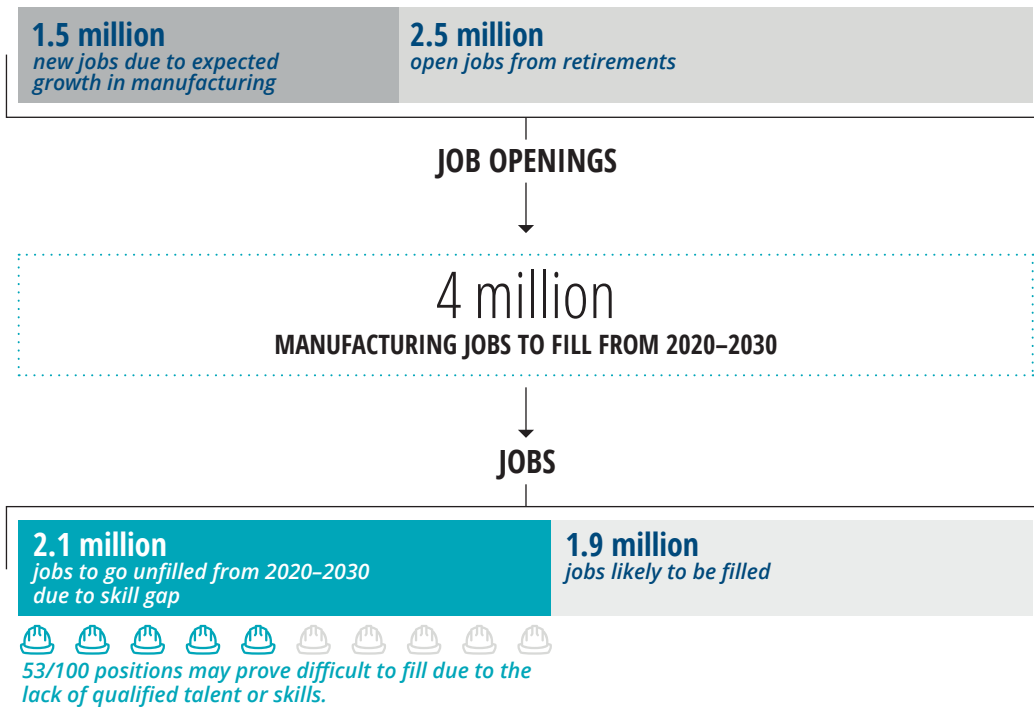
Source: Deloitte analysis of data from O\*Net.

While both types of job shortages are placing significant pressure on many manufacturers—even as they face the ongoing challenges of maintaining operations during the pandemic—there is a third and larger challenge the industry faces over the next five to 10 years. As digital transformation in the manufacturing industry continues to develop, the skills needed to do the jobs in the smart factory

will likely be different than skills used today. But today's manufacturing workforce doesn't possess many of these skills. And, without making changes to the skills composition of the workforce, manufacturers could leave up to 2.1 million jobs unfilled between 2020 and 2030, impacting everything from productivity to innovation and competitiveness to GDP (figure 4).

FIGURE 4

### An estimated 2.1 million open positions may prove difficult to fill by 2030



Note: Retirement age of 66 was considered for the above analysis.

Source: Deloitte analysis of data from the Bureau of Labor Statistics and estimates from the Deloitte economic analysis using the Oxford Global Economic Model.



# The future manufacturing workforce

## Going digital

**D**IGITAL TRANSFORMATION IN the manufacturing industry continues its steady progress. Despite a year of historic disruption to work, workforce, and workplace, manufacturers have shared common experiences of accelerating digital adoption to help mitigate some of the pandemic-related disruptions in production environments.<sup>16</sup> In the 2021 Deloitte Global Resilience Study, 57% of manufacturing respondents reported using advanced technologies to redesign job tasks (e.g., automating previously manual tasks).<sup>17</sup> Adding more co bots or other sources of automation could help maintain production, but it also puts pressure on a plant to upskill workers quickly to absorb the new technology. Manufacturers that haven't thought through this workforce transformation can find themselves struggling to adapt. In the 2020 Deloitte Global Human Capital Trends Study, 75% of industrial organizations identified reskilling the workforce as important or very important for their success over the next year, but only 10% said they were very ready to address this trend.<sup>18</sup>

This rapid change taking place will also likely alter the nature of jobs in manufacturing, creating new roles and transforming others. Deloitte has developed a series of [personas](#)<sup>19</sup> that bring to life future versions of possible manufacturing roles. Looking more closely at three of the most difficult manufacturing positions likely to be most difficult to fill for respondents in the coming years can help visualize the changes taking place at the role level in the more immediate term. Figure 5 illustrates how advancing digital transformation in the manufacturing industry is expected to impact the

work of an assembler, a machinist, and an industrial design engineer. It also highlights what skills and capabilities are likely needed for them to succeed in the factory of the future.

More importantly, manufacturers should consider how to manage their workforce through this change. In the 2021 Deloitte Global Resilience Study, nearly half of manufacturing respondents reported already implementing processes to easily redeploy workers to different roles depending on need.<sup>20</sup> And 57% have training or rotational programs to help reskill workers. This level of agility will likely be critical for manufacturers in the coming years, and it could require a shift away from narrow job descriptions toward developing a portfolio of skills that are applicable across an evolving set of jobs across an organization.

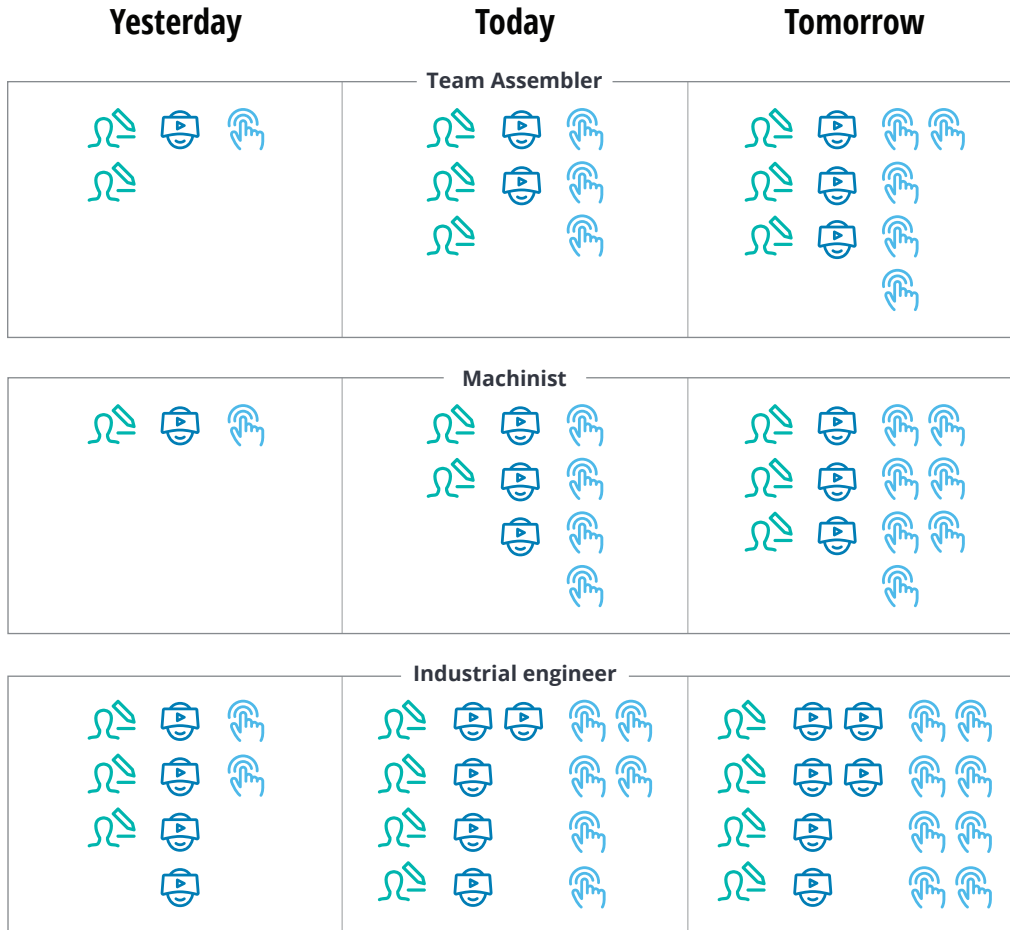
Focusing overtly on digital skills, though, is not going to solve the broader workforce gaps in the manufacturing industry, nor the industry's ability to respond to disruption such as the levels experienced in 2020. Innate human capabilities, such as conceptual thinking, decision-making, social flexibility and drive, will determine whether tomorrow's manufacturing workforce can engage with a digital environment and drive outcomes. In fact, flexibility/adaptability was ranked by manufacturing respondents in the 2021 Deloitte Global Resilience study as the most critical workforce trait for an organization's future.<sup>21</sup> Manufacturers should balance the need to cultivate innate human capabilities while reskilling their workforce with digital skills to satisfy the emerging new roles in manufacturing production.

FIGURE 5

## The changing nature of skills, roles, and jobs further challenges manufacturers

An illustration of how current manufacturing jobs are likely to change in coming years

■ Human capabilities ■ Specialized skills ■ Technology skills



### Human capabilities

- Basic digital learning agility
- Management of resources
- Decision-making/problem-solving
- Ability to handle multiple teams and team members
- Advanced digital skills such as process twin development and testing

### Specialized skills

- Understanding and working with state-of-the-art robotics and automated equipment
- Data analysis
- Proficiency with advanced manufacturing technologies
- Automated process monitoring and control
- Production process proficiency
- Leveraging digital systems

### Technology skills

- Understanding of connected equipment and industrial control software
- Computer aided manufacturing (CAM)
- 6-sigma DMAIC or DFSS certified
- Advanced customer data analytics
- Advanced computer skills and knowledge of document and spreadsheet products
- Working knowledge of statistical analysis

Source: Deloitte analysis based on data from O\*Net.

# Measuring the impacts

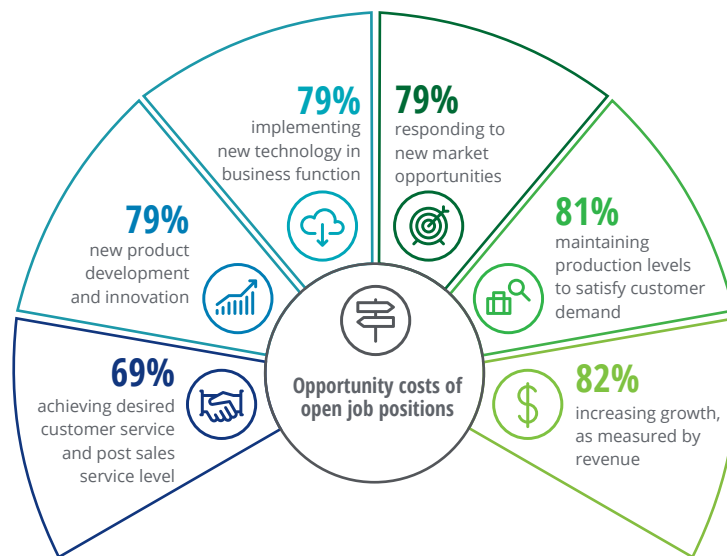
**M**ANUFACTURING EMPLOYMENT IN the United States has held at roughly 8.7% of overall employment for the past decade, representing more than 12.3 million jobs at the end of 2020.<sup>22</sup> While the industry’s employment share is less than it was in the decades leading up to the recession of 2008–2009, the economic impact manufacturing wields on the market is considerable. In fact, manufacturing has the highest multiplier effect of any economic sector: for every US\$1.00 spent in manufacturing, another US\$2.74 is added to the economy.<sup>23</sup> Using this multiplier, leaving the open jobs unfilled in manufacturing could bring a potential negative impact to the US economy of more than US\$1 trillion by 2030 alone.

The impact of not filling job openings and not having the right skill set in the workforce to respond to market demands can be felt in a number of ways for manufacturers (figure 6). Almost eight in 10 manufacturing executives surveyed indicated that not filling jobs has a moderate to very high impact on maintaining production levels to satisfy growing customer demand, responding to new market opportunities, supporting new production development and innovation, and even implementing new technologies.<sup>24</sup> These aspects ultimately spill over and contribute to an impact on the overall growth of manufacturing companies.

FIGURE 6

## Consequences of not being able to fill jobs stretch beyond lower production levels

Share of manufacturers surveyed who indicated the following as the top consequences of not being able to fill jobs



Source: Deloitte analysis of data from multiyear Deloitte and The Manufacturing Institute skills research studies.

# Understanding potential causes

## Retirement

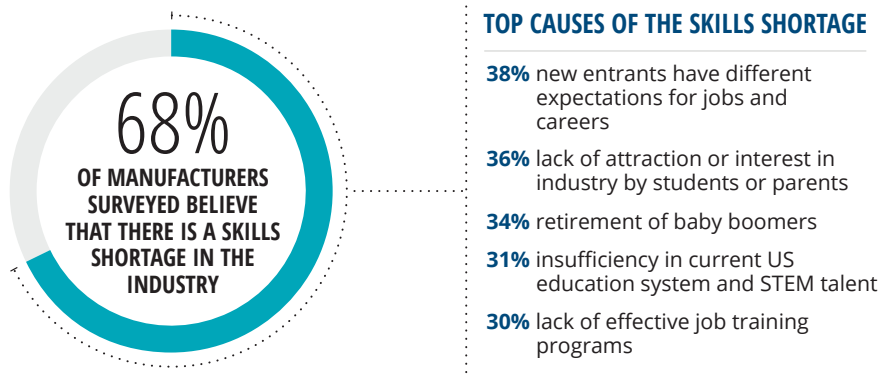
THE MANUFACTURING INDUSTRY has been sustained by a generation of workers that see the value in making things and are accustomed to production work that is shift-based. Many of these workers are likely entering retirement in the next decade,<sup>25</sup> and this is a top cause that managers give for the skills shortage in manufacturing (figure 7). It is increasingly difficult to find talent to replace the accumulated skill set of this population. Our study confirmed a likely reason: New entrants have different expectations for jobs and careers. It appears that not enough potential workers show an interest in making a career in manufacturing. And this situation could get worse as major employers of warehouse and distribution facilities hire tens of thousands of new workers on wages that resemble manufacturing's entry positions. These jobs can offer flexible schedules and can provide better work/life balance.

## Work/life balance: Expectations and reality

The 2020 Deloitte Global Human Capital Trends study identified well-being as a top trend, cited by 80% of respondents across industries.<sup>26</sup> There are a number of aspects to an employee's well-being, and one major component is work/life balance. In the manufacturing industry, work/life balance is the number two priority behind "attractive income/pay" when respondents choose where to work. However, it is also the top area where respondents believe manufacturers fall short, *and* work/life balance is the top reason that respondents are considering leaving the manufacturing industry.<sup>27</sup> For an industry that needs to attract new entrants from other places, manufacturers likely have to address this disconnect between what workforce entrants want and the way manufacturing work is structured.

FIGURE 7

### Top causes of the skills shortage in the US manufacturing industry over the next three years



Source: Deloitte analysis of data from 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study.

### Talent pipeline and applied skills

There is a group of production-related jobs that require some level of skills or experience to be brought into the role. As shown before, examples include machinists, technicians, and trade-related roles such as welders and electricians. The pay for these positions typically prevents these workers from relocating to find new work, and therefore, manufacturers need to source these jobs from the local workforce. The challenge in this case is providing available preemployment training in the same locations where there is demand and

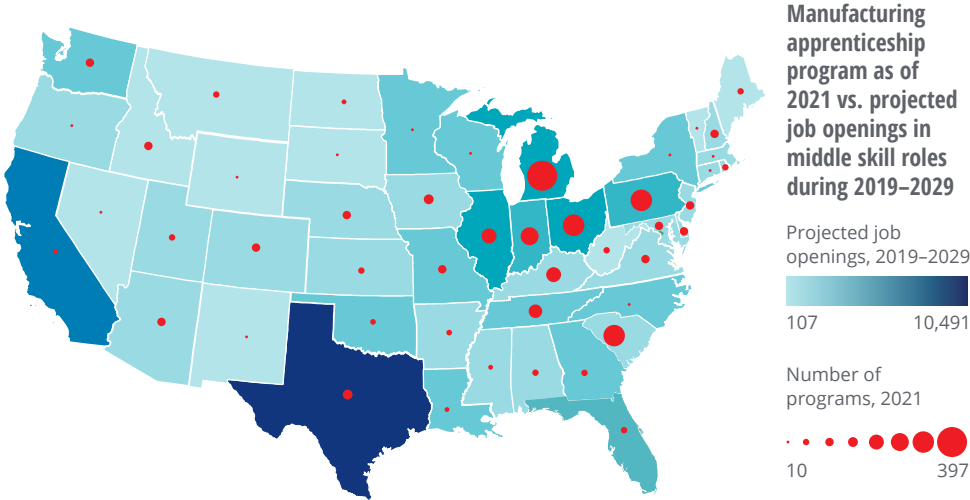
available workforce, the ability of in-market resources to match the two, and the successful program completion that could take several months to more than a year to complete, often without pay (figure 8).

The recommendations section below includes a number of potential solutions to this pressing challenge the industry faces. In addition, beyond adding capacity to train future skilled workers for manufacturing jobs, the industry can also consider broadening the talent pipeline to directly engage a more diverse population.

FIGURE 8

### Mismatches may exist between job demand and skills programs

Most manufacturing apprenticeship programs are concentrated in Midwest and Northeast. But are these enough?



Note: Middle skill roles included in this analysis are machinists, welders, cutters, solderers, brazers, industrial machinery mechanics, and computer numerically controlled tool programmers and operators.  
Source: Deloitte analysis of data from Burning Glass, Bureau of Labor Statistics, and Apprenticeship.gov.

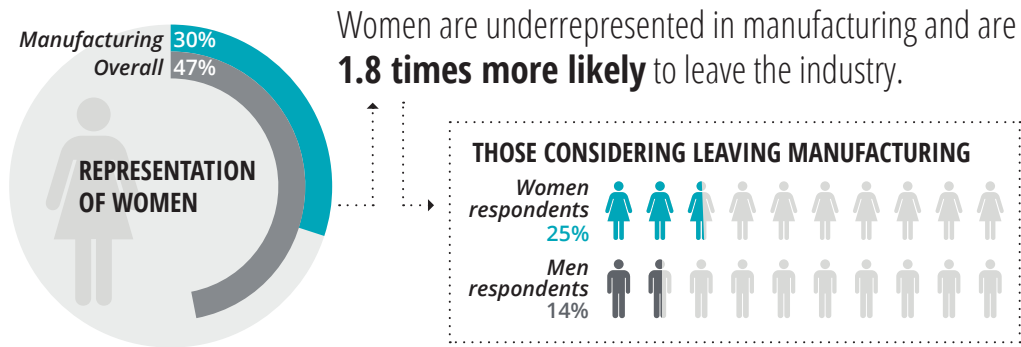
# The growing need for diversity, equity, and inclusion

THE ACRONYM DEI represents the summation of activities and/or the formal function within an organization that focuses on supporting diversity and inclusion outcomes that drive outcomes of equity and belonging. Diversity includes the representation, in a group, of various facets of identity, including (but not limited to) ability, age, gender, ethnicity, nationality, race, religion, sexual orientation, and socioeconomic status. In manufacturing, DEI is often focused on women because the industry has historically been

male-dominated. Fewer than one in three manufacturing professionals are women today, despite representing nearly half of the overall workforce in the United States.<sup>28</sup> Intensifying the situation, the 2021 Deloitte and The Manufacturing Institute DEI study highlights that women are more likely to leave the industry than men (figure 9). While part of this could be due to the extenuating circumstances of the pandemic, it could also speak to how work is organized in manufacturing.

FIGURE 9

## The state of women in manufacturing



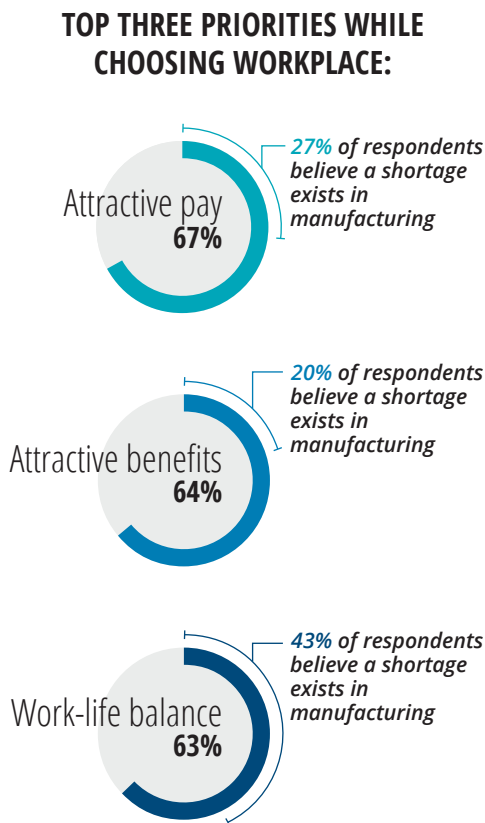
Source: Deloitte analysis of data from 2021 Deloitte and The Manufacturing Institute DEI study.

In the study, lack of work/life balance and flexible work arrangements have been top reasons that many women give for leaving the industry (figure 10).<sup>29</sup>

As important for manufacturers are efforts to retain other historically marginalized groups. The subject of equity is becoming an important component of DEI conversations and strategies. Equity is the outcome of diversity and inclusion actions wherein all people have fair access, opportunity, resources, and power to thrive, with consideration for and elimination of barriers.

FIGURE 10

**Women come for attractive pay and good benefits but leave due to the lack of work-life balance and flexible work arrangements**



Source: Deloitte analysis of data from 2021 Deloitte and The Manufacturing Institute DEI study.

Equality, by comparison, is when all people are treated identically, without consideration for historical and systemic barriers and privileges.<sup>30</sup>

Most manufacturers are on the journey to develop a diverse and equitable organization. As one executive noted, “I don’t care if we are really good at recruiting more than our fair share of diverse talent. At the end of the day, people leave because of culture and the environment they’re working in.”<sup>31</sup>

Why is this work so important? DEI has been proven to drive business performance and innovation.<sup>32</sup> Not only do companies with a diverse workforce experience increased productivity and better organization management, they have been shown to have a competitive advantage in the industry. An analysis of Fortune 500 manufacturing companies reveals that companies fostering diversity and building inclusive environments are more likely to have stronger financial performance.<sup>33</sup>

In the 2021 Deloitte and The Manufacturing Institute DEI study, 63% of surveyed manufacturers link the business benefits of DEI to an enhanced ability to attract, retain, and develop talent. Despite the focus on DEI, not all manufacturers are able to make the connection between expanding the pool of potential employees through DEI and higher success with talent retention. While a majority of these manufacturers have already implemented DEI training in their talent management programs, fewer than one-fourth of respondents find these programs impactful in retaining the employees. This contrast implies that training alone won’t lead to more equitable outcomes. Going beyond training could be critical to prevent negative impacts to overall management performance, company innovation progress, and even the bottom line. While setting a company’s values is an important first step,

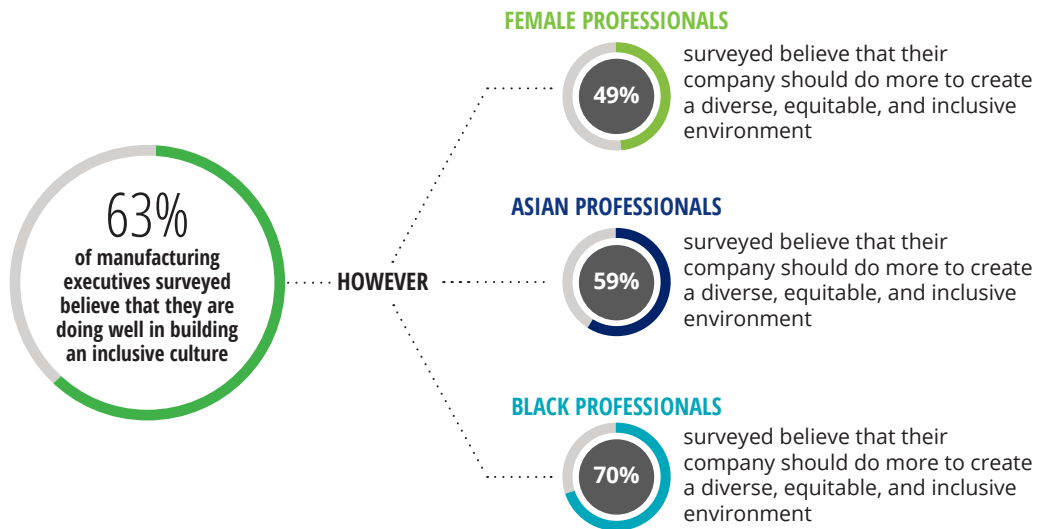
business leaders should take tangible actions to create and sustain a more diverse, equitable, and inclusive culture (figure 11).

So where should manufacturers focus today? Efforts should expand beyond training to incorporate broader management, culture, and workforce initiatives. As one of the executives interviewed mentioned, “You have lots of opportunities throughout most days to practice or instill goodness by the choices you make, because it’s those small choices you make every day that

matter.”<sup>34</sup> Manufacturers cannot just focus on recruiting diverse talent, but must continue to focus attentively on building an inclusive culture, fostering growth opportunities and pathways to careers, and living these values at the every level of the organization. This effort should start with leadership, who must do the hard work to educate themselves about DEI so they can create this culture. For a closer look at DEI in manufacturing, read [Beyond reskilling: Manufacturing’s future depends on diversity, equity, and inclusion](#).

FIGURE 11

### Manufacturers are working to build an inclusive culture



Source: Deloitte analysis of data from 2021 Deloitte and The Manufacturing Institute DEI study.



# Pathways to the future of work

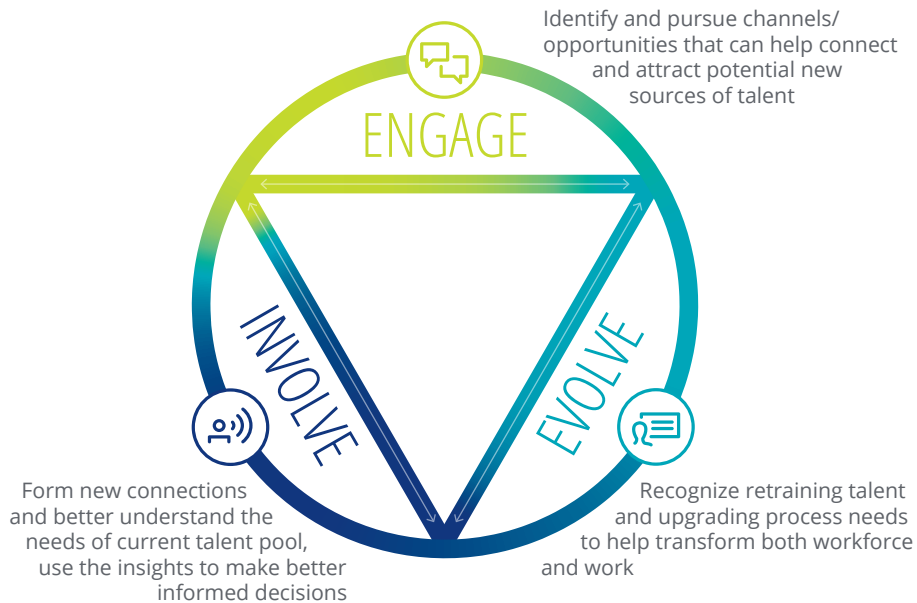
**W**HERE SHOULD MANUFACTURING leaders focus their efforts on the momentous task of filling open jobs, upskilling their workforce, and preparing for further transformation in the production environment? The following section identifies some of the top challenges manufacturers are facing and suggests approaches that can help mitigate them (figure 12).

## If filling entry-level manufacturing workforce positions is your greatest challenge

- **ENGAGE:** Consider how to better connect with the community in which your facilities operate. Companies that have built strong relationships within the community and fostered a connection between employees' work and their lives outside the walls of the factory have reported a better ability to attract new job candidates for entry-level positions.<sup>35</sup>

FIGURE 12

### A framework to address workforce challenges



Source: Deloitte analysis.

- **ENGAGE:** Consider launching efforts at the high school level to connect with local youths and build awareness of the promising careers that exist in manufacturing, including attractive pay. Also, understand specifically who the competitors are in your market/geography for entry-level jobs and identify what would be required to compete against them successfully.
- **INVOLVE:** Listen closely to what new work entrants value in a job. Work/life balance and flexibility have both been identified as priorities for employees at the individual contributor levels. Consider whether it is possible to reorient your shift-based jobs toward flexible arrangements.
- **EVOLVE:** Identify opportunities for augmenting manual processes with automation, including co-bots, autonomous material movers, etc. In the survey, manufacturing respondents were able to use automation to help fill 16% of open jobs.<sup>36</sup>
- **INVOLVE:** Mine your existing production workforce to identify potential candidates for a train-to-work program that combines after-work training and credentialing with hands-on learning.
- **INVOLVE:** Actively broaden your talent pipeline to pull from a more diverse talent pool to expand the presence of diverse thoughts and experiences in your workforce.
- **EVOLVE:** Explore the possibility of joining or creating an external talent ecosystem in the location(s) where you are having the hardest time filling these roles to create a robust candidate pool. Often, combining efforts among several local manufacturers and working with technical training programs or community colleges can help create a concentration of skilled workforce that benefits the broader community.

## If finding skilled manufacturing workforce applications to fill jobs such as machinists, welders, and maintenance technicians is your greatest challenge

- **ENGAGE/INVOLVE:** Consider targeting specific cohorts of workers, such as former military personnel, who likely have skills in the areas you need. The Manufacturing Institute's Heroes Make America program is one example of a resource that manufacturers have used, as nearly 200,000 service men and women return home each year.<sup>37</sup> Many companies have participated in the program.<sup>38</sup>

### SPOTLIGHT ON AN APPROACH:

FAME—founded by Toyota in 2010 and transitioned to The Manufacturing Institute in 2019—is a manufacturing workforce development and education program in the United States. The two-year program combines training in technical skills with development of professional practices while immersed in the culture of lean manufacturing. It is delivered through a co educational model where students learn both at school and on the job and is managed by a group of employers that form a FAME chapter and sponsor participating students. As of the spring of 2021, more than 400 companies are participating in FAME chapters across 36 locations in 15 states.<sup>39</sup>

**SPOTLIGHT ON AN APPROACH:**

The Connecticut Digital Credential Ecosystem Initiative—a network of companies, community colleges, government agencies, and other stakeholders, led by the Business-Higher Education Forum (BHEF)—aims to develop new pathways to digital careers, particularly for individuals unemployed due to COVID-19. This initiative is likely to benefit an estimated 2,200 learners. The BHEF will help community colleges issue industry-validated credentials to support career pathways across Connecticut and the surrounding region. Participating employers will approve the knowledge, skills, and abilities for these credentials by building a recruitment and hiring pipeline for students who complete the course.<sup>40</sup>

## If keeping your manufacturing workforce upskilled and trained on emerging equipment, technologies, and digital skills is your greatest challenge

- **ENGAGE:** Start by rethinking the way you manage your workforce. Changing the talent management approach from a “supply chain” of static job descriptions and linear career paths toward defining and organizing the work and the workforce is an important aspect that can define the areas most necessary for training.
- **INVOLVE/EVOLVE:** Take inventory of the skills and capabilities within your current workforce. It can be a critical step for making the transformation, which many manufacturers may have missed capturing.
- **EVOLVE:** Design roles that include ongoing invention and evolving skills, and then align training to this continuous learning model. Ensure that job postings (both internal and

external) and hiring criteria keep pace with the evolving definitions of roles.

- **EVOLVE:** Leverage advanced technologies to increase digital fluency. There are a number of advanced technologies that can be used in training environments to upskill and reskill workers. For example, AR/VR glasses can be used to simulate new tasks and help employees develop the skills needed to accomplish the tasks. Purdue University has entered into a cooperative agreement with the National Science Foundation to create an AR/VR experience prototype called Skill-XR to enable manufacturers to upskill workers more easily.<sup>41</sup>

**SPOTLIGHT ON AN APPROACH:**

General Motors’ (GM) Technical Learning University (TLU) is an initiative that began in 2017 with a focus to improve the technical ability of GM’s skilled trades workers and salaried manufacturing engineers. Since its inception, the umbrella program has trained more than 300 GM employees. In August 2020, GM’s TLU completed a US\$2 million upgrade to manufacturing laboratory facilities located on the Global Technical Center campus in Warren, Michigan. Over the next three years, TLU leadership anticipates training up to 3,600 US-based workers on vehicle launches and other critical areas.<sup>42</sup>

## If increasing retention rates for underrepresented minorities and women in manufacturing is a significant challenge

- **ENGAGE:** Start with a candid assessment of internal employee perceptions, programs, and engagement levels to ascertain whether the current company culture can attract and retain

these underrepresented groups. Do this by location and pay attention to differentiation in response from individual groups of underrepresented employees, as findings may be very different across these variables.

- **ENGAGE:** Evaluate your talent processes to see if there is any bias or if they pose disproportionate barriers to underrepresented groups. Collect and understand data on how women and underrepresented minorities have progressed and been developed. On the hiring side, even well-intentioned application processes can create challenges for women or minority populations. Tweak your application-review processes as needed.
- **INVOLVE:** Create multifaceted training programs on DEI for all levels of employees. Tie leadership performance to DEI metrics to ensure putting ideas into action. Increase transparency of efforts to build a culture of inclusion.
- **EVOLVE:** Consider how to bolster existing programs by adding several of the most impactful approaches that survey respondents identified: formal sponsorships, mentorships, learning and development opportunities that are tied to career progression, and work/life balance/flexibility.

#### **SPOTLIGHT ON AN APPROACH:**

Executive leadership plays a crucial role in implementing a culture of trust and belonging throughout an organization. A number of leading manufacturers have established inclusion councils to bring their DEI vision to life. 3M's chairman and CEO, Mike Roman, has created a CEO Inclusion Council, which includes a group of diverse 3M leaders from across the globe that focus on elevating and prioritizing actions to build a more inclusive and competitive workplace. This inclusion council sets companywide initiatives to drive 3M's DEI strategy.<sup>43</sup>

- **ENGAGE/INVOLVE:** Foster an innovative and inclusive culture that encourages gender diverse teams at all levels and spotlights role models for women and underrepresented minorities. The Manufacturing Institute's STEP Women's Initiative is one example of a resource that manufacturers have used to create a pipeline of women for leadership. The program highlights the manufacturing company's commitment to the development and retention of women, and supports leadership development for women in the workplace. Over the past nine years since inception, hundreds of manufacturers have participated in the program.

# Final thoughts

**T**HE ONGOING CHALLENGES most manufacturers face in attracting, retaining, and upskilling their workforce are likely to persist without a concerted, industrywide effort. While many of the recommendations above are designed to help address specific pain points, the broader reality is that the industry as a whole should continue to come together to help with the perception of work and introduce flexibility in manufacturing for a new generation of workers, standardize on the most-needed credentials, and build additional on-ramps to talent programs that can expand and diversify the pipeline entering the industry.

Public-private talent ecosystems, such as those highlighted above, can be a powerful method of

filling the gaps that persist. Manufacturers should continue to provide opportunities to underrepresented groups to on-ramp them into the manufacturing industry, and then create programs that engage, involve, and *evolve* these employees, unlocking the future potential of tomorrow's manufacturing workforce. Ecosystem conveners like The Manufacturing Institute are leading many of these efforts and can help to amplify the impacts many manufacturers are making. The simple demographic arithmetic demands that organizations cannot have a robust talent strategy without a robust DEI strategy. None of this is easy, and it won't happen overnight, but every manufacturer can take steps today to build a better workforce that is capable of delivering manufacturing excellence.

## Endnotes

1. U.S. Bureau of Labor Statistics, "Employment, hours, and earnings from the current employment statistics survey (national)," accessed February 2021.
2. U.S. Bureau of Labor Statistics, "Job Openings and Labor Turnover Survey," accessed February 2021.
3. The National Association of Manufacturers, "NAM Manufacturers' Outlook Survey: Fourth quarter 2020," December 23, 2020.
4. U.S. Bureau of Labor Statistics, "Labor force statistics from the current population survey," accessed February 2021.
5. Craig Giffi et al., *2018 Deloitte skills gap and future of work in manufacturing study*, Deloitte Insights, November 14, 2018.
6. U.S. Bureau of Labor Statistics, "Labor force statistics from the current population survey".
7. The National Association of Manufacturers, "NAM pledge for action," September 24, 2020.
8. Christopher Mims, "On the 100th anniversary of 'robot,' they're finally taking over," *Wall Street Journal*, January 23, 2021.
9. Executive interviews for the 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study.
10. 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study.
11. Deloitte analysis based on data from O\*NET Online, accessed February 25, 2020.
12. Ibid.; U.S. Department of Labor, "Minimum wage," accessed February 25, 2020.
13. U.S. Bureau of Labor Statistics, "Employment, hours, and earnings from the current employment statistics survey (national)."
14. Ibid.
15. Deloitte analysis of BLS data.
16. Paul Wellener et al., *Accelerating smart manufacturing: The value of an ecosystem approach*, Deloitte Insights, October 21, 2020.
17. Deloitte analysis based on survey data for manufacturing respondents from the Deloitte 2021 Global Resilience Study.
18. Deloitte analysis based on survey data for manufacturing respondents from the *Deloitte 2020 Global Human Capital Trends report*.
19. Paul Wellener et al., *The future of work in manufacturing: What will jobs look like in the digital era?*, Deloitte Insights, April 13, 2020.
20. Punit Renjen, *Building the resilient organization: 2021 Deloitte Global resilience report*, Deloitte Insights, January 25, 2021.
21. Ibid.
22. U.S. Bureau of Labor Statistics, "Employment, hours, and earnings from the current employment statistics survey (national)."
23. The National Association of Manufacturers, "Facts about manufacturing," accessed February 25, 2021.

24. 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study.
25. U.S. Bureau of Labor Statistics, "Labor force statistics from the current population survey."
26. Deloitte, *Deloitte 2020 Global Human Capital Trends report*, accessed February 25, 2021.
27. 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study.
28. Lynda Laughlin and Cheridan Christnacht, "Women in manufacturing," United States Census Bureau, October 3, 2017.
29. 2021 Deloitte and The Manufacturing Institute DEI study.
30. Deloitte, *The racial equity imperative*, February 2021.
31. Deloitte executive interviews for the 2021 Deloitte and The Manufacturing Institute DEI report.
32. Deloitte analysis of DE&I programs and financial data of Fortune 500 manufacturing companies.
33. Deloitte analysis based on data from S&P Capital IQ and company websites of Fortune 500 manufacturing companies.
34. Deloitte executive interviews for the 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study.
35. Ibid.
36. 2021 Deloitte and The Manufacturing Institute Manufacturing Talent study.
37. The Manufacturing Institute, "Heroes MAKE America," accessed February 25, 2021.
38. IndustryWeek, "Heroes MAKE America: New program to train veterans for manufacturing," January 31, 2018.
39. The Manufacturing Institute website; FAME USA website, accessed February 25, 2021.
40. StanleyBlack&Decker, "Workforce development," accessed February 25, 2021.
41. Jared Pike, "How augmented, virtual reality can reduce manufacturing skills gap," *Plant Engineering*, October 30, 2020.
42. General Motors, "GM Technical Learning University relaunches with new training center," accessed February 25, 2021.
43. 3M, *2020 global diversity, equity & inclusion report*, accessed February 25, 2021.

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