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## About the Deloitte survey

To understand the outlook and perspectives of organizations across the manufacturing industry, Deloitte fielded a survey of over 100 US executives and other senior leaders in August 2022. The survey captured insights from respondents in nine specific industry segments: industrial and commercial equipment and machinery; electrical equipment, appliance, and component manufacturing; construction products and equipment; aerospace and defense manufacturing; automotive and transportation equipment; food and beverage manufacturing; heavy equipment; consumer and electronic product manufacturing; and chemicals and specialty materials manufacturing.

# Manufacturing growth amid uncertainty

US manufacturing has demonstrated continued strength in 2022, building on the momentum it gained emerging from the pandemic, and surpassing expectations from the prior two years.<sup>1</sup> Policy initiatives such as the Creating Helpful Incentives to Produce Semiconductors for America Act (CHIPS Act) and Inflation Reduction Act (IRA) have the potential to help sustain recovery in the manufacturing industry. Looking ahead to 2023, Deloitte projections based on Oxford Economics' Global Economic Model anticipate 2.5% growth in GDP in manufacturing.<sup>2</sup>

While overall demand and production capacity have hit recent highs, there are indications that the near-term outlook may not be as bright. The industry is currently experiencing concerns related to inflation and economic uncertainty. In addition, manufacturers continue to grapple with talent challenges that may limit the industry's growth momentum. Even though employment levels now stand higher than in 2008,<sup>3</sup> the industry remains significantly short of skilled workers.<sup>4</sup> Moreover, supply chain issues, including sourcing bottlenecks, global logistics backlogs, cost pressures, and cyberattacks, will likely remain critical challenges in 2023. As highlighted in the recent National Association of Manufacturers (NAM) survey, these disrupters have affected manufacturers' optimism and business confidence, pulling the second-quarter Manufacturing Outlook Index to 55, down by 4.2 points since first-quarter 2022.<sup>5</sup>

Going forward, as leaders look beyond disruption and revamping their approach, they should consider five important trends for manufacturing playbooks in the year ahead: managing uncertainty; tackling workforce shortages; driving supply chain resiliency; scaling smart factory initiatives to the metaverse; and developing sustainability.

# 1

## Technology

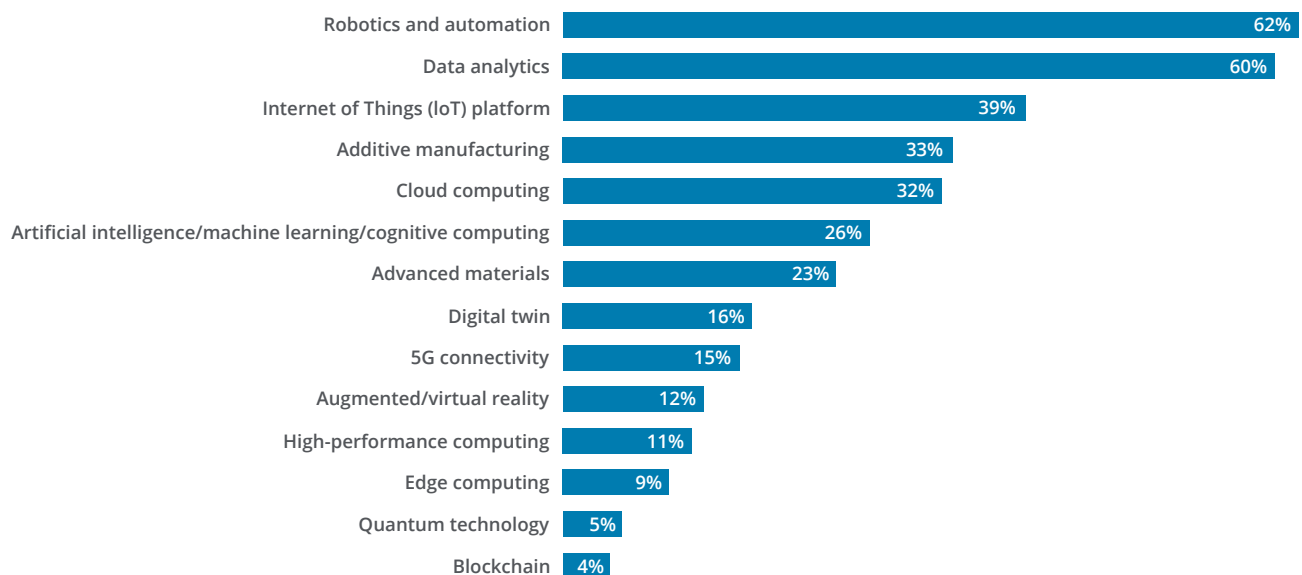
### Investing in advanced technologies to help mitigate risk

Manufacturers have increased their digital investment over the past few years and accelerated the adoption of emerging technologies.<sup>6</sup> Companies with higher digital maturity have shown greater resilience, as did those that accelerated digitalization during the pandemic.<sup>7</sup> For example, they were able to pivot faster than manufacturers with limited digital capabilities.<sup>8</sup> Similarly, companies with higher digital implementation tend to have increased supply chain visibility and are better able to adapt to supply chain challenges.<sup>9</sup> Continued investments in advanced manufacturing technologies can help develop the required agility.

The high level of uncertainty is expected to continue over the next 12 to 18 months, and manufacturers' digital strategies over this period are likely to be based on many of the following dynamics (figure 1):

- **Maintain momentum:** Investments in the right technologies can help manufacturers pivot quickly. For example, enhanced data and analytics capabilities can improve forecasting. Additionally, it could also accelerate the value mapping of suppliers and raw materials along with the impact of a shortage. This advanced analysis can expedite the implementation of preventive measures during uncertain periods.
- **Protect long-term profitability:** Implementing digital capabilities across the value chain can help secure profitability, and manufacturers have multiple levers to engage when it comes to digital sophistication. The right mix of technology adoption that strengthens the core (process automation, data analytics) while also pushing the edges can improve efficiency.
- **Broaden advanced manufacturing capabilities:** Robotics and automation can enhance efficiency, whereas artificial intelligence and machine learning capabilities can provide the required edge. Increased automation is likely to drive productivity but also lead to changes in the workforce composition in the industry. For example, some manufacturers have accelerated warehouse automation in response to pandemic-related labor shortages.<sup>10</sup>

**Figure 1. Surveyed manufacturers plan to focus on a range of technologies to increase operational efficiencies over next 12 months**



Source: 2023 Deloitte manufacturing outlook survey.

# 2

## Talent

### Implementing a broad range of talent management strategies to reduce voluntary exits

Addressing the tight labor market and workforce churn amid shifting talent models is expected to remain a top priority for most manufacturers in 2023. Despite a record level of new hires, job openings in the industry are still hovering near all-time highs at 800,000.<sup>11</sup> Additionally, voluntary separations continue to outnumber layoffs and discharges, indicating substantial workforce churn.<sup>12</sup> This prevailing workforce shortage, elevated by supply chain limitations, is reducing operational efficiency and margins.<sup>13</sup> Manufacturers are pursuing several approaches to strengthen their talent retention strategy (figure 2):

- **Pay increases:** Talent scarcity is compelling more manufacturers to consider raising wages. Although the industry has historically had a higher baseline wage for production workers, competing industries such as warehousing and retail are increasing wages more quickly than manufacturers.<sup>14</sup>
- **Upskilling and reskilling:** As the use of digital technologies proliferates across the manufacturing sector, the workforce increasingly needs advanced technical and digital skills. However, skilled workers are in short supply in the manufacturing industry. Manufacturers are likely to emphasize reskilling strategies, including continuous training to upskill the workforce, investment in startups to access new technology and talent, and collaboration with academic ecosystems to access digital skills.
- **DEI strategy:** The industry is focusing on diversity, equity, and inclusion (DEI) to attract more women and racially and ethnically diverse groups to the workforce. Women currently account for less than one-third of the total manufacturing workforce, and the proportion of Black, Asian, and Latinx employees is even lower.<sup>15</sup> Manufacturers acknowledge that greater diversity and gender parity will likely increase the available talent pool.<sup>16</sup> Furthermore, 67% of responding US job seekers stated in a recent Deloitte survey that a diverse workforce is an important factor when considering a job offer.<sup>17</sup> Manufacturers are increasingly adding leadership that focuses on advancing their DEI maturity, from meeting representation targets to creating more inclusive environments where diverse talent can build careers.<sup>18</sup>
- **Flexible work arrangements:** Manufacturers are actively seeking ways to rearchitect the work, the workplace, and the workforce to adapt to the broader shifts in the overall work culture. The early success of remote work for business continuity has raised the expectations of employees and employers alike. As a hybrid work culture begins to spread to parts of the manufacturing sector, companies are exploring ways to add flexibility across their operations. Many are also implementing new ways to attract and retain workers, such as addressing factors like well-being and flexibility, which are important to experienced workers as well as to the younger generation entering the workforce.<sup>19</sup>

**Figure 2. Retaining high-performing talent likely to be strategic priority for 2023; surveyed manufacturers also highlighted it as top challenge in 2022**





# 3

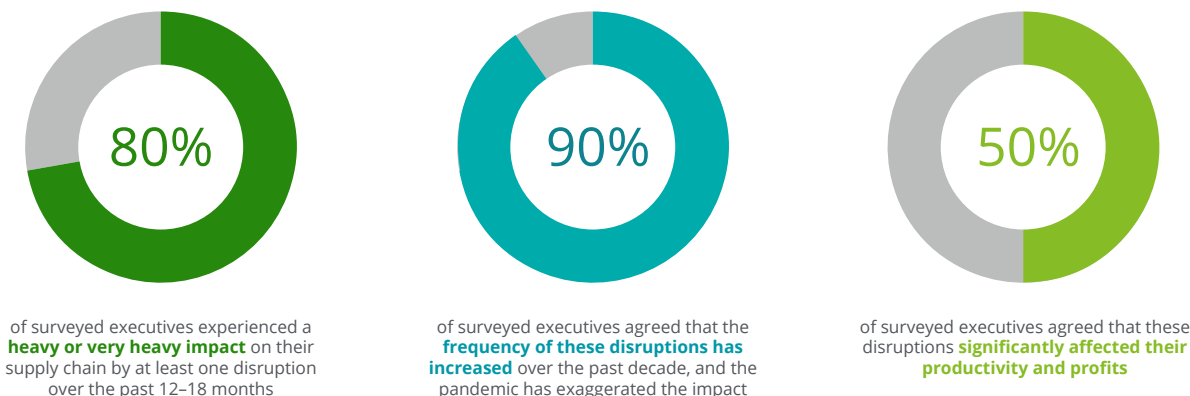
## Supply chain

### Relying on time-tested mitigation strategies with enhanced tactics to achieve supply assurance

Deloitte's recent supply chain research highlights that 80% of surveyed manufacturing executives have experienced a “heavy” to “very heavy” impact of disruption on their supply chains over the past 12 to 18 months (figure 3). According to the Deloitte outlook survey, 72% of surveyed executives believe the persistent shortage of critical materials and the ongoing supply chain disruptions present the biggest uncertainty for the industry in the coming year. Manufacturers are mitigating these risks not only with increased utilization of digital technology but also with time-tested approaches:

- **Relationship management and supply chain illumination:** Many manufacturers are working closely with suppliers as partners to navigate through the current disruption. Such relationships can help them pivot effectively to alternate transport routes or sources for components. In addition, most manufacturing supply chain executives are actively engaging beyond tier 1 suppliers while managing existing tier 1 to develop required redundancy.<sup>20</sup>
- **Building redundancy in the supply chain:** Manufacturers are expected to continue diversifying their supplier base and adding redundancy in the coming year. Supply chain executives should closely evaluate the cost of multiple suppliers versus the benefits of increased agility and risk mitigation. For example, the industry may see an acceleration in original equipment manufacturers (OEMs) taking equity stakes in suppliers or acquiring them completely to develop capabilities in-house and gain more control over their supply chain.<sup>21</sup> One automotive company recently engaged with two different suppliers to meet its near-future production targets, whereas another manufacturer holds a long-term supply agreement with seven different suppliers across regions to ensure supply for its global production.<sup>22</sup>
- **Boosting local capacity:** Many manufacturers have boosted local capacity by integrating their businesses across the value chain to reduce exposure to logistics issues and transportation bottlenecks.<sup>23</sup> In response to the current disruption, many global OEMs have committed to opening new production facilities in US locations, boosting local production capacity for parts and materials.<sup>24</sup> The incentives in the Infrastructure Investment and Jobs Act (IIJA), the CHIPS Act, and the IRA are expected to bolster this trend to increase US manufacturing capacity.<sup>25</sup>
- **Implementing digital technologies:** As manufacturers actively recalibrate their supply chain exposure, many are turning to digital capabilities that can increase their supply network visibility and improve control and coordination. Deloitte's procurement officer report highlights the growing importance of innovation and digital transformation to achieve supply assurance in future disruptions.<sup>26</sup>

**Figure 3. Impact of recent disruptions was substantial**



# 4

## Smart factory

### Taking a holistic approach to smart factory initiatives to unlock new horizons

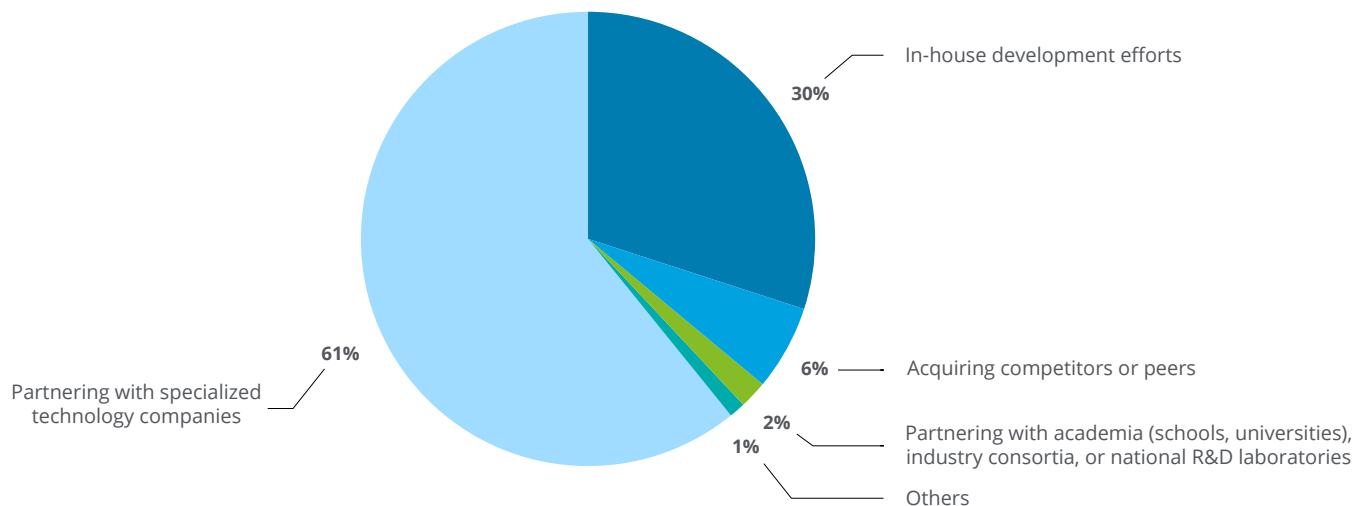
Manufacturers will likely continue progressing toward smart factory transformations, as these initiatives drive future competitiveness.<sup>27</sup> Many manufacturers are making investments in laying the technology foundation for their smart factories. Frontrunners enhance connectivity through the cloud, edge computing, and 5G. With the adoption of these foundational technologies, leading manufacturing companies are also likely to partner across their value chain. More than 60% of surveyed executives are partnering with specialized technology companies to further their smart manufacturing initiatives in the coming years. For example, in a demonstration of the strength of an ecosystem approach, an electronics manufacturer is partnering with a research university and a telecommunications company to develop a fully enabled private 5G production environment to test use cases for industrial facilities.<sup>28</sup>

Once they establish the digital core, manufacturers are investing in disruptive technologies such as augmented reality (AR), artificial intelligence (AI), Internet of Things (IoT), additive manufacturing, blockchain, and advanced analytics. One industrial conglomerate is using augmented technologies with digital twins for training and reskilling its employees.<sup>29</sup> In another example, an aerospace leader uses drones, cloud, and sensor technologies with AR for its quality control processes.<sup>30</sup>

Some early adopters are already experimenting with digital technologies to interact and collaborate in creating a seamless, unlimited reality experience like a metaverse. Our survey highlights that one in five manufacturers is already experimenting with underlying solutions or actively developing a metaverse platform for their products and services. For example, a global automotive manufacturer is already exploring the metaverse by using a virtual factory simulating an actual production line and replicating the entire production line digitally to ensure that all processes run smoothly before operating in the physical factory. Even the technicians in its service centers use AR glasses to complete complex repairs in a virtual environment and connect with other experts to work on the problem collaboratively using digital twins.<sup>31</sup>

As manufacturers advance to the metaverse, cybersecurity will be table stakes. Organizations must stay ahead of cyberthreats, and most are investing in their cyber infrastructure. However, the focus should be not only on cyber defense but also on the resiliency and continuity of businesses in the event of a cyberattack. Increasing monitoring efforts to check for abnormal behavior of information technology and operational technology as quickly as possible can prevent catastrophic damage.

**Figure 4. Primary growth strategy of surveyed manufacturers for smart manufacturing initiatives in the coming years**



# 5

## Sustainability

### Focusing on corporate social responsibility

The fast-evolving environmental, social, and governance (ESG) landscape may require close monitoring in 2023 for manufacturers. Many organizations voluntarily comply with a complex network of reporting regulations, ratings, and disclosure frameworks. But regulators globally are also moving toward requiring more disclosures for nonfinancial metrics.<sup>32</sup> Manufacturers are progressing toward their ESG commitments by making operational changes across their value chains.

- **Managing waste:** Nearly one-fourth of surveyed manufacturing executives agreed that developing better capabilities for waste management and using technologies to improve product recycling could make manufacturing operations sustainable.<sup>33</sup> For example, a global electronics manufacturer is working toward net-zero factory goals by adopting a multitier approach. It is investing in technologies to reduce its waste and water usage.
- **Increasing supplier diversity:** Many companies have included supplier compliance and supplier diversity programs in their overall strategies. While the pandemic and other disruptions have slowed progress on some of these initiatives, the longer-term focus on building these capabilities is expected to increase.
- **Elevating smart buildings:** Technology-enabled smart buildings could assist in achieving carbon neutrality. Optimization ranging from machines to production lines, and from sensor-enabled heating and cooling systems to facility lighting, is driving cost savings and an option for a cleaner and more resilient power supply. Seventy percent of surveyed manufacturing executives agreed that technologies that improve energy efficiency could make manufacturing operations more sustainable.<sup>34</sup> One technology manufacturer, for instance, has already achieved carbon neutrality for its corporate emissions by sourcing 100% renewable electricity for its corporate facilities.<sup>35</sup>
- **Electrifying fleets:** Energy transformation can bring sustainability to operations, and fleet electrification is often a starting point. The IRA manufacturing tax credit program and the Department of Energy's programs to strengthen battery material supply chains could boost fleet electrification, including industrial fleets, which can help reduce costs and carbon emissions.<sup>36</sup> Manufacturers looking to electrify their fleet may also take advantage of clean vehicle tax credits under the IRA provisions.<sup>37</sup>

Recent years have also seen greater emphasis on achieving DEI within organizations. Some manufacturers have evolved their DEI strategy to develop employee-led resource groups that provide a forum for diverse employees and allies from varied backgrounds to express concerns and build community.<sup>38</sup> Focusing on the social aspect can create engagement among the younger workforce, one of the most ethnically and racially diverse generations in history.<sup>39</sup> This can provide manufacturers with another potential avenue for attracting younger workers.



# The road ahead: Industry poised for growth despite anticipated challenges

The acceleration gained in 2022 is expected to continue into 2023, though headwinds of supply challenges, labor shortages, and an uncertain economic environment will persist. Energy price volatility, higher labor costs, and inflation worries could also affect the industry. In addition, the impact of legislation passed in 2022 will likely become more evident in the coming year. Amid these uncertainties, innovations and solutions pioneered in 2022 are expected to gain momentum in 2023, potentially altering tried-and-true business practices in the pursuit of growth and productivity.

In the year ahead, manufacturing companies should consider the following:

- Increasing the utilization of digital technology to increase supply chain visibility, productivity, and connectivity with suppliers, partners, and consumers
- Growing focus on attracting and retaining talent through upskilling; reskilling; providing flexibility where possible; and promoting diversity, equity, and inclusion in the workplace
- Mitigating supply chain risk through building local capacity and moving from just-in-time sourcing to create redundancy in the supply chain
- Implementing smart factory initiatives to achieve targeted business goals
- Adapting strategies for the future of work

# Let's talk



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