



2021 manufacturing industry outlook

Manufacturers seek to be disruption-proof

2020 has been a year like no other in recent history, and the US manufacturing industry has felt the impact. Before the pandemic hit, the industry was working to regain the momentum it had reached after the 2008 recession. However, after the first wave of pandemic-driven shutdowns, segment recoveries for various manufacturers have been uneven. Looking ahead to 2021, the recovery may take longer to reach prepandemic levels, as Deloitte projections based on the Oxford Economic Model (OEM) anticipate a decline in annual manufacturing GDP growth levels for 2020–2021, with a forecast of -6.3% for 2020 and 3.5% for 2021.¹

Reeling from the effects of a global pandemic-driven shutdown, US industrial production (-16.5% year over year) and US total factory orders (-22.7% year over year) saw a steep decline in April, followed by suppressed improvement. The current US Industrial Production Index stands at 105.7 in December (the most recent month available), a substantial dip from its pre-pandemic level of 110.² Production and order levels are still below 2019 levels, but the trajectory of the decline has slowed. Total industrial capacity utilization improved to 74.5% in December from 64.1% in April but is still below pre-pandemic levels of 77%.³

2020 has also experienced a significant dip in manufacturing employment levels, largely due to forced shutdowns in the early days of the pandemic and suppressed orders, with April recording the lowest employment levels since 2010.⁴ Despite recent gains (as much of the country's manufacturing base is back in operation) employment levels in December are still 543,000 lower than February.⁵ All of these indicators have created an environment of ongoing uncertainty, although 63% of executives in Deloitte's postelection poll (see "About the study") are showing a somewhat or very positive outlook on business.



About the study: Deloitte postelection survey

To understand the outlook and perspectives of organizations across the energy, resources, and industrials industries, Deloitte fielded a survey of more than 350 US executives and other senior leaders in November 2020 following the 2020 US presidential election. The survey captured insights from respondents in five specific industry groups: chemicals and specialty materials, engineering and construction, industrial products, oil and gas, and power and utilities.



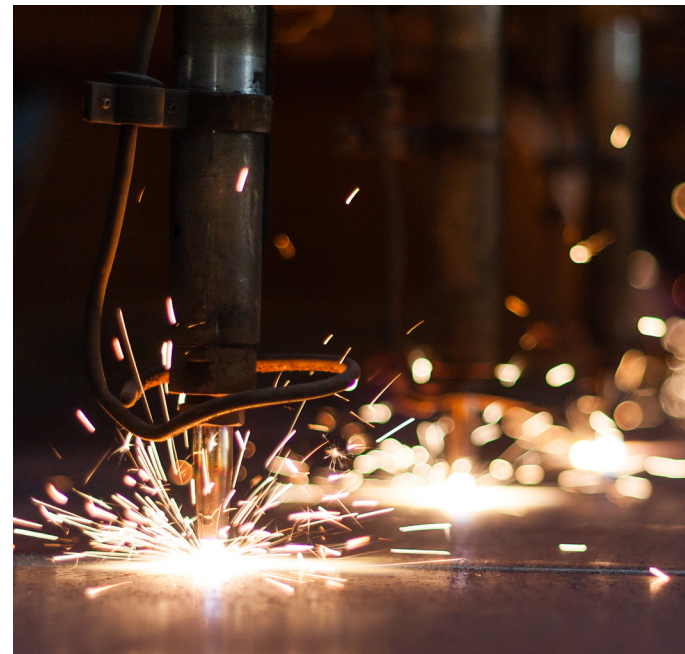
Navigating disruption

Solving forecasting challenges could be critical in navigating the disruption

The pandemic has affected different segments within manufacturing in very different ways. Some segments have been negatively affected by rolling economic shutdowns in different regions over the past 10 months, which have caused a ripple effect throughout all manufacturers that are part of these value chains. Commercial aerospace and heavy equipment are both experiencing significant slowdowns in demand. Bright spots exist, as there are manufacturing segments that are experiencing surges in demand, reflecting the changing needs of their end markets, including home improvement, outdoor power equipment, paper products, sanitizers, and exercise equipment manufacturers. On the commercial side, HVAC and building automation manufacturers are seeing substantial interest from hospitals, offices, and other commercial building owners that want to upgrade their air filtration. And, as vaccines for COVID-19 become available, there is expected to be increased demand for many aspects of the supply network that will be necessary to support a global rollout, including cold-chain components such as industrial freezer units for transportation.

Across all these varied experiences, there is a common thread: the difficulty in forecasting in the current environment. This can be seen by the number of companies who have publicly stopped issuing guidance over the past several quarters. One could argue that the disruption brought on by the pandemic is unprecedented, and in some ways, it *is* unlike other past disruptions. However, it is possible that disruption could become a “predictable” part of the business environment, even if the source of that disruption is unpredictable.

For manufacturers, the events of 2020 may be a warning to develop better systems for navigating disruptions like the one we are currently experiencing. Visibility is likely to become the most critical capability for manufacturers in the coming months. Where to increase visibility depends on how a company is experiencing the pandemic, as exemplified above, and digital technologies could be important enablers. For example, manufacturers experiencing a surge in demand should ensure visibility across their supply network as they ramp up production. As the lack of a single part could derail an assembly-line production flow, manufacturers in this scenario may need to consider multisourcing that part.



In contrast, manufacturers that are experiencing a slowdown in demand may want to increase visibility into operations to help them focus on cost-cutting opportunities. They can use the visibility gained to create flexibility across their production environment, enabling them to quickly take down costs to weather suppressed demand or more quickly respond to an eventual uptick in demand. For companies that are between these two situations, increasing digital fluency in the production environment can enable them to stress test their systems to prepare for the next inevitable disruption. In fact, 76% of manufacturing executives in Deloitte’s postelection poll intend to increase their investments in digital initiatives and plan to pilot and implement more Industry 4.0 technologies. The following sections suggest some specific areas where leaders could consider making these investments.

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Digital investment

Digital twins could support new levels of resilience and flexibility

The events of 2020 have cast a light on how quickly a manufacturing operation can come to a complete standstill or, in some cases, can be reved up to unsustainable levels. Some manufacturers have experienced forced work stoppages or ongoing supply disruptions, driving down capacity utilization rates and impairing productivity. In Deloitte's postelection poll, 24% of manufacturers cite coping with new requirements due to the pandemic as their top challenge, and 20% of manufacturing executives found that managing productivity is their top challenge of the current environment.

Increasing productivity has been an elusive goal in manufacturing for much of the past decade, despite advances in technology like factory automation. The pandemic has shone an even brighter spotlight on the issue, as many production environments have new mandates to maintain physical distancing requirements, which could further constrain efforts to increase productivity and throughput. Digital investments can help to address the ongoing challenges of managing through unknown disruptions. Areas of investment can include adding sensors and machine learning to production lines to predict, prevent, and even prescriptively fix problems before they occur. Another example is installing vision systems with data analytics to improve in-line quality of products or parts. Digital twin technology can help prepare manufacturers for the next disruptive event. Deloitte's postelection poll of manufacturing executives identified that 24% executives who plan to invest in digital technologies believe digital twin technology will be the most important technology in which their company will invest in 2021 (tied for first with augmented workforce efficiencies).

In its simplest form, a digital twin is a representation, or blueprint, of a physical thing. That thing could be a single product or a component. It could also be a production process or even the physical production environment. Using a digital twin, a manufacturer can virtually recreate a product, its production, and even simulate its performance in the real world without having to "bend metal" or take any other physical action.

Digital twins offer a wide range of benefits, including increased productivity, by reducing development time for new products and avoiding costly defects. But perhaps the greatest opportunity for digital twins in a post-COVID-19 world is their ability to enable the flexibility and agility that manufacturers may need to respond to the unknowns of the constantly shifting "new normal."



As an example of how instrumental digital twins could be to manufacturing in the coming months and years, Barbara Humpton, president and CEO of Siemens USA, has shared an ambitious vision of how the US manufacturing base could create a library of digital twins of products, processes, and production environments to prepare for future unknown events like the pandemic.⁶

This concept can be applied across manufacturing operations, but would require an investment for manufacturers to digitize their product plans, production processes, and production environments. However, it could potentially mitigate the historic losses in productivity and output that many manufacturers faced during the onset of the pandemic. That alone could be an investment worth making.

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Supply chain resilience

Manufacturers may expand their options to reduce exposure to trade and other disruptions

The global pandemic has forced manufacturers to critically evaluate their supply constraints and build agility in their supply chains. In a recent survey, only 21% of respondents were confident in their supply network's visibility and ability to swiftly flex sourcing, manufacturing, and distribution, if needed.⁷ Given the disruptions many manufacturers have faced this past year, increasing flexibility in these global supply networks is generally a top business priority. There are a number of ways to achieve this, but two main decision categories where products are sourced and made and the use of digital capabilities to increase visibility and flexibility across a global supply network.

Regarding the first category, regionalization has garnered interest due to the disruptions experienced in early 2020. In a Deloitte postelection poll, 44% of executives plan to recalibrate their supply chain by shifting more toward a regional model in the next year. Based on ongoing trade uncertainty and recent pandemic disruptions, some manufacturers are reducing dependency on China. A recent study reveals that 33% of supply chain leaders have either moved some of their operations out of China or plan to move some out in the next two to three years.⁸ Manufacturers are actively exploring other Asian markets like Taiwan, Japan, and India. They are drawn by the availability of skilled talent and a healthy customer base. However, rising wages in developing economies could diminish the cost synergy that made production in these regions work in the past.

As such, US manufacturers are also exploring how to expand their production closer to domestic markets and develop production capabilities in markets like Canada and Mexico. In our postelection poll, 31% of executives mentioned that they will nearshore some part of their production back to the Americas in the next year. Potential constraints to nearshoring include securing the talent that is necessary to sustain production, as well as infrastructure investments to support the digital foundation of smart manufacturing.

As manufacturers evaluate whether and where to recalibrate their global production footprint, they can also turn to digital capabilities that can increase their supply network visibility. The early days of the pandemic saw many manufacturers create "war rooms" that brought together demand and supply planners to manually share updates in real time from their respective viewpoints. Now, manufacturers can automate this with a digital



supply network (DSN) to gain real-time understanding of activity across a complex supply network. The DSN breaks down the silos of data and includes adding connection points across the network that can sense and respond to sudden supply or demand changes and optimize operations accordingly. This level of visibility would enable manufacturers to reevaluate their extended supplier network and develop an inventory strategy based on data and insights rather than on history and hunches.



Adapting to the new workplace

Disruption increases the need for greater workforce agility

In what could become a permanent change for the industry, the majority of manufacturing leaders seem unlikely to return to all the prepandemic work arrangements. Manufacturers are seeking ways to rearchitect work, the workforce, and the workplace to manage disruption and uncertainty. In our postelection poll, 61% of surveyed executives are planning to develop a hybrid model for their production and nonproduction processes over the next three years. In fact, 28% of surveyed executives identified that upskilling and building new skills to match evolving work environments (automation, digital, and remote) are the top challenge they are facing today in managing work and workforce.

Alongside this shift in where work is done, the industry continues to struggle to fill certain jobs with skilled workers. Despite a loss of overall employment volume, manufacturing consistently posts monthly average job openings of 400,000.⁹ The increased number of furloughs and retirements has only widened the prevailing skills shortage.¹⁰ To manage persistent output levels with a reduced workforce and constrained work environment, many manufacturers have accelerated their adoption of automation and robotics.¹¹

These changes in operations are driving many manufacturers to reevaluate the role of the workforce. Some operational job losses during the pandemic could become permanent changes to the labor profile. And, as robots, cobots, and other forms of automation grow in the production environment, the need for a workforce to manage and interact with these technologies also increases. These “middle-skill” roles require technical expertise and regular upskilling.

Similarly, as companies increase the digital capabilities of their supply networks, the skills needed to manage the DSN will likely also change, including greater technical capabilities. One of the potential risks related to evolving DSN roles is an increase in specialization, which can result in creating nonstandard roles. This could create challenges because digital operating models and technologies require a greater degree of flexibility and problem-solving capabilities. What's needed is greater agility and cross-functionality in the way manufacturers define roles, the skills needed for them, and training programs to reskill the existing workforce.



One way to incorporate digital capabilities in the workforce is to develop a talent ecosystem, which is a deliberate network of external partners that can help bolster the talent pipeline for manufacturing. An example of a talent ecosystem activity includes a manufacturer partnering with a technical school to create a specific train-to-hire program that provides role-specific training and results in a job offer upon successful completion. [The 2020 Deloitte and MAPI Ecosystem Study](#) reveals that more than 80% of surveyed manufacturers believe talent ecosystems are critical to their competitiveness, and 41% have already started forming new relationships to develop robust talent ecosystems.¹² Talent ecosystems could be a game-changer in the year ahead for manufacturers that engage with them.

Agility could be key to manufacturing resilience

The year ahead will vary for manufacturers depending on where they have felt the greatest impact from the pandemic. For some, it will focus on rebuilding lost revenue streams; for others, it could require recalibrating supply networks to serve different market demands. But for all manufacturers, it should include a commitment to increasing agility in operations. By continuing to invest in digital initiatives across production and the supply network, manufacturers can respond to the disruptions caused by the pandemic and build resilience that can enable them to thrive. Manufacturing leaders can start by identifying use cases

that solve for specific challenges on which the pandemic has cast a spotlight, such as fluctuating end-market demand. Manufacturers should set goals for data capture and analysis across the global manufacturing footprint, as this step alone is a key to identifying breakpoints and opportunities for improvement. And finally, manufacturers should consider how digital twins (of products, of processes, or of production environments) may hold the key to ensuring that manufacturing thrives through the next disruptive event, which could be right around the corner.

Let's talk



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Paul is a vice chairman, Deloitte LLP, and the leader of the US Industrial Products & Construction practice. He has more than three decades of experience in the industrial products and automotive sectors and has focused on helping organizations address major transformations. Paul drives key sector industry initiatives to help companies adapt to an environment of rapid change and uncertainty—globalization, exponential technologies, the skills gap, and the evolution of Industry 4.0. Based in Cleveland, Paul also serves as the managing principal of Northeast Ohio.



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