Industrial manufacturing trends 2020: Succeeding in uncertainty through agility and innovation

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The state of the global economy, which faced uncertainty before we surveyed CEOs around the world at the end of 2019, is even more fraught today given the COVID-19 health emergency. As economies slow, industrial manufacturing (IM) leaders will need to resize the enterprise to meet realistic levels of future demand. They must focus — perhaps now more than ever — on creating agility, which will enable them to pivot and adapt to the constantly changing conditions on the ground. This can be achieved by strengthening technological capabilities across functions, reorganising global supply chains and building a workforce with the Fourth Industrial Revolution (4IR) skill sets.
Economic uncertainty, 4IR and talent trends shape the sector

CEOs of IM companies were concerned about their growth prospects before the coronavirus pandemic. In PwC’s 23rd Annual Global CEO Survey, conducted in September and October 2019, more than a quarter of IM CEOs reported that they were “not very confident” in their own organisation’s 12-month revenue growth — the most pessimistic result of the past five years. Since our survey was conducted, their concerns have been amplified by COVID-19, which is already having a major global economic impact.

As of April 2020, the US purchasing managers’ index (PMI) slipped to 41.5. Global growth projections are being scaled back from earlier estimates, to –3% in 2020, according to the International Monetary Fund, significantly worse than during the financial crisis of 2008–09. In PwC’s latest COVID-19 CFO Pulse, 85% of global financial leaders expect a reduction in revenue and/or profits this year as a result of the pandemic, with 51% anticipating a decrease of up to 25%.

The COVID-19 pandemic has also exacerbated ongoing issues such as tariff increases, shifting trade policies that impact supply chains around the world, and increasing costs at all levels of the manufacturing process.

COVID-related lockdowns are also increasing the cost of doing business for IM organisations, and threatening their long-term competitiveness. For one, the crisis is creating an opportunity — and an imperative — to look at SKU rationalisation as an area that can unlock significant cost savings. IM leaders will need to consider fundamental demand reset points post-crisis, which might necessitate new product or service innovation (for example, reduced business travel and personal vehicle commuting with more people working from home, reduced building technology demand for office buildings, and so on.)
In the case of human capital, even factoring in the sudden increase in unemployment, restrictions on movement are reducing an already small talent pool at a time when the industry desperately needs STEM graduates to drive innovation. Adding to this talent drain is an ageing workforce, with, for the first time since 1948 in the US, those old enough to retire now outnumbering those just entering the workforce.

The need for a tech-savvy workforce is all the more important as IM leaders look to transition to digitised operations and migrate to more resilient, agile and innovative business models. IM companies have been talking about and piloting new solutions for the past few years, but have not broadly implemented them at scale — even though the return on investment (ROI) is clear in many cases. Government incentives in most countries enable tax credits or other forms of subsidies for such investment. COVID-19 is punctuating the need for agility and for seamless remote work. In the Global CEO Survey, IM CEOs prioritised the increased use of artificial intelligence (34%) and other digital innovation such as predictive maintenance (37%). Additionally, 43% of IM CEOs acknowledged the opportunity to modernise their enterprise resource planning (ERP) systems.

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Cybersecurity threats introduce another dimension of uncertainty and could result in increased government regulation — which could slow the pace of the 4IR. Of the IM CEOs surveyed, 69% reported that the increasing complexity of cyber threats are having the greatest impact in shaping their cybersecurity strategy, while 55% said that cybersecurity and data privacy regulations were having the greatest impact.

The natural response to all this churn and economic pressure is to hunker down and avoid spending. Although the instinct to seek cost reductions and operational efficiencies is the right one, to succeed in uncertain times, IM leaders also need to focus on building new capabilities, doubling down on innovation to drive growth, and enabling a workforce that’s fit for the future and able to meet the challenges ahead. They’ll need to both cut and invest selectively and not resort to across the board cost reductions.
The case for agility

During a time of uncertain demand and the danger of shocks to globalised supply chains, companies need to conserve capital by requiring strong business cases and staying disciplined about investments. They should focus cost cutting efforts on lower priority areas, and deliberately reallocate unlocked funds and resources towards high priority capabilities that will secure their future competitiveness. The goal is to enhance capabilities, invest in 4IR technologies and digitise end-to-end value chains. Cost control measures like right-sizing should be undertaken as a means of redeploying capital into capabilities that will ultimately enhance profitability.
The 2018 Global Innovation 1000 study, PwC’s Strategy&’s analysis of the 1,000 publicly held companies that spend the most on research and development (R&D), identified ‘high-leverage innovators’ — companies that outperformed their industry groups on seven key measures of financial success for the previous five years, while at the same time spending less on R&D as a percentage of sales. These innovators have developed deep end user insight and rigorous portfolio management of their R&D effort, coupled with tight alignment of their R&D agenda with their overall strategy and a culture supportive of innovation and risk taking.

The study found that during the Great Recession and in the early years of the subsequent expansion (2007–12), high-leverage innovators recovered more quickly and vastly outperformed their competitors, in particular in terms of gross profit growth (6.6 times as high as that of other companies), operating income growth (7.0 times as high) and total shareholder returns, which were 13.4 times those of the rest of the companies in the Global Innovation 1000. During a time of uncertain demand and the danger of shocks to globalised supply chains, the goal is to enhance capabilities, invest in 4IR technologies and digitise end-to-end value chains.
Over the past few years, we’ve written extensively on digital transformation and the need for IM organisations to at least begin this process while they still have the time and resources. Although many companies have at least launched pilot programmes, broad adoption of digital remains limited. And PwC’s Global CEO Survey reveals that the vast majority of IM CEOs globally — 74% — report operational efficiencies as the main activity for driving growth over the next 12 months (see Exhibit 1). The increased efficiencies and production capabilities brought forth by digitisation are integral to that goal, but too many companies still have not made bold commitments to embrace and scale digital innovation across their enterprise.

Combined with the long (often 10- to 15-year) life cycles for IM products, the transition to 4IR has slowed for industrial manufacturers, despite the increased number of traditional and non-traditional competitors in this space. But that’s precisely why IM leaders should move more aggressively on digital transformation — at least those that have retained investment capacity during the coronavirus pandemic. They can create the space to be more thoughtful about how they innovate, which will result in a better outcome than if they rush the process without adequate headcount or capital.

**Exhibit 1**

IM leaders look to operational efficiencies to drive revenue growth

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational efficiencies</td>
<td>74%</td>
</tr>
<tr>
<td>Organic growth</td>
<td>59%</td>
</tr>
<tr>
<td>Launch a new product or service</td>
<td>55%</td>
</tr>
<tr>
<td>Enter a new market</td>
<td>38%</td>
</tr>
<tr>
<td>New strategic alliance or joint venture</td>
<td>27%</td>
</tr>
<tr>
<td>New M&amp;A</td>
<td>23%</td>
</tr>
<tr>
<td>Collaborate with entrepreneurs or start-ups</td>
<td>17%</td>
</tr>
<tr>
<td>Sell a business</td>
<td>9%</td>
</tr>
</tbody>
</table>

**Question**

Which of the following activities, if any, are you planning in the next 12 months in order to drive revenue growth?

**Source:** PwC, 23rd Annual Global CEO Survey
The key is agility — IM companies need to quickly envision and test innovative solutions, even if half or more ‘pilots’ fail, because the rapid pace of change puts a priority on speed. Anything that takes years to develop will likely be outdated by the time it leaves the lab or workshop floor, but engaging in rapid innovation efforts will enable companies to gain insights and form new muscle memory, and thus new capabilities.

They need to start with a clear understanding of the business value, rather than jumping into pilots driven by hype about the need to be digital. Of course, this type of agile development process can be difficult to implement incrementally, especially at larger companies. In traditional, risk-averse, engineering driven companies, this type of mindset can be counter-cultural. That’s why the culture needs to change from the top down. Indeed, only 14% of IM leaders in PwC’s Global CEO Survey believe the statement “We are agile and pursue new opportunities that emerge” most strongly enables their strategic goals.

Beyond the digital transformation, building a culture of agility will help IM leaders adapt to areas of uncertainty and change, not only due to the short-term disruptions from COVID-19, but also volatility in the global trade environment and increased regulation on all fronts, from cyber to labour protections. A shorter supply chain, for example, with a more centralised command centre that can respond quickly at all levels of the manufacturing process, will enable IM organisations to shift and adapt to increased costs through tariffs and further restrictions of movement of people and goods. If these capabilities don’t exist within the organisation, industrial manufacturers should also consider forming partnerships to help them achieve near-term objectives. Alliances with suppliers, channel partners and even customers, for example, can help them to reduce the investment needed to achieve some of their goals.

Industrial manufacturers with capital to spare can also seek to acquire companies that will help them succeed in the next few years. Honeywell and Siemens have led the way. Each has acquired several small-to-medium-sized tech companies, likely with more to come, for their intellectual property, R&D teams and expertise in technologies like AI — enabling them to also develop capabilities like those of software companies. These acquisitions do not necessarily add much right away to revenue streams, but they do offer a quick way to get into technologies or markets the acquiring companies are seeking to penetrate.
Preparing for the potential fallout of a trade war, increased tariffs, labour restrictions and subsequent cost increases does not require localising production altogether but it does require companies to revisit their globalised, highly interconnected supply chains. Moreover, the COVID-19 health emergency is revealing the effects of disruption on these globalised supply chains. To address these issues, leaders should consider some or all of the following:

• Consider suppliers from other countries besides China and Mexico, where doing business is becoming more complex and expensive. Alternative sources include Malaysia, Indonesia, India, Thailand, Poland, Slovakia, Hungary, Ireland and Brazil.

• Optimise existing plants to squeeze every ounce of current capacity. Automation and digitally enabled workflows can create that capacity, lower unit costs to more globally competitive levels, and speed customer responsiveness.

1. Accept de-globalisation as the new normal

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• Redraw your global manufacturing and supply chain footprint, and reconsider alliances and strategic partnerships that can provide regional, technical and skill-set agility. Keep in mind production costs, tax implications, quality and delivery. There is value in shortening the overall supply chain cycle time to better adapt to changing environments.

• Assess transfer pricing approaches to offset international taxes.

• Diversify into adjacent products or segments that are either countercyclical or have a demand-supply gap.

A call to action

The following actions will not only prepare IM companies to meet these challenges but will also enable them to leverage these trends to become more innovative, cost-effective and competitive.
For example, Stanley Black & Decker has employed a ‘make where we sell’ strategy. Although it’s not always possible to source entirely within a certain region, and localising may result in slightly higher costs, these added expenses can be offset with new products and greater competitiveness by getting those products to market faster and more efficiently. This strategy also allows for operational hedging, giving IM organisations with interchangeable capacities the ability to shift production in the event of a severe change in foreign exchange rates, for example.

Moreover, our Global Innovation 1000 study has found that companies that develop more products in labs in the countries in which they compete grow faster, because they are better aligned with unique local needs, than do companies that try to sell products originally developed for US or European markets.

Of course, this type of agility comes at a cost. IM companies need to properly model the impact of these changes, as not everyone has a global ecosystem or the capital to triple the number of manufacturing configurations.

Data analytics can help leadership teams understand the costs and benefits of redrawing the manufacturing footprint. Understanding and anticipating demand more accurately, for example, will help companies make smarter decisions about capital investment and enable them to react quickly to change.
2. Accelerate the Fourth Industrial Revolution

Despite the promise of 4IR technologies such as AI, the Internet of Things, advanced data analytics, robotic process automation, blockchain, robotics, cloud computing, virtual and augmented reality, 3D printing and drones — and 5G as it continues to roll out — industrial manufacturing continues to lag other industries in both digitising products and services as well as core operations. These are big bets, because retooling and digitising operations is expensive, as is developing digital products and services — especially since the technologies are evolving rapidly and these changes can be disruptive and lead to new ways of working.

IM leaders tend to view 4IR through the lens of individual business units and functions, but the concept needs to cascade throughout the whole enterprise. To digitally transform your operations and improve performance, start with the following steps:

- **Address digital capabilities from the top.** Leadership needs to communicate the common goal to teams that may previously have been siloed, and pave the way for them to work together seamlessly.
- **Learn from software businesses.** Pilot projects, like those used in software development, demonstrate how specific improvements can generate wins in areas such as uptime, safety and costs. These pilot projects can then be scaled across the organisation.
- **Extend digitisation beyond traditional information systems.** Companies should look at operational technologies and products such as track and trace solutions and digital twins to replicate physical assets in order to improve asset performance — for example, to enable predictive, condition-based maintenance.
3. Develop your workforce to bridge the digital divide

The organisational change necessary to meet the demands of digitisation involves identifying a workforce that is fluent in today’s technology, but committed to lifelong learning, as 4IR demands. Companies need to shift their engineering workforce to include people with more technological expertise, for example, in software and IoT, versus mechanical and electrical engineers.

The scarcity of highly skilled talent, which will still be an issue post-crisis, means the IM sector will need to upskill its workforce (see Exhibit 2, next page). The World Economic Forum estimates* that, by 2022, 54% of employees are going to need significant training, with 35% needing at least six months’ worth of time and effort in building new skills. CEOs who have embraced this strategy are already realising the rewards of greater workforce productivity and innovation, yet only 16% of global IM CEOs surveyed state they made “significant progress” in improving their workers’ and leaders’ knowledge of technology and its potential implications.

IM leaders will also need to think about ways to retain newly trained workers, with 16% of IM CEOs surveyed citing retention as one of the primary challenges of upskilling, along with motivation of workers (12%) and a lack of resources (17%). That said, workers understand that automation will greatly impact them, with 53% of the 22,000 workers recently surveyed by PwC reporting that they believe automation will significantly change or make their job obsolete within the next decade. These workers are eager to prepare for this future, with 77% saying they are willing to learn new skills now or completely retrain to improve their future employability. They reported a willingness to spend up to two days a month on training to upgrade their digital skills.7

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Only a small percentage of IM leaders report major progress in upskilling.

- Building employee engagement through open communication on skills of the future: 21%
- Defining the skills needed to drive our future growth strategy: 20%
- Implementing a diversity and inclusion strategy to attract a wide range of talent and ensure inclusiveness in how we work: 18%
- Improving our workers’ and leaders’ knowledge of technology and its potential implications: 16%
- Establishing an upskilling programme that develops a mix of soft, technical and digital skills: 14%
- Collaborating with academic/government institutions on the skills needed for the future: 11%

Source: PwC, 23rd Annual Global CEO Survey
Base: Industrial manufacturing respondents (2020=390)
Given the short shelf life of many of these skills as technology evolves, employers will need to find ways to integrate skills development into the jobs of their employees. At PwC, we have made our Digital Fitness app available for everyone to share for free, to help people to boost their digital acumen and access resources to navigate our new reality. IM organisations could also partner with community colleges, nonprofits and government agencies to develop skills training and vocational programmes that will prepare entry-level and existing employees for their specific needs, whether that is programming, operating, or maintaining the robots and digitally enabled machinery they will be standing alongside in the production lines.

IM companies should:

- **Hire more software and IoT engineers and data scientists while training the wider workforce in digital skills.** Siemens, Bosch and Lockheed Martin have all used a combination of automation and training to close the talent gap. Digitising processes doesn’t replace the need for human workers; it creates a need for workers with different skills.

These companies understand that future employees must be ‘system savvy’ craftspeople that can work alongside advanced technologies such as AI-based systems, robotics, and connected devices in order to collect and analyse accurate data, solve problems, and design and manage data-rich solutions.

- **Introduce manufacturing and process innovations to transform the workplace and workers’ perceptions about their roles.** These efforts must be driven by fully engaged employees, as one Middle East and North Africa-based aerospace supplier recognised when it launched a drive to integrate its digitised processes with the rest of its operations, many of which were still manual. Senior management brought in their operations, finance and technology teams to drive the digital transformation and train operators, resulting in real-time, integrated supply and demand operations, end-to-end integrated production planning, and digital quality-assurance systems, among other technological upgrades.
Implemented correctly, this commitment to digital transformation can result in a positive change in attitude among manufacturing employees, changing assumptions about what constitutes routine work and which skills are most critical.

With more tasks becoming automated, the best workers will not only need motivation to develop technology skills but the ability to combine these with problem solving and innovation. This is critical: we found through our Global Innovation 1000 research that companies across all industries that committed earlier and devoted a greater proportion of their R&D portfolio to software grew faster than their competitors.
Conclusion

At a time of significant uncertainty, IM leaders need to avoid the temptation to hunker down and instead continue building agility on all fronts of the business. In sum, they should focus on the following.

• Building agility into their business model and culture, allowing them to adapt to the rapidly changing external conditions
• Redrawing their supply chain footprints, localising where they can
• Continuing to digitise, emulating the software model by coming to market quickly through scalable pilot projects
• Extending digitisation beyond legacy information systems to core operations as well as to products and services
• Adding to and sustaining their talent pool, finding creative ways to upskill, including hiring outside their industries and partnering with other organisations to fill the knowledge and experience gaps.

Instability, unpredictability and increased restrictions are here for the foreseeable future. In response, leadership teams need to redirect resources that will help them regain their footing in a rapidly moving landscape, creating the agility, resilience and innovation to not only withstand the turbulence but to come out stronger on the other side.
End notes


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PwC surveyed 3,501 CEOs in 83 territories in September and October 2019, which included 390 CEOs from industrial manufacturing companies. Of the 390 CEOs whose responses were used for the industrial manufacturing figures:

- 19% of their organisations had revenues of US$1bn or more
- 29% of their organisations had revenues between US$100m and US$1bn
- 44% of their organisations had revenues of up to US$100m
- 71% of their organisations were privately owned.

About PwC’s 23rd Annual Global CEO Survey

Notes

Not all figures add up to 100% as a result of rounding percentages and excluding ‘neither/nor’ and ‘don’t know’ responses from exhibits.

The sample of 1,581 CEOs used for the global figures in this report are weighted by national GDP to ensure that CEOs’ views are fairly represented across all major regions.

We conducted in-depth, face-to-face interviews with CEOs from six regions. Extensive transcripts can be found on our website at https://www.strategy-business.com/inside-the-mind-of-the-ceo.

The research was undertaken by PwC Research, our global centre of excellence for primary research and evidence-based consulting services: www.pwc.co.uk/pwcresearch.