

Creating the Modern Manufacturing Workforce

For manufacturers seeking to thrive in an Industry 4.0 world, digitally enabling the workforce may be an excellent first step, facilitating better collaboration, innovative products, a better customer experience and a more robust supply chain. But it's easier said than done. Getting there begins with a thorough examination of your organization's competitive position and business initiatives.

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Executive Summary

Even before COVID-19 hit, manufacturing faced pressure to up its digital game. The industry's very maturity was sometimes perceived as working against it. Competing with tech, finance and other sectors for young talent was growing more difficult. Fairly or not, manufacturers had a reputation for stodginess and reluctance regarding investing in the technology that excited top millennial minds. Meanwhile, global competition was relentlessly driving down price points and profits on traditional goods.

The onset of the pandemic highlighted the industry's vulnerabilities. Supply chains, which had long been built on a low-cost-at-all-costs approach, were exposed as overly reliant on a single region. While workers in many industries needed only a phone, a laptop and collaboration software like Microsoft Teams to resume work, many manufacturers shut down for extended periods, their shop floors and assembly lines at the mercy of broken supply chains, distancing guidelines and other imperatives.

So if the writing was on the wall before COVID-19, the pandemic has added underlining and an exclamation point: Manufacturers that haven't done so already must embrace digital – and fast.

But where to begin?

All too often, enterprise attempts at digital business take the form of technologies assembled in haphazard fashion, with no unifying vision. Initiatives along these lines tend to further complicate existing process execution. Unsurprisingly, they usually fall short of comprehensive business model change.

The modern enterprise construct offers manufacturers a way to think of their operations holistically, using a quantifiable business-centric approach that provides a context for reimagining core processes; supporting technologies; and organizational and cultural models needed across the value chain. It thus puts into perspective key trends and imperatives, such as the merging of the physical and digital worlds, the democratization of data, and the linchpin: workforce transformation.

A 2019 study by Cognizant's Center for the Future of Work indicates that employees generally considered blue-collar feel that they lack the right technology to do their job and are subject to fragmented experiences, outdated processes, and legacy technology.¹ Closing the skills gap, retraining the existing workforce, and building a data-driven culture are fundamental to workforce transformation in manufacturing. Moreover, they are also fundamental to becoming a modern manufacturing enterprise, which entails embracing agility and resilience and democratizing data in a holistic effort to eliminate silos and respond to customer needs. (Learn more in "[Crafting the Modern Manufacturing Enterprise in the Post-COVID-19 World](#).") For this reason, workforce transformation may be an ideal stepping stone in the larger shift to Industry 4.0 — but that's true if, and only if, it is done within the context of what the business's needs are as they pertain to its value chain.²

In this white paper, we highlight recent examples of engagements conducted by both Cognizant and Microsoft that reveal the key architectural and operational principles critical for moving the manufacturing workforce into the digital age. They include attracting and managing talent; enhancing skills, productivity and teamwork; connecting the workplace; and delivering innovation that drives true business value.

Manufacturers considering this path should begin with an evaluation of the company's existing technology footprint and business processes in light of new initiatives, and should go where the evidence leads them; workforce enablement will be the appropriate path for many, but not all, organizations.

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The COVID-19 impact

The pandemic has highlighted the importance of staying connected regardless of physical location, although the trend toward increased work from home (WFH) and reduced factory-floor personnel was already solidly in place.

Despite COVID-19's tragic, world-twisting nature, then, the pandemic offers clarifying insights for manufacturers. Businesses that are rethinking aspects of their processes due to work from home (WFH), geographically distributed employees and so on are grasping the importance of versatility in workers. Manufacturers need people who can learn multiple advanced technologies, learn them quickly, train others in their use and embed them in day-to-day processes to create value. This aggravated an already growing skills gap across the industry, as illustrated in Figure 1.

Trends shaping the workforce transformation agenda

Technology, competition and globalization are reshaping the manufacturing industry

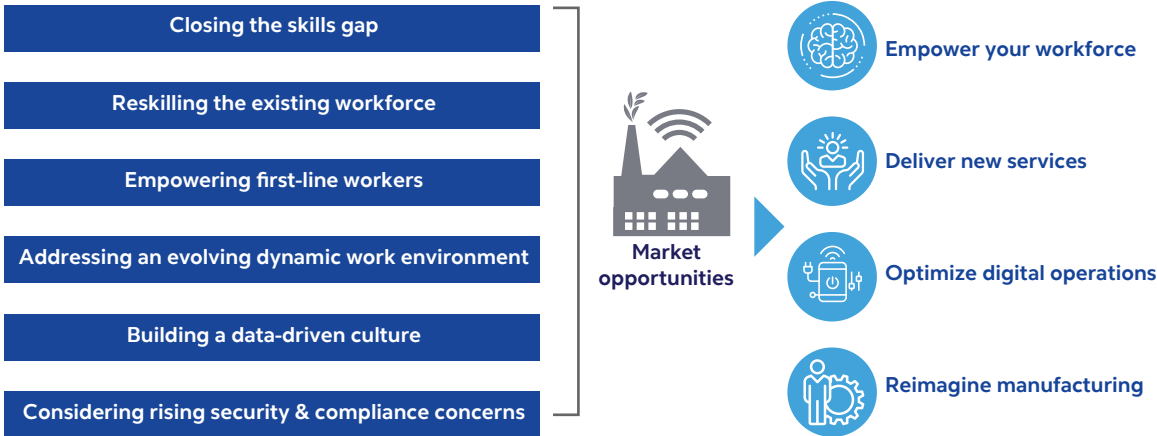
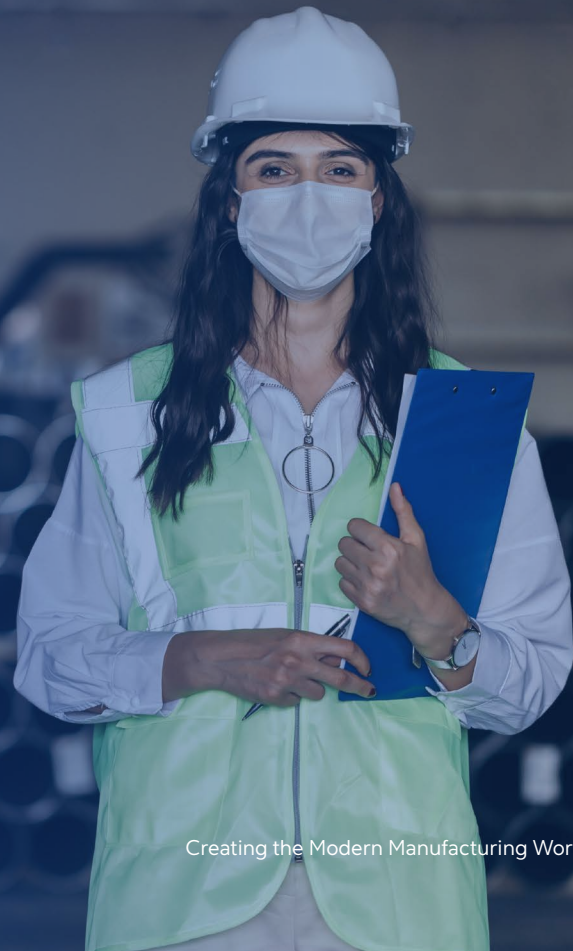


Figure 1

Attracting the next generation

Excelling in the future will require employees with top digital skills, and this is an area in which investing in workforce technology could provide a boost. Manufacturing is one of the most established industries in today's business landscape, with many processes that date back 100 years or more. On the positive side, this means manufacturing processes and guiding philosophies have been honed and fine-tuned through extensive experience. On the other hand, manufacturing's long history and pragmatic nature don't exactly add to its sex appeal, in a workplace context. In general, manufacturing faces “**an acute skills gap**,” and clients tell us that this is exacerbated in the digital arena, with top tech minds applying their talents to other industries.³

One way that manufacturing can address this gap is to match the tech offerings that appeal to not only millennials, but also workers of all ages who are eager to embrace the latest tools. Consider collaboration and meeting apps now taken for granted, such as Microsoft Teams, Slack and Zoom. Not long ago, Slack was scoffed at by old-school manufacturing enterprises, deemed a departmental toy that was not ready for primetime. Today, it's hard to imagine functioning without Teams or a similar tool. (To learn more about the type of project, tools and mission that can attract millennials, see Quick Take, on the next page.)



Quick Take

Breathe in: Tackling the ventilator shortage

As the effects of COVID-19 were felt around the world, leaders at the UK's High Value Manufacturing Catapult, which is tasked with boosting tech innovation, sought to address the UK's shortage of hospital-grade ventilators. The resulting VentilatorChallengeUK consortium demonstrates the best values and abilities of today's manufacturers and digitally capable workforce.

For such an extraordinary mission, Microsoft ensured rapid deployment of its HoloLens, the Microsoft Azure cloud platform, Teams, Dynamics 365 and Power BI to the consortium. HoloLens, a mixed-reality headset, serves as a powerful example of tools enabling workforce transformation. It allowed assembly line staff to see holograms of how parts fit together and make hands-free video calls to experts while they were working. Through voice commands and hand gestures, they could bring up a virtual screen that hovered in front of them, displaying a live stream of someone with knowledge of the ventilators, wherever they were in the world. That was critical for 2,500 engineers who had spent their careers building products such as cars but now had to switch to assembling medical equipment overnight. (Mixed- and virtual-reality tools have also become valuable for workplace training in general, and safety training in particular.)

Additionally, Azure Cognitive Search lets workers create a digital repository of information; pictures; video; and handwritten and typed documentation, and then retrieve information relevant to the job at hand.

With these tools in the hands of a digitally enabled workforce, the consortium established a new supply chain; performed all necessary training; and thus was able to scale production from 50 ventilators a week to 1,500 a week — compressing what would typically be considered a two-year project down to two months.

The new workplace

As it's been noted often since COVID-19 hit, remote management and collaboration will remain key parts of working life going forward. WFH and reduced human presence on the factory floor is hardly new; what is now clearer than ever is that manufacturers must keep investing in technology and talent to maintain productivity, preserve corporate culture and drive professional development.

On the collaboration front, environments like Microsoft Teams have quickly become a household word. Going forward, manufacturers need tools that deliver a consistent feature set and user experience regardless of platform and physical location. Glass packaging producer Owens-Illinois (O-I), which has 26,500 employees in 77 plants across 23 countries, upgraded from Skype for Business Online to Teams and quickly discovered not only new capabilities that O-I knew it needed (notably improved communication and decision-making within its glass production processes across both shifts and device types), but also some capabilities that came as a pleasant surprise, such as real-time language translation in instant messaging. Almost immediately, employees began to use Teams' built-in translation capabilities to support communication in their language of choice.

Early in the COVID-19 lockdown, emotions ran high throughout the corporate world, suggesting that many, perhaps most, organizations would not permit workers to return to a physical work environment anytime soon. WFH productivity was said to be at least as high; the future of office parks was deemed dire.

The passage of time has led to a more mixed reality, especially where manufacturing is concerned — despite the march of technology, the shop floor still tends to require a large number of people, often in close proximity to one another. Moreover, studies find that while WFH does bring certain benefits (personal creativity, ability to focus) to many employees, most people want to get back to their physical workspace.⁴ For a look at how Cognizant is enabling a safe return to the factory or office, see Quick Take, page 8.

Quick Take

Getting back to the shop floor – safely

The Cognizant Safe Buildings approach combines layered safety strategies and a technology foundation to sense, monitor and manage data insights to lower risks.⁵

Tools and strategies help manufacturers:

- I Screen employees and visitors for elevated body temperatures using thermal imaging.
- I Monitor physical distancing and provide contact tracing through location data from wearable sensors, smart cameras and systems.
- I Ensure hand hygiene and sanitization compliance using data from smart bands.

One of many early adopters, a multinational food company with 150 factories and 100,000 employees piloted Cognizant Safe Buildings with the goals of tracking workers' physical distance from one another; sending alerts on violations of these distancing rules; and contact-tracing employees who'd been exposed to COVID-19.

The pilot was a strong success, according to the manufacturer. Following tweaks developed through employee feedback, the program is now being scaled first to the manufacturer's North American factories, and then to other geographies.

In keeping with our suggested approach of auditing business needs and allowing them to dictate the best action, manufacturers should consider their own situation before rushing employees back to the shop floor en masse. WFH is now commonplace. The goal is not necessarily to gather the largest possible group under one roof, but rather to preserve productivity and organizational culture while enabling workers who may spend only part of their time in an office or on a factory floor.

The new workforce

When manufacturers audit their technology and business initiatives to rationalize investment, they often find that reskilling their workforce earns a high priority. As a 2019 report from Cognizant’s Center for the Future of Work put it, “blue-collar work isn’t what it used to be.”⁶ Consider, the authors noted, today’s factory floors, layered with sensors and algorithms sequencing intricate hand-offs between teams of people and banks of machines. In such environments, newly empowered workers aren’t limited to routine physical tasks; armed with the ability to exploit data, analytics or machine learning, they’re adding value in innovative ways, using human insight and judgment to master sophisticated technical process work with skill and flair.

This new category of worker is exemplified by the “Takumi Masters” at Lexus, who meld detailed knowledge of digital processes with old-school experience and an artisan’s touch.⁷ At Lexus, to be a Takumi is to have earned a high honor — and to be rewarded appropriately. We believe this is the evolutionary direction of what we’ll call the Digital Craftsperson.

For another example of thoughtful workforce enablement, this one focused on field technicians, see Quick Take, page 11.

Unfortunately, not enough enterprises are creating environments in which digital craftspeople can thrive, in spite of a clear need, as shown in the following figure; this is the type of investment that a careful self-assessment can lead to. Failing to prime the workforce is a severe risk. The technology isn’t slowing down, and the competitive pressure is only going to ratchet up. The time to act is now.



Quick Take

What color is your collar?

A Cognizant Center for the Future of Work research report found less than half of businesses across industries were making needed workforce strategy changes despite:

- | Over 70% of respondents say the biggest driver impacting blue-collar work is the growth of technology.
- | Blue-collar work will focus less on physical, repetitive tasks and more on knowledge-intensive, digital-oriented roles.
- | The use of smart machines is predicted to rise over the next five years for routine and simple decision-making, by nearly 26% and 35%, respectively, and even more so for complex and mission-critical decision-making (44% and 75% increases, respectively).
- | Nevertheless, most operational decisions will still require lots of human input.
- | A productivity bonus awaits leaders — businesses that consider themselves ahead of the competition in this area expect a productivity kicker of 13% to 14% over the next five years.

Quick Take

Enabling field techs: Efficiency's going up, costs are going down

With WFH and the field now a virtual extension of the factory floor, enabling remote workers has never been more important for manufacturers. Recently, one of the world's largest elevator OEMs sought to improve the productivity of its more than 31,000 field technicians.

Cognizant, selected as the manufacturer's mobility enablement partner, performed an activity analysis and found that fully 40% of the technicians' work was considered to be of low value. The first step in reducing this percentage was to put in place key performance indicators (KPI) to ensure all changes contributed to business goals — to wit, improved productivity.

By codifying cumulative expert input as knowledge graphs in Microsoft Azure, Cognizant created first a troubleshooting app featuring search and chat capabilities, and then a tool that actively monitors the company's elevators at scale.

Results? Immediately, average search times for parts dropped from 10 minutes to 2, the client told us. Little wonder, then, that the initiative that continues to be rolled out has achieved a 5% improvement in field-tech efficiency — or a \$300 million per year savings — according to the client.

Quick Take

The manufacturing value chain: Future capability map

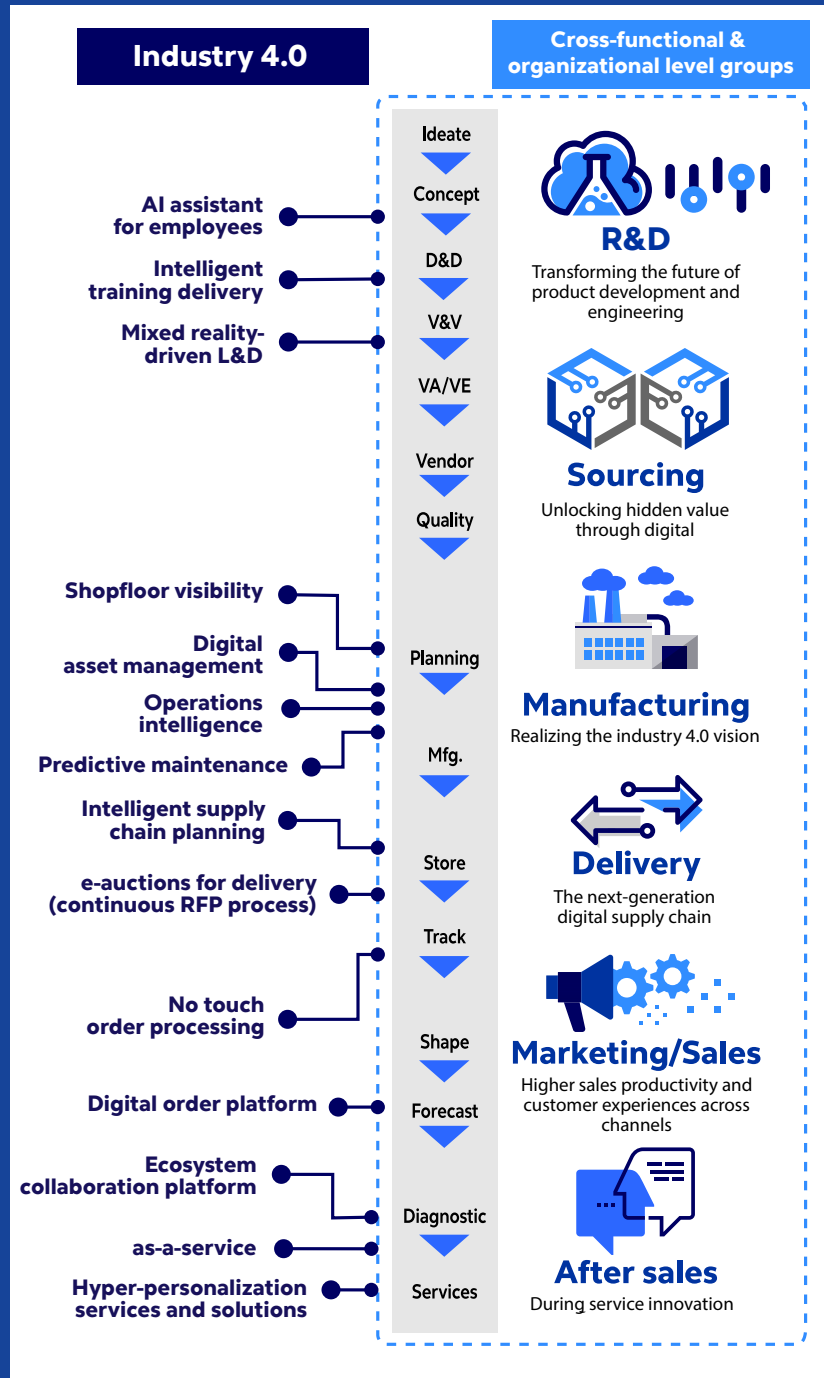


Figure 2

Rethinking data

The democratization of data demonstrates how changes made with the workforce in mind can and should filter up through the organization to deliver value in myriad ways. Through data lakes or other means, forward-looking manufacturers are creating a “single source of truth” so that workers across departments — customer service, operations, finance — can maintain consistency, confident that they’re all singing from the same hymnal.

Before it can be democratized, data must be modernized; data in older formats doesn’t lend itself to web services-enabled forms of interoperability and sharing across silos, business functions and ecosystems.

Once addressed, data modernization does far more than enable employees. Properly aggregated, data is far easier to store, use and share. That allows businesses to transform what was once an expensive burden into an asset that helps leaders drive revenue growth, contain costs and increase business value.

Tooling and industrial materials supplier Kennametal, based in Pittsburgh, operates globally in multiple languages, solving problems for customers in different verticals and regions. Kennametal employees are now using Microsoft Power Platform to gain insight into factory productivity, using dashboards to get ahead of the curve on incidents and equipment issues that previously required expert-level human resources onsite. Natural-language query capabilities, whose results are presented in easily digested visual formats, will ultimately provide 12,000 employees in multiple geographies with cloud-based access to sophisticated analytics and project data. Visualizing information in minutes, business users can explore data and uncover new insights without specialized help, Kennametal said.

In a prime example of how workforce empowerment benefits the business as a whole, Kennametal’s broader vision is to link its smart factories to customers, providing them with up-to-the-minute information.

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Looking ahead: The workforce as a stepping stone

In addition to the myriad benefits that reinventing the manufacturing workforce offers on its own merits, we believe it's an excellent entry point into a broader and deeper digital journey. Many of the processes and technologies required to address workforce issues (embracing new apps, the democratization of data, knowledge capture, humans working closely with machines, geographical flexibility) will serve as stepping stones to an overall transformation.

In one example, Cognizant recently helped a global provider of packaging solutions chart its course for becoming a modern enterprise, and reshaping the workforce played a huge role. The client was extremely successful — but that very success had created unforeseen issues, including a need for better talent and knowledge management challenges. As a result, the client wasn't sure that its investment strategy was consistent with market dynamics and its growth aspirations.

Cognizant used its modern enterprise framework and proprietary NorthSTAR consulting methodology (see Figure 3) to identify and assess a range of disruptive business factors ranging from market dynamics driving future product line requirements to innovation initiatives. All of these factors together provided a context for digital innovation.

Cognizant evaluated the company's maturity via 36 core and 60 cross-functional digital capabilities. A key part of the analysis was to interview, and listen to, millennial employees. The exercise identified the interventions and process reengineering needed to drive the client's business functions moving forward across key areas.

In the end, the client's executive leadership was able to adjust its transformation strategy to better serve its business and, most importantly, gain execution buy-in at the board level.

Leveraging NorthSTAR for a 360-degree view

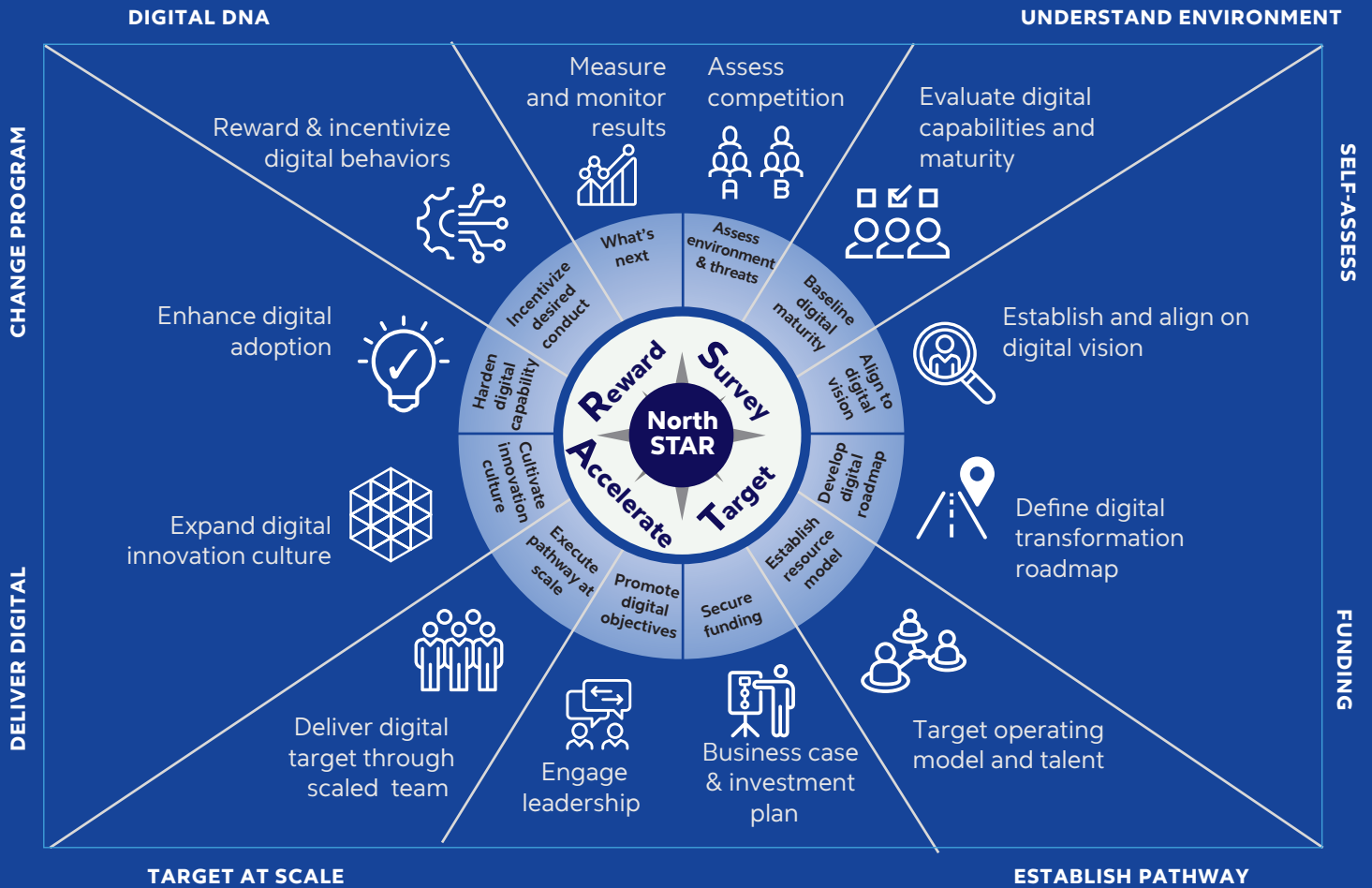


Figure 3

Once a manufacturer determines that workforce enablement is a priority, what steps should it take? Our thoughts:

- Begin with a guiding philosophy and agreed-on KPIs to ensure that all investment delivers business value.
- Execute and communicate a Safe Buildings program so employees know that when they enter a facility, they do so with minimal risk.
- Tweak corporate culture and management strategies to recognize the new reality of WFH.
- Attract leading candidates by implementing technology that appeals to millennials and other next-generation workers.
- Improve worker productivity through automation and knowledge harvesting.
- Put in place knowledge-capture and knowledge-sharing tools to ensure that employees' experience is integrated into systems and passed on.
- Embrace career-long training to keep employees' skills up to date.
- Offer career and compensation paths that recognize and reward newer roles.

The manufacturing industry is at a critical juncture regarding digital change. Rather than launching halfhearted modernization efforts in a handful of unrelated departments or business units, leaders should create a unifying vision, communicate that vision throughout the enterprise with full-throated support, and move to execute it. If an audit shows that digitally enabling the workforce is the right place to begin, then it's an initiative that can bring lasting benefits to the business as a whole.



The image shows two workers in a factory setting. They are wearing yellow hard hats and high-visibility safety vests. The worker on the left is wearing a white face mask and holding a tablet. The worker on the right is also wearing a white face mask and is pointing towards a control panel or machinery. The background is a blurred industrial environment with yellow safety railings. The entire image has a blue color overlay.

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Endnotes

- ¹ <https://www.cognizant.com/whitepapers/the-renaissance-of-blue-collar-work-codex5193.pdf>.
- ² https://en.wikipedia.org/wiki/Fourth_Industrial_Revolution.
- ³ <https://tulip.co/blog/skills-gap/skills-gap-manufacturing/#:~:text=What%20is%20the%20Skills%20Gap,following%20the%202007%20financial%20crisis>.
- ⁴ <https://www.gensler.com/research-insight/blog/most-people-want-to-return-to-the-office-but-expect-changes>.
- ⁵ https://www.cognizant.com/perspectives/open-for-business-making-the-workplace-safer-for-employees-and-customers?utm_source=google&utm_medium=cpc&utm_campaign=NAM_2020_Post_Covid|Q2%202020|NA|US|crs|IND|CDB|IoT|Brand_SFB_SAFEBuildings_EX&utm_term=cognizant%20safe%20buildings&utm_content=Exact|na|na|na|AlwaysOn&gclid=CjwKCAjwh7H7BRBBEiwAPXjadnCxYoN8dfxfmjN-ZDe_KBX7vE0pperk4kCqnqcuZhaTwcx0E2sbyRoCZGwQAvD_BwE.
- ⁶ <https://www.cognizant.com/whitepapers/the-renaissance-of-blue-collar-work-codex5193.pdf>.
- ⁷ <https://www.lexus.co.uk/discover-lexus/craftsmanship/takumi-masters/>.

About the author



Dr. Gautam Sardar

Advisory Consulting Head, MLEU Practice

Dr. Sardar leads decision sciences from a digital transformation perspective within MLEU and heads Advisory Consulting for Cognizant's Manufacturing, Automotive, Transportation and Logistics practices. He brings over 25 years of experience in areas such as data monetization, digital supply chains, predictive modeling, analytics, AI, machine learning, business and operational model transformation. Previously, Dr. Sardar was Chief Scientist of the Global Supply Chain Center of Excellence (CoE) at Tata Consultancy

Services responsible for the creation of innovative offerings in supply chains based on approaches in modeling, simulation, optimization, and analytics. Prior to this role, Dr. Sardar was the Principal Scientist and Head of the TCS Innovation Lab at Cincinnati where he spearheaded R&D in manufacturing, healthcare, energy & utilities. Dr. Sardar holds a BE in computer engineering from Pune University and PhD. in systems and control engineering from the Indian Institute of Technology, Bombay. He can be reached at Gautam.Sardar@cognizant.com | [linkedin.com/in/gautamsardar](https://www.linkedin.com/in/gautamsardar).



Neal Meldrum

Global Director of Business Strategy, Manufacturing and Resources group, Microsoft

Neal Meldrum is Global Director of Business Strategy in the Manufacturing and Resources group at Microsoft. He has 20-plus years of experience in the industrial equipment, operational technology and cloud manufacturing solutions space. Neal is responsible for driving corporate strategy for Factory of the Future, Industrial IoT and Digital Twin. He can be reached at Neal.Meldrum@microsoft.com.



Digital Operations

Cognizant Digital Operations helps clients re-engineer, digitize, manage and operate their most essential business processes, lowering operating costs, improving user experiences, and delivering better outcomes and topline growth. Across the practice, we are creating automated, data-driven platforms and industry utilities. We help clients run better by applying traditional optimization levers, and we help them run differently by creating competitive advantage through making their processes digital-ready, which often leads to more effective operating models and corresponding topline revenue growth. Visit us at cognizant.com/cognizant-digital-operations.

About Cognizant

Cognizant (Nasdaq-100: CTSH) is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 194 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at www.cognizant.com or follow us [@Cognizant](https://twitter.com/Cognizant).



World Headquarters

500 Frank W. Burr Blvd.
Teaneck, NJ 07666 USA
Phone: +1 201 801 0233
Fax: +1 201 801 0243
Toll Free: +1 888 937 3277

European Headquarters

1 Kingdom Street
Paddington Central
London W2 6BD England
Phone: +44 (0) 20 7297 7600
Fax: +44 (0) 20 7121 0102

India Operations Headquarters

#5/535 Old Mahabalipuram Road
Okkiyam Pettai, Thoraipakkam
Chennai, 600 096 India
Phone: +91 (0) 44 4209 6000
Fax: +91 (0) 44 4209 6060

APAC Headquarters

1 Changi Business Park Crescent,
Plaza 8@CBP # 07-04/05/06,
Tower A, Singapore 486025
Phone: + 65 6812 4051
Fax: + 65 6324 4051