

Operational Excellence 4.0

Technology and Beyond

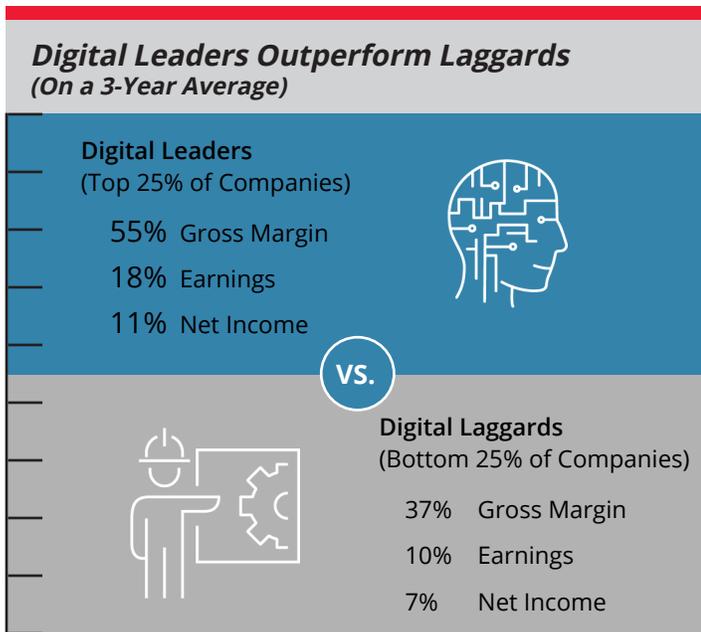


Operational Excellence 4.0 (OpEx 4.0)

Manufacturing is benefiting from a host of new technologies that hold the promise of creating much more efficient operations and greater customer satisfaction. But to become digital leaders and realize the business results of this transformation, companies will need more than new technology. They will also need a workforce that can adapt to and support these innovations. *This is the essence of OpEx 4.0: technology and people working together to achieve the best possible results.*

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Source: S&P Capital IQ and Keystone Strategy Analysis

In a study of 344 U.S. public companies by S&P Capital IQ, digital leaders had higher gross margins (55% vs. 37%), stronger earnings (18% vs. 10%) and greater net income (11% vs. 7%) than the digital laggards over the course of three years. Yet few companies have gotten very far on this journey. In a 2017 EIU survey of more than 500 manufacturing professionals, only 27% reported that their operations have undergone “substantial industrial transformation.” Nearly 35% said they were transforming parts of their operations while 19% said they were still developing a transformation strategy.

Significant Barriers to Achieving OpEx 4.0

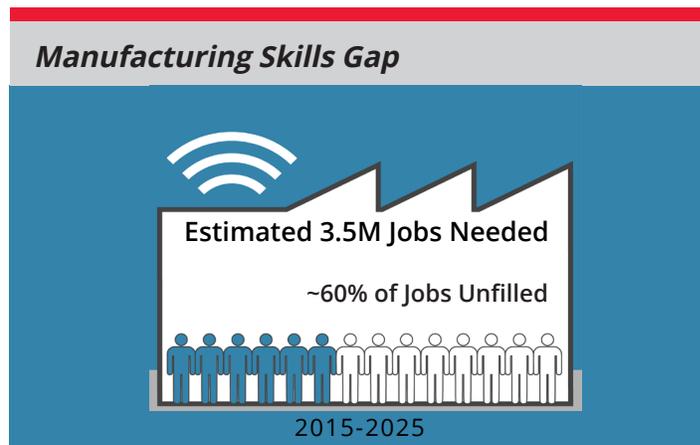
One of the most significant barriers to achieving OpEx 4.0 is an impending skills crisis in the manufacturing industry which will make it difficult for companies to hire the necessary talent. Job openings in the U.S. manufacturing sector reached an unprecedented monthly average of 390,000 in 2017, according to IBIS, and the shortage of people who could fill them is expected to worsen.

Generations are Skipping Manufacturing Jobs

Millennials, now the largest generation in the workforce, are showing a reluctance to enter manufacturing, according to a 2014 Deloitte Millennial Survey. Their offspring, Generation Alpha, are also likely to pursue other options. As baby boomers continue to retire, more than 2 million manufacturing jobs will remain unfilled over the next decade for lack of want or skills, according to the National Association of Manufacturers.

According to October 2018 article in Industry Week, when it comes to technology, there is a disconnect between perceptions that the C-suite holds and those of the staff. A PwC survey found that 90% of C-suite executives believed their company pays attention to people’s needs when introducing new technologies in the workplace, yet only 53% of staff said the same. Thus, it is important for organizations to consider technology as a part of the strategy for human capital enhancement.

Given the widening gap between rapid innovation and shrinking pools of talent, it becomes even more critical for manufacturers to focus on developing their existing workforces. That means helping factory workers at all levels embrace new technology rather than fear it and creating an organizational culture of continuous growth.



Source: The Manufacturing Institute and Deloitte, 2015

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Three Steps for Putting “Excellence” in OpEx 4.0

In an OpEx 4.0 environment, all work responsibilities, processes, reporting lines, budgets and points of decision-making will change. Factory workers at all levels will need to respond to issues in real time and possess skills beyond those required for their current positions.

At auto manufacturing plants, for example, equipment maintenance supervisors who now spend their time managing technicians and overseeing repairs will also need to have robotics and controls engineering skills. The equipment maintenance technicians who work for them will have to know how to use analytics such as thermography and vibration analysis to determine when to maintain equipment before it breaks down, rather than diagnose and troubleshoot problems as they happen.

There are three steps manufacturing leaders can take to ease this transition: support employees with technology, upskill the workforce for OpEx 4.0 and make change fun.

1. Support Employees with Technology (Not the Other Way Around)

No matter how much new technology manufacturers deploy, humans will still be critical to the success of their transition to OpEx 4.0. In a global study of 1,500 companies at the forefront of implementing artificial intelligence systems, Accenture technology researchers Paul Daugherty and James Wilson found that companies achieved the greatest performance gains not when machines were used to replace employees, but when they were deployed to work alongside them.

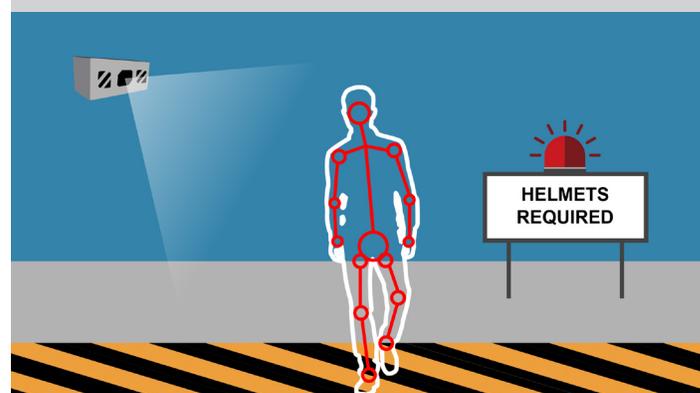
Daimler, for example, is developing a fully networked smart factory that will manage the entire automotive value chain of a Mercedes Benz, from design and production to sales and service. One would think this futuristic model, Factory 56, would be operated solely by robots and AI. In fact, the opposite is true. Recognizing that humans are cognitively superior to machines, Daimler has designed the factory of the future to be a shining example of human-robot collaboration (HRC). Robots will only take over when a task becomes complex, dangerous or ergonomically unsafe for humans, such as installing batteries weighing over 220 pounds.

Another way technology can help upgrade human capabilities in manufacturing is to use it to monitor and train factory workers to standardize and improve how they do their jobs. One of the most underused aspects of IoT is video surveillance and analytics, including LiDAR technology that can be used to provide real-time feedback when something is wrong so that the worker can fix it then and there rather than farther down the factory line.

Hitachi, for example, has a factory solution that uses LiDAR to track the motions of machine operators and compare them against the standard movements using sophisticated algorithms. When the operator deviates from the standard, the system issues visual and audible warnings to alert the worker that they are straying into a dangerous area, making repetitive motions that could lead to injury, or performing a task inefficiently.

LiDAR, which unlike video maintains the privacy of the person it is tracking, is also an excellent tool for training because it provides immediate feedback to workers about whether they are doing a task in the safest, most optimal way. It can be particularly helpful for factories with performance issues by troubleshooting their layouts, processes and human errors.

LiDAR Provides Anonymous Factory Imaging for Safety and other Improvements.



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2. Upskill employees for OpEx 4.0

The first key to upskilling employees will be to empower them with technology. As machines become more sentient, they will work alongside humans to drive new levels of productivity. Hitachi's humanoid robot EMIEW3*, for example, can provide additional customer service support at places such as airports,

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*EMIEW3 robot pictured above is not currently available in the U.S. market

where it can direct travelers to whatever they are looking for, whether it's a specific terminal or the closest ATM. Training humans to work effectively alongside robots and smart equipment is key to maximizing the value of these investments. To achieve OpEx 4.0, an organization should introduce new technology in tandem with a comprehensive training program.

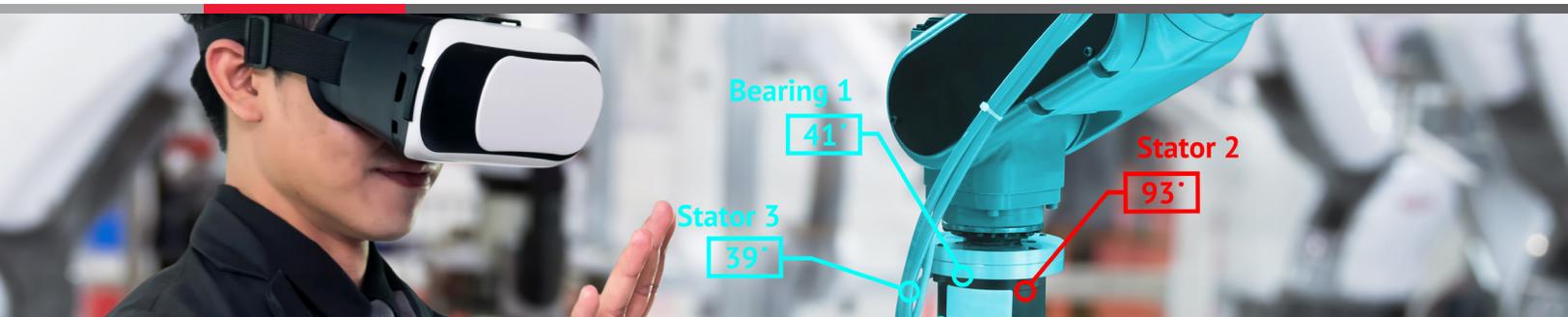
The second key to upskilling the workforce for OpEx 4.0 is to make training and education purpose-driven. People engage and learn best when they can acquire a new skill that will make them more valuable. It also helps when the instruction is hands-on, bite-sized and workers can do it at their convenience. One of the leading sports clothing manufacturers, for example, has a university set up within its factory to teach sewing to any employee willing to learn, re-train or gain a higher level of skill. The university has a waiting list of employees who are eager to attend various sessions that teach specific sewing skills.

The third key is to train supervisors and leaders at multiple levels within organizations to handle human-robot interactions in addition to human-human ones. As manufacturing companies progress towards OpEx 4.0, human resources will need to become human & robotic resources and provide training on how to manage robot performance issues as well as human ones.

In addition, companies must expend effort at the city, state, national and international levels to reap the long-term, global benefits of OpEx 4.0. They will need to collaborate with universities and other public and private organizations to get the millennial and Gen Alpha workforce excited about manufacturing and the OpEx 4.0 journey.

3. Make Change Fun

Creating a fun environment, free of blame and anxiety, can make a huge difference in building teams willing to take more risks and venture outside their comfort zones. One way to engage, influence and motivate a diverse workforce is to gamify or apply game mechanics to complex technologies, activities, and business processes.



As an international trainer and coach, I have found that when I have taken a gamification approach to teaching technical certification courses, the participants in those classes were much more engaged than those in my regular classroom-based lessons on the same subjects. They were also better at applying the concepts they've learned to real-world situations, from top-level executives to shop floor personnel.

Another way to spark fun is to use new learning tools such as augmented and virtual reality. These technologies not only make training more exciting and immersive, but scalable. Because of this, Volkswagen has launched a global initiative to train 10,000 employees using VR technology. It will use VR not only to on-board new employees but also for training on vehicle assembly and customer service within Audi, SEAT, ŠKODA, and Volkswagen.

Getting people out of the office and into other operations that have implemented innovative processes can also get workers excited about what's possible. Before opening a highly-automated "Speedfactory" in Atlanta, Georgia, Adidas flew employees to the original Speedfactory in Germany for training, and to work with the AI-based robotic machinery there.

Now is the Time to Start

Companies that implement OpEx 4.0 will generate more than cost savings from more efficient operations. These innovators will also be able to mass produce customized products for individuals; NikeiD, for instance, allows customers to customize the color and design of their footwear and have them delivered to their doorstep.

It will also put them in a good position to attract top talent, particularly among younger generations such as millennials who put great stock in certain values. In a 2014 Deloitte Millennial Survey, 78% of millennials said they are strongly influenced by how innovative a company is when deciding if they want to work there.

Achieving OpEx 4.0 requires having people and technologies collaborating to achieve excellence in operations and customer satisfaction. Technology of course, can be bought, but for it to be implemented and operated successfully, the organization's workforce must be ready to embrace it, utilize it and optimize it. That's why an organization's top priority should be to prepare its workforce for achieving excellence using the technologies of Industry 4.0. Since that takes time, now may be a good time to start this journey.



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