

SIX STRATEGIES FOR MAXIMIZING MANUFACTURING PRODUCTIVITY WITH CONNECTED WORKERS

Whitepaper



Rapid change is the new normal for many of today's manufacturers, and success rests on being able to turn on a dime.

On an ongoing basis, this means efficiently switching production lines to meet different customers' orders. However, to thrive, more manufacturers are finding that they need to pivot the entire business between different markets as industry sectors go through cycles of higher and lower demand. Doing so requires the ability to get new suppliers onboard, distribute work instructions across the shop floor; schedule production; define quality and compliance specs; and manage logistics, including labeling and delivery. And it often needs to be done in weeks if not days.

Success also depends on being able to anticipate and adapt to increasingly unpredictable global supply chains.

The good news is that new opportunities are emerging as more retailers, OEMs, and others look closer to home for manufacturers that can produce a range of products and components. At the same time, manufacturing firms need to contend with spikes in demand, transport disruptions, production slowdowns, and other factors that can lead to significant shortages or delays in the availability of raw materials and supplies.

Adding more machinery and expanding the shop floor will expand capacity, but it will have little impact on adapting to change. Instead, manufacturers seeking to maximize productivity in an era of change need to transform their teams into connected workers by providing them with the technologies, tools and training they need to excel. Underpinning this shift is the drive toward data democratization across manufacturing employees.



THE DRIVE TOWARD DATA DEMOCRATIZATION

Historically the most valuable data was aggregated, analyzed, and reported by analysts and provided to managers, directors, VPs, and C-level executives, not to production workers. More recently, to adapt to fast-moving production plans, management teams have begun empowering employees on the shop floor by sharing quality data. This typically includes scrap counts and first yield rates; production line's performance data, including uptime, machine metrics, and analytics and audit data; and real-time data from production and process monitoring.

The data informing workers on the production floor comes from a combination of machinery and software, such as manufacturing execution systems (MES), enterprise resource planning (ERP), supply chain management (SCM), warehouse management, and logistics. Empowered with knowledge from these systems, employees are being transformed into connected workers with the insights and agility to get up and running quickly, as well as identify and troubleshoot potential problems before they impact production.

Connected workers also have the data to see how and why their efforts matter and how they are helping to keep the manufacturer competitive, leading to greater initiative and adaptability. As a result, manufacturers that have democratized data among employees now have teams of connected workers in place who are unleashing the productivity gains that machinery had promised to deliver for decades—delivering significant improvements in time-to-market, quality, and cost improvements in a fraction of the time expected. In this way, connected workers are proving to be one of the most effective strategies manufacturers can put into place today.

While data democratization has become the cornerstone of what defines a connected worker, it is not a monolithic concept. Instead, there are a number of ways in which this has successfully been put into practice. Following are the six key strategies being implemented by those manufacturers who have successfully pivoted and expanded their businesses to meet rapid changes across their customers and supply chains.

UTILIZE SMARTER, BETTER SENSORS

Manufacturers have increased their purchases of smart machines that can report on production, utilization, wear, and energy use, among other metrics. These companies are also retrofitting their existing machinery with smart sensors that similarly provide valuable data, such as variations in production processes, which help to improve production efficiency and product quality.

For the many manufacturers with production and process monitoring systems in place, rapid improvements in the Internet of Things (IoT) and Industrial Internet of Things (IIoT) sensors are helping to bring greater contextual information and insight to connected workers. These smarter, better sensors put knowledge in the hands of workers to improve everything from efficiency to health and safety.

For example, a manufacturer upgraded the sensors used for in-line quality testing and discovered new data on how workers could reduce the number of work instruction steps and improve quality. IIoT-based data on cycle times and in-quality testing helped enhance worker health and safety, finding several machines in need of maintenance and more lubricant to alleviate the possibility of a lock-up or, worse, an accident.



APPLY REAL-TIME ANALYTICS

Transitioning to a connected worker approach for smart manufacturing begins with reliable data that provides manufacturers with new, often unexpected insights into increasing production efficiency and quality.

Forward-thinking companies are applying real-time analytics at every phase of the manufacturing execution process to fine-tune work instructions, improve machinery selections, and optimize the best possible worker for a given task and much more. Sharing these real-time analytics across employees on the shop floor creates greater ownership of every orders' outcome and higher productivity as workers look for new ways to improve the metrics applying to them.

Notably, real-time analytics are going beyond gauging the current status to enabling predictive analysis for assessing risks to production and the impact on revenue. With the resulting, highly accurate sales and margin forecasts, manufacturers can further improve their financial visibility.

To be effective, manufacturers need to start by defining the most critical metrics and key performance indicators (KPIs) against which the analytics will be run.

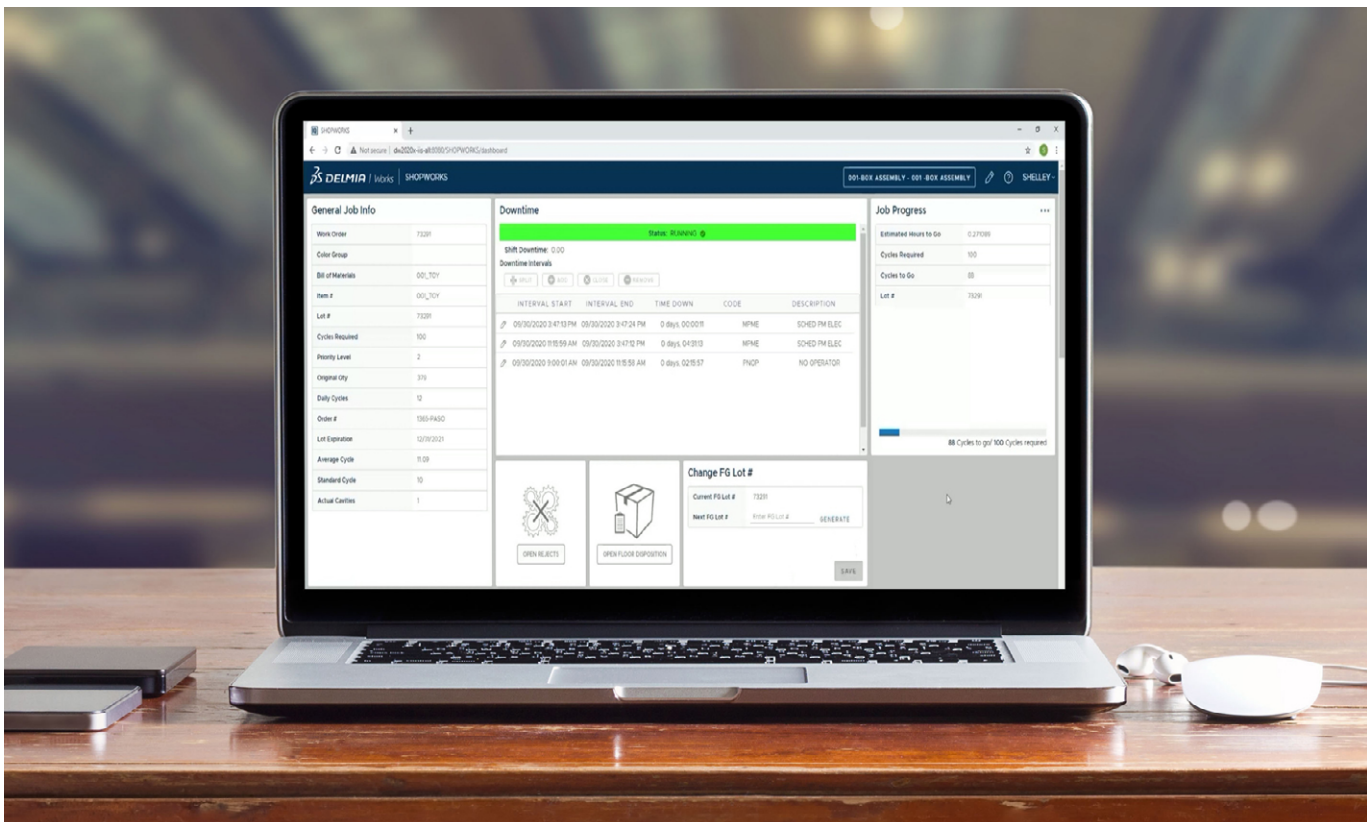


DRIVE DIGITAL WORKFLOWS WITH TOUCHSCREEN INTERFACES

Workers on the shop floor need ready access to information from ERP and manufacturing systems to improve production efficiency. The newer class of intuitive touch-screen shop floor interfaces help to blur the line between workers and these systems by streamlining data access and real-time information collection and availability in order to improve quality and reduce costs. The new intuitive user interfaces also help digitize manufacturing operations and improve production efficiency. For example touchscreen interfaces for MES solutions give workers greater control over and adaptability in dealing with changing forecasts and their impact on build schedules.

The next step is implementing digital workflows that capitalize on the strengths of touchscreen-based shop floor interfaces to guide workers through complex tasks and prevent the most common types of human errors. These are useful in guiding existing employees as they begin new productions. The digital workflows can also drastically reduce the time to bring a new employee or temporary worker up to speed—a critical function for the many manufacturers facing chronic labor shortages.

Solutions such as SHOPWORKS, which provides a touchscreen-based shop floor interface to the DELMIAworks manufacturing ERP system, provide each manufacturing center with the freedom to configure workflows that best meet their unique costing, quality management, and time-to-market requirements while nurturing a more connected workforce. Customizing digital workflows and course-correct based on data from real-time production and process monitoring, combined with insights from related workers on the shop floor, leads to more significant productivity gains than relying on a single metric alone. In SHOPWORKS, this is accomplished using configurable Work Center dashboards. Following is an example of the SHOPWORKS user interface.



SHOPWORKS helps improve production efficiency by streamlining data access with RealTime™ information collection and availability across the shop floor, improving quality, reducing costs, and digitizing manufacturing operations at scale.

ENABLE REMOTE ACCESS

Remote access to ERP, MES and customer relationship management (CRM) solutions has proven invaluable in empowering employees in sales, accounting, and other back-office functions to keep supply chains, production scheduling, shipping, and customer service on track whenever they need to, no matter where they are located.

The realization by many manufacturers that employees continue to be productive working remotely has led some to rethink onsite staffing policies and utilization of their facilities. Moreover, it has become clear that many facilities did not need staff onsite to monitor machines and instead can manage multiple sites from a single control center for greater efficiency.

Additionally, remote access is serving as a useful tool for recruiting and retaining workers. Policies might include letting employees work from home a few days a week to cut down on long commutes or giving workers the flexibility to work remotely for the day to care for a family member, manage a home repair, or take care of other personal business.

Creating a scalable connected worker network starts with baseline technologies, such as remote access to critical enterprise systems protected with multi-factor authentication (MFA)—such as a password plus a verification code sent via text—and advanced security layers in place. Think collaboration and knowledge sharing first across these systems and giving connected workers the ability to share data and insights to solve problems in real time.



MODERNIZE QUOTING AND PRICING

Getting quote and pricing performance right is as much about streamlining the customer's experience with online ordering as it is about getting the quoted order communicated accurately to the shop floor. State-of-the-art sales and product quoting systems, including configure, price, quote (CPQ) platforms, have a much more significant impact on connected worker productivity than many manufacturers realize.

Manufacturers turn to 2D and 3D models created in computer-aided design (CAD) products, such as SOLIDWORKS, to represent the quoted products they're selling. Manufacturers using CPQ-based selling techniques that include SOLIDWORKS for configuration have reported a 30% increase in sales leads at a minimum.



Combining 2D and 3D models with accurate quotes also leads to clearer, more accurate bills of materials (BOMs) and a clear consensus on exactly what a customer wants. These factors come together and provide the data and direction connected workers need to produce products that match customers' requirements.

INVEST IN DIGITAL TRAINING TOOLS

According to the World Economic Forum, digital training tools will reduce training time by as much as 75%, further increasing the expertise and knowledge of production team members across locations. At the same time, the U.S. Bureau of Labor Statistics projects a manufacturing worker shortage of more than 2 million workers by 2025. Therefore, manufacturers need to create digital training programs to teach essential skills to workers or contractors replacing the many employees expected to retire in the next few years.

Manufacturers also need to consider building employees' skills in new areas, such as robotics. To mitigate recurring labor shortages, more companies are investing in robotics for diverse, repetitive shop floor tasks, for example end-of-arm assembly, labeling, pick and place, packaging, stacking, and palletizing. Now, forward-thinking manufacturers are investing in employees who want to become certified on maintaining their robotics, whether through bonuses or reimbursement for courses passed. By building an internal robotics team, these manufacturers can provide career opportunities and significantly save costs down the line.

Whether looking at traditional processes or new ones around robotics, a manufacturer's commitment to upskill and continually provide additional training and certifications for employees directly impacts each worker's success and loyalty to the organization. Cross-training on specific work processes and systems enriches jobs and helps create a more connected workforce that learns quickly and puts knowledge to work.

As one manufacturing vice president noted, "It's most important to connect workers with expertise first. Build the learning ecosystem with people, and the results will follow. Tech is secondary to their trusting each other and becoming more knowledgeable as a team." Those are wise words on how to create, nurture and scale a connected workforce.

CONCLUSION

Building a team of connected workers is about understanding how technology can be selectively used to ensure each team member excels. By enabling connected workers, companies can create an ideal environment in which to excel despite the rapid changes and unpredictability that are the new normal in manufacturing. And by sharing data in real time anywhere employees need it, manufacturers are breaking down barriers between departments and creating a more adaptive workforce that can anticipate and act on rapid changes in the market and across the supply chain.

For more information, please visit www.3ds.com/delmiaworks or call 1.866.367.3772

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