

WHITEPAPER

Training for the Future of Manufacturing

How to meet the challenge of the skills gap



EXECUTIVE SUMMARY

This is an exciting time for manufacturing in the United States. Manufacturing jobs are re-shoring. The economy is expanding—this sector is expected to gain 700,000 jobs by 2025. Technical advances on the production line, such as smart machines and digitally connected processes, have created a need for skilled workers.

On the other hand, the baby boomers are retiring. Students are graduating without the necessary science, technology, engineering and math skills that manufacturers urgently need, and with no desire for a career in manufacturing.

This is the skills gap—a job-and-skills mismatch that will result in 2 million manufacturing jobs going unfilled by 2025, leaving businesses without the workforce they need to grow, compete, and meet consumer demand.

Nearly half of US employers are already reporting difficulty filling jobs, particularly skilled trades and technicians (production, operations and maintenance).

Talent shortages lead to high overtime costs, and higher salaries commanded by in-demand skilled workers. Studies indicate that for every three months a position remains unfilled, a company loses an average of \$14,000. The skills gap is currently costing the average manufacturer 11% of annual earnings.

If manufacturers want to remain competitive, they will have to undertake the training and skill [development](#) of their workers and equip them with the required skills.

[Simulation training](#) is ideal for high-risk or dangerous jobs such as those found in manufacturing because it offers a realistic yet safe environment for hands-on learning. It is interactive, engaging, can be customized to trainees' skill level, and may be repeated whenever necessary.

The Manufacturing Skills Gap

The [skills gap](#), or talent shortage, is the mismatch between the skills required for manufacturing needs and the skills of the workers available to fill those jobs. It is a much-talked-about reality of modern manufacturing that is even now affecting manufacturers' productivity, efficiency, ability to expand, and profits. According to all indicators, it's going to get worse before it gets better.

The Manufacturing Institute, in collaboration with Deloitte, has been publishing a report¹ on the skills gap periodically since 2001. Their latest analysis, performed in 2014, is based on a survey of over 450 US manufacturing executives, their opinions and experiences related to the skills gap, and the challenges it presents to their business. The analysis indicates that by 2025, 2 million skilled jobs may go unfilled because there is no one qualified to do them.

Eighty-four percent of US manufacturers agree there is a talent shortage,¹ and identify the most seriously deficient skill areas as technical and computer skills (70%), problem-solving skills (69%), and basic technical training (67%).¹

These facts have sobering implications for manufacturers that rely on a supply of skilled workers.

What's Behind the Skills Gap?

According to the executives surveyed in the study, several key factors are intensifying the crisis of talent, compared to decades past:

- **The baby boomers are retiring.** Baby boomers, the demographic cohort born between 1946 and 1964, have been steadily hitting retirement age since 2011. They're leaving the workforce and taking their wealth of experience and embedded knowledge with them.
- **The manufacturing sector is growing.** The current strength of the economy and the reshoring of manufacturing jobs have contributed to a manufacturing renaissance in the US. Deloitte estimates there will be an additional 700,000 jobs created by 2025 due to natural economic growth.¹
- **There are more skilled positions.** High-tech *smart* machines with sophisticated electrical components and digital connectivity are maximizing efficiencies and accelerating production, but also require more advanced skills to operate and repair.
- **Youth have a negative perception of manufacturing.** A recent poll² found that 52% of teenagers did not wish to pursue a career in manufacturing, while 61% saw it as a dirty or dangerous environment that did not require thinking and offered little opportunity for personal growth.
- **There is a lack of STEM talent from educational institutions.** At the same time the number of jobs and skill level expectations are increasing, schools are graduating fewer students interested in STEM (science, technology, engineering and math) careers. Apprenticeship programs in the US declined by 40% between 2003 and 2013.³

The Talent Shortage: What it's costing manufacturers

The costs of the [skills gap](#) are fairly intuitive—businesses that can't get the employees they need face lower levels of efficiency, loss of innovation and creative talent, obstacles to growth, and the challenge of keeping production levels high enough to satisfy growing consumer demand.

The increase in the number of skilled manufacturing jobs, set against the retirees exiting the workforce and the lack of interest and relevant education of those newly entering the workforce, predicts that the skills gap will only widen over the next decade.

The financial cost, however, may be surprising: estimates put it as high as 11% of annual earnings for the average manufacturer.⁴ A 2014 CareerBuilder study found that for every three months that an unfilled position remains open, a company loses an average of \$14,000 (and as much as \$25,000.)⁵ Considering that the average time to fill an open position for a skilled production worker is 70 days,¹ the losses add up quickly.

It is a reality that manufacturers are already experiencing. The Manpower Group 2016/2017 Talent Shortage survey found that 46% of employers were having difficulty filling jobs, and, for the seventh year in a row, skilled trades were the hardest jobs to fill. Technicians (production, operations and maintenance technicians) also made the top ten list.⁶

Manufacturers face high overtime costs when there is a talent shortage. The skilled staff who are available must work longer hours, commanding overtime wages. Currently, workers in manufacturing clock an average of 17% more hours than those in other private industries.¹

Companies must also offer higher salaries, or face steep turnover rates as staff leave to follow the money. Four out of five US manufacturers said they were willing to pay more than market rates to attract and keep skilled employees;¹ creating ideal conditions for bidding wars and skyrocketing labor costs. In fact, this is already beginning: manufacturing workers in the US earned 20% more in 2016 than workers in other industries.⁷

What to do? Hiring Experts Versus Creating Them

Manufacturers who want to expand capacity, maintain or improve efficiency, and keep customers happy have two choices: (1) overcome the obstacles to hiring to meet staffing requirements, or (2) equip staff with the skills they need through training.

Difficulties of hiring

The obstacles to hiring ready-made skilled workers may not be easily overcome. The top three reasons why US employers say filling positions is difficult are (1) lack of

available applicants (23%); (2) lack of hard skills (16%); and (3) lack of experience (18%).⁶

The Manufacturing Institute survey found that even if manufacturers were able to hire production workers, they often did not last through the probation period. Forty-seven percent of respondents said this was the major difficulty, followed by 35% who said that the main problem was finding candidates to enter the screening process in the first place.¹

It may be easier, faster, and more cost-effective for companies to train employees themselves to give them the necessary competencies. In fact, 94% of manufacturing executives agree that the best way to develop a skilled production workforce is through internal employee development and training programs.¹

Benefits of training

The difficulty of hiring staff with the necessary skills has caused many employers to take matters into their own hands; 48% of US employers are already training existing employees to fill open positions.⁶

Besides filling empty positions, training offers a number of other benefits. *Upskilling* endows employees with a sense of personal pride, boosts confidence, and improves morale because they have the opportunity for career and personal growth. Improved job satisfaction lowers turnover rates and helps retain experienced employees. And of course, happier employees mean happier customers.

Approaches to Training

Once a business has made the decision to upskill existing employees, it must decide on the delivery method. Common options include classroom training, virtual classroom training, microlearning (learning in short bursts when the worker desires it), and simulation training.

For highly complex tasks or dangerous jobs where errors can be deadly, simulation training provides a safe and effective way for staff to train *hands-on*.

Simulation Training

[Simulation training](#) has long been used by pilots, and is now commonly used by surgeons, nurses, firefighters, the military, and electrical maintenance workers (e.g., [Simutech Multimedia's Training System](#)TM for repairing electrical faults in high-voltage equipment).

Among the many advantages of simulation training are:⁸

- It allows trainees to engage in high-risk activities—activities that in the real world could result in harm to themselves or others or cause costly accidents—in a safe environment.
- Users receive immediate feedback, which is beneficial to learning.
- It is interactive and allows for active trainee participation, which is far more engaging than passive listening to lectures.
- It offers a realistic, hands-on environment, but learners don't have to wait for a particular situation to arise (as they would in real life) in order to practice.
- It can be set up at appropriate times and locations, and repeated as often as necessary.
- It can be customized to trainees' skill levels and areas of weakness.

Disadvantages of simulation training include the expense of a physical simulator, and the length of time it can take to develop a good simulation model. These disadvantages do not apply to simulation software, which can be easily deployed on standard computers, and already has the simulation model in place.

The Future of Manufacturing

The youngest of the baby boomers are now 54 years old, heading for retirement within the next decade, and taking with them their experience and embedded knowledge. This exodus is happening at a time when manufacturing jobs are coming back to the United States, via economic expansion and reshoring.

Technology will continue to advance at a rapid pace. It has already intersected with the manufacturing industry to create production line equipment and processes requiring advanced skill sets in workers, but the current lack of interest in a manufacturing career among the young and the decline in related educational program, will see the skills gap continue to grow. The Manufacturer's Institute predicts a production worker shortage of 63% by 2020, up from 54% in 2011.¹ It is reasonable to assume the trend will continue beyond that.

The manufacturing sector as a whole must collaborate on solutions to the talent shortage by making manufacturing careers more appealing to youth, and by working with educators on curricula and apprenticeship programs that will to ensure students are graduating with critical skills. This will take time.

In the meantime, manufacturers that want to remain competitive must adapt and invest resources in internal training and development programs to create the workforce they need right now.

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