

## Report Two: The Rise of the “Tech” in Manufacturing

By Tom Davenport



**T**his report explores the critical role of the “tech,” or manufacturing technical worker, in the contemporary manufacturing industry. There are not enough techs available to fill the current need, and the requirements for these roles will only increase

There have historically been two distinct groups in manufacturing environments, often contrasted as “white collar vs. blue collar,” “management vs. labor,” or “exempt vs. nonexempt.” One of these groups, the “white-collar” category, consisted of managers and engineers, typically with four-year university degrees. This group designed and ran the manufacturing plants. The blue-collar group consisted of factory floor workers who operated the machinery and performed any necessary physical work. Most were designated as unskilled labor and had high school degrees, although the blue-collar ranks also sometimes included members of skilled trades such as electricians or plumbers.

Today, however, a third group has emerged in the contemporary manufacturing environment, and is poised to eclipse at least one of the two traditional groups in importance. It is also a category that has grown, even in a manufacturing context, that has seen shrinking numbers of workers. Creating, finding, and retaining workers in this third category are already becoming critical factors in the success of advanced manufacturing.

Often called technicians or “techs,” it is the job of this category of workers to program, operate, troubleshoot, and maintain the increasing number of computer- and network-driven manufacturing devices in the contemporary factory. These devices include CNC (computer numerical control)-driven routers, stampers, and drill presses, robots, additive manufacturing devices such as 3D printers, and devices in manufacturing cells that communicate through local area networks. These devices have proliferated in manufacturing, not coincidentally at the same time that many traditional blue-collar factory jobs have been outsourced or automated out of existence.<sup>1</sup> Therefore, jobs for techs are rising as overall manufacturing job levels fall.

### The Growing Importance of Techs in Manufacturing

A number of manufacturing company executives described the importance of techs to their companies’ manufacturing strategies. For example, David Kohler, President of the plumbing fixture company Kohler, noted:

*Techs are a big issue for us. We and many other companies in the U.S. are expanding manufacturing labor in two forms. One is entry level, lower-skill classifications, which are typically a contingent workforce, but sometimes perma-*

## Report Two: The Rise of the “Tech” in Manufacturing

*ment. The other area involves workers with higher skills – techs doing machine setup and CNC programming, and skilled tradespeople. Those jobs are the ones we definitely want to be market-competitive for in manufacturing compensation. More and more of our products have embedded electronics, systems, and connectivity, which also raises the demand for techs with skills in those areas.<sup>2</sup>*

Todd Teske, the CEO of engine and outdoor power equipment manufacturer Briggs & Stratton, described the long-term dynamic leading to greater use of technical workers:

*Over the last ten years especially, our plants have become very different. We always looked at the tradeoff between human and fixed capital. When we had access to a lot of affordable labor, it didn't make sense to put fixed capital in to take out human capital. But as labor cost has gone up and fixed capital down, the environment has shifted. Now we have lots of robots – as many in a single manufacturing cell as we once had in the whole factory. The skill levels required to work in our plants have gone up substantially. We need people who can program the robots and CNC machining centers, operate them, and fix them. The jobs involve much less manual transfer of material, and more technology.*

**73%** of manufacturing managers agreed that “The manufacturing process/ technologies we use in our operations have become much more sophisticated and complex in the past several years.”

– 2012 Manpower Manufacturing Workforce Survey

Marty Thomas, Senior Vice President of Operations and Engineering Services at Rockwell Automation, a manufacturing automation company, notes that both the company's products and their own factories are increasingly electronic and automated:

*The products we create are all modular and based on programmable logic, and the technicians in customer factories must be aware of how to interpret the data they produce. It is like an auto mechanic today, with all the electronics in cars. Our own factories are the same*

*way. Our manufacturing is on fire in the U.S. today, but if you want to do manufacturing in a high-cost area, you have to automate. The technician role is the key. It is not the traditional hourly role, or the salaried role, but something in between.*

Finally, Bruce Los, the Senior Vice President of Human Resources and Information Technology at Gentex, a leading manufacturer of electrochromic mirrors and systems for automobiles and airplanes, commented on the nature of manufacturing automation in his firm and the implications for skills:

*We are very highly automated in manufacturing, primarily making circuit boards. We get more automated every day. We originally got into it for quality reasons, not efficiency. We call it “flexible automation” – it involves small batches, with CNC, and robotics. To operate that kind of manufacturing requires a high level of functioning hourly team members. Our biggest challenge is finding those techs – the people who can program and maintain the manufacturing devices. We use a hybrid model of engineers working with non-degreed techs that we train in very specialized areas, similar to the apprenticeship programs in Germany.*

The comments of these executives in leading manufacturing firms attest to the growing importance of and need for manufacturing technicians. Of course, not all manufacturing companies face a shortage of or need for such people. Ken Goodson, Executive Vice President of Operations at office furniture manufacturer Herman Miller, commented that the company had been working for many years to reduce the skill levels needed in the manufacturing process, and had reduced the need for a high number of skilled technical positions. And Michael Greenwood, Senior Manager of Boeing Commercial Airplanes Manufacturing and Quality Workforce Management and Integration, said that the company had many qualified applicants for any opening, including jobs involving manufacturing technology. Additionally, Paul Grangaard, CEO of Allen Edmonds Shoe Corporation, noted that shoe manufacturing had changed relatively little over recent years, and that finding first-line manufacturing leaders was more of an issue for his company than hiring techs. There are, then, some exceptions to the trend of both requiring more techs and finding them difficult to hire.

### Specific Education and Skill Requirements for Techs

It is apparent from most of our interviews that tech workers in manufacturing need to have skills involving the programming, operation, and troubleshooting of a variety of electronic manufacturing devices, including CNC-based machines, robots, local area networks, and other programmable logic devices. These are typically quite specialized skills, and require a combination of publicly-available education (typically in community colleges or technical schools), vendor-based education, and on-the-job training.

The tech jobs in contemporary manufacturing will also require data interpretation skills. Current manufacturing devices tend to capture and throw off data, which must be interpreted and acted upon to create an effective manufacturing process. In addition, process improvement requires an understanding of statistical process control approaches. Dave Lilak, Director of Human Resources for Manufacturing at General Mills, commented on this set of skills:

*We've never had so much data in our plants. There is a need to turn information into insight on the plant floor. The key to phase progression [the company's approach to process improvement] is using data to really find out what the sweet spot is on the cereal, yogurt, and dough lines – what is the center line. You use the data and analytics to find it so it runs at that same rate day in, day out. To do this our workers had to build their skills to understand and analyze data.*

Pam Kimmet, Senior Vice President of Human Resources for Coca-Cola Enterprises, Western Europe's largest Coca-

Cola bottler, mentioned that logistics expertise is critical to her organization:

*Our business success is heavily driven by the capabilities of our supply chain organization. In order to support our customers, our supply chain team needs to have a deep understanding of the end-to-end logistics of our business, from procurement through distribution. We analyze data to understand how to optimize our production and distribution, and our manufacturing workers play a key role in ensuring processes are optimized and line utilization is as high as possible. The key goal is to ensure our customers have their orders “on time and in full,” and we need everyone to be fully engaged and working as efficiently as possible.*

In addition to these technical and data interpretation skills, techs need the ability to work closely with other factory floor employees and with managers and engineers. Several manufacturing executives commented that factory workers are increasingly members of integrated teams, and increasingly take on tasks that were once reserved for management.

### Programmatic Approaches to Developing or Finding Techs

Many of the manufacturing executives said that they were working closely with community and technical colleges to identify and develop tech workers. Some said that they were experimenting with apprenticeship programs, or with approaches to identifying talented hourly workers with the potential to become techs. Several commented, however, that the environment for identifying and training workers of this type is very fragmented, and that it does not approach the programmatic and well-institutionalized approaches used in some other countries like Germany.

Techs are a relatively new category for many manufacturing companies in North America, and companies have thus far employed localized and tactical approaches to this job category. There are some other good reasons for the use of these localized approaches. As David Kohler put it:

*We do not have a comprehensive structured approach for the higher-skilled jobs, either for internal development or recruiting. We handle them at the facility level, where we typically look at compensation strategies and other*

**81%**

The number of manufacturing managers who agreed that “Our manufacturing technology increasingly generates data that should be analyzed to create optimum performance.”

– 2012 Manpower Manufacturer Workforce Survey

## Report Two: The Rise of the “Tech” in Manufacturing

*approaches to retain and attract them. The localized approach works for us because the tech workers work in a lot of different process areas, and labor markets are very different country by country. But this could possibly be an area where corporate would get involved in the future. We could at least have a toolbox of tactics and a structured approach that you can apply in different situations.*

# 90%

**of manufacturing managers agreed that “We view our manufacturing workforce as full partners in solving problems, improving processes, and satisfying our customers.”**

– 2012 Manpower Manufacturing Workforce Survey

It is possible, however, for firms that are relatively centralized geographically to select a few schools or universities with programs related to specific technician needs, and to cultivate them. Rockwell Automation, for example, has done this with several universities – endowing chairs, developing curricula, and nurturing relationships with faculty. Their approach has largely focused on engineers rather than techs, but there are some examples of close collaboration with technical colleges as well. As Marty Thomas, Senior Vice President of Operations and Engineering Services at Rockwell Automation, put it:

*Talent is either a passion or it is not. I believe that you have to give responsibility for the issue to line management, rather than HR. The line managers are the most likely to be passionate and accountable for talent.*

In addition to focus on identifying and developing external talent, it is also possible for techs to be internally developed. When factory floor workers show some interest and expertise in relevant technical subjects, and demonstrate an appetite for learning, they have a strong potential to become techs. General Mills is one of the companies that has adopted this approach. Dave Lilak explains:

*At some of our manufacturing plants, we have taken people in front-line factory roles and turned them into*

*techs. These locations have a clearly-identified tech track providing an opportunity for our employees to improve their technical mastery.*

### Changing the Image of Techs and Manufacturing

Given the growing importance of techs in manufacturing, what can be done to create more of them? Many of the executives we interviewed believe that there are cultural obstacles to putting more people into these roles. Todd Teske, CEO of Briggs and Stratton, described some of them:

*One reason why the quality and quantity isn't there for tech workers is, I think, that there is a stigma against going to a tech school vs. getting a four-year college degree. We have misdirected our youth. High schools have become prep schools for college, and not industry. There is less industrial arts education. Everything is geared toward four-year bachelors degrees and jobs related to them. People don't seem to know that there are good jobs available that pay good wages off technical degrees and certificate programs. When people with four-year degrees fill a tech job, they believe they are overqualified.*

Bill Symonds, the Director of the Pathways to Prosperity program at the Harvard Graduate School of Education, describes this cultural problem:

*Across the country, people have a negative view of manufacturing. They are aware of the automobile assembly line and steel mill, and think that's what manufacturing today is like. They also think that a lot of the jobs have been wiped out. We've created a negative legacy; people don't know what the opportunities are now, or what you can make in manufacturing jobs.*

Symonds and some other experts in manufacturing talent have suggested, only half in jest, that if there were a popular television program that dramatized tech jobs in manufacturing, then people would flock to them. He commented that:

*The CSI (Crime Scene Investigation) shows on television have glamorized the job of the forensic analysts. I've heard that because of these shows, community colleges say*

## Report Two: The Rise of the “Tech” in Manufacturing

*there is tremendous demand for CSI-related degree and certificate programs, even though there is little actual demand.*

Others have even suggested that a video game might also help in this regard.

Short of the development of such popular cultural products, however, there are other avenues to pursue. One is to embed manufacturing tech options in the career counseling process in schools. Although diminished in many cases in the U.S. by lack of funding, more effective career counseling could expose students to the opportunities offered by tech jobs and the paths to getting them.

Some companies are beginning to reach out to schools – even middle schools – and expose students to these opportunities. Kennametal, a specialty metal goods firm in Pennsylvania, has outreach programs for middle school students to expose them to tech jobs and STEM careers. The company believes that by high school, students are usually too far down other educational and career paths to be able to change their occupational aspirations.

Perhaps the ideal situation would be to develop a glamorous fictional movie about tech careers and show it to middle schoolers. Whatever the specific method used to overcome these cultural barriers, it is important to recognize that they exist. We will not see North American students flocking to these important tech jobs – and getting the preparation they need to perform them successfully – without dealing with current stereotypes about manufacturing and jobs in it.

### About Manpower

Manpower®, a part of ManpowerGroup™, is the global leader in contingent and permanent talent resourcing, workforce programs, and workforce insight and innovation. For more than 60 years, we have helped our clients succeed by leveraging our industry-leading network, providing them with access to a deeper talent pool, unique market knowledge, and actionable workforce programs to help them enhance their efficiency and profitability.

### Summary

This report has explored the critical role of the “tech,” or manufacturing technical worker, in the contemporary manufacturing industry. The rise of computer-based devices and manufacturing automation in plants has led to a need for sophisticated technical workers to program, operate, and maintain these technologies. They also create data that needs to be analyzed and applied on the factory floor – another role for techs. There are not enough techs available to fill the current need, and the requirements for these roles will only increase. Leading companies are beginning to work closely with educational institutions to develop programs that would train techs. There also need to be changes in the image of manufacturing and techs in order to attract more students into the field.

<sup>1</sup> For a discussion of the effect of automation on the labor force, see Erik Brynjolfsson and Andrew McAfee, “Race Against The Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy.” Digital Frontier Press, 2011.

<sup>2</sup> Unless otherwise specified, all quotations are from telephone interviews arranged for the purpose of this study, and completed in mid-to-late 2012.

This report is part of “The Future of the Manufacturing Workforce” research paper.

### About the Author:

Thomas Davenport is a business strategist and best-selling author that researched the manufacturing industry as it relates to workforce challenges on behalf of Manpower.

Learn more about how Manpower can help you with manufacturing workforce solutions at [manpower.us](http://manpower.us).

