



America's Manufacturing Workforce: Make or Buy?

Strategic Choices for Building a Strong Manufacturing Workforce



CSW
Corporation for a
Skilled Workforce

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Preface

Since 1989, the Hollings Manufacturing Extension Partnership (MEP) – a program of the U.S. Department of Commerce's National Institute of Standards and Technology (NIST) – has been working to improve the competitiveness of U.S. manufacturers. MEP's nationwide network of field staff serve as trusted business advisors to their small and mid-size manufacturing clients, assisting them to improve their processes and identify opportunities for growth and innovation. The program has a proven history of helping clients obtain significant and measurable economic impacts, and these results have been recognized at all levels of government. MEP clients achieve higher profits, save time and money, invest in physical and human capital, and create and retain thousands of jobs.

Manufacturing continues to be a critical sector, supporting highly compensated middle class jobs, enhancing US productivity, funding a large portion of R&D, and playing a central role in innovation. Small and mid-size manufacturers (SMMs) in particular play an important role across all manufacturing industries.

While its importance to the economy remains constant, today the manufacturing sector faces extraordinary challenges: recovery from the longest economic downturn since the Great Depression, intense global competition, rapid technological change, skills gaps, and the green/sustainability revolution. More than ever, MEP must consider how it can effectively help clients cope with these challenges.

This report is intended to dispel the notion that an adequate supply of skilled employees is beyond the reach of American manufacturers. In fact, there are several choices that American manufacturers can make to ensure a pipeline of talent for the foreseeable future. However, manufacturers must be strategic in their thinking and rigorous in their execution of these options. With that in mind, America's SMMs can fill their skilled worker gaps before they become insurmountable challenges.

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Executive Summary

This report, prepared by Corporation for A Skilled Workforce for NIST Manufacturing Extension Partnership, provides a new outlook and a set of recommendations to ensure a strong and relevant manufacturing workforce. It explores the conditions, choices and strategies of “growing your own” talent, a.k.a. the “make” course of action, or of recruiting a skilled workforce, the “buy” course of action. This paper makes the case that in fact it is rarely a “make or buy” choice, but an integrated set of make and buy strategies that manufacturers must implement to remain competitive.

As awareness of next generation manufacturing grows, new attention is being paid to the role of a skilled workforce in the industry’s success, as skilled workers are critical to growth and innovation. But tackling workforce challenges – new technologies, new equipment, more complex manufacturing processes, and sophisticated research and development, design, and marketing – requires an ever more sophisticated workforce.

The examples and recommendations in this report are the result of research and interviews with manufacturing subject matter experts, and represent a handful of promising strategies and practices across the country. While the views expressed here are those of the authors, the examples and recommendations should be considered by small and medium-sized manufacturers, as well as MEP Centers, as guideposts for supporting a workforce that fits the needs of today’s diverse advanced manufacturing.



Introduction

A shift is underway in America's manufacturing. In the private sector, manufacturers both large and small are recalculating the costs and benefits of making their parts and products beyond U.S. borders,¹ and reversing course, bringing back jobs and creating new ones. Opportunities for manufacturers in energy and environmental technology, aerospace and defense, electronics and semi-conductors, analytical instruments, medical technologies and other growing sectors are creating what some believe is a U.S. manufacturing renaissance.

The White House's Advanced Manufacturing Partnership (AMP) is a national partnership of industry, universities and federal agencies to identify emerging technologies and opportunities for high quality job growth in the U.S. In 2012, the President proposed building a National Network of Manufacturing Institutes (NNMI) consisting of regional hubs that will accelerate development and adoption of cutting-edge manufacturing technologies. And in 2013, he announced another national network of fifteen Manufacturing Technology Acceleration Centers (MTACs) that will focus on moving technology into the products and processes of small- and medium-sized manufacturers. The MEP will oversee the MTACs. The nation's governors are also in the game including eight states that participated in a National Governors Association Policy Academy² to take a new look at state policies that support advanced manufacturing in their states. Other key indicators of support are the ongoing efforts by MEP, and its network of MEP Centers across the nation.

Manufacturing Matters to the U.S. Economy

There is good reason for all this attention. Today's manufacturing is still a powerhouse in the U.S. economy, and therefore well worth the time and effort it may take to find ways to better support it. It is a mistake to look at the

decline of manufacturing jobs over the past three decades and assume it is a dying sector. Manufacturing matters to today's economic recovery, and the future growth of the U.S. economy. It provided 12 million jobs for Americans in 2013. It accounts for two-thirds of private sector research and development, employing 63 percent of domestic scientists and engineers.³ It accounts for 65 percent of all U.S. trade, including both exports and imports.⁴ It attracts the most foreign direct investment of any nation in the world. It also pays premium wages, 9 percent more in wages and benefits than any other sector. It is well known too that manufacturing has a greater economic multiplier effect than any other sector, with an estimated additional \$1.40 in output from other sectors for every \$1.00 in final sales of manufactured products. As if that were not enough to make the case that manufacturing matters, the sector is the primary component of supply chains and supports other major U.S. economic sectors, including healthcare, business services, defense, energy, construction and energy. U.S. manufacturing jobs continue to grow even as other jobs in other sectors are declining.

Today's Manufacturing Requires a Full Ecosystem of Supports

It's not just high-tech equipment that makes today's manufacturing different. Manufacturing is being defined by the coming together of multiple trends and opportunities that specifically position the United States for a manufacturing renaissance. Today's small and mid-sized manufacturing is high-tech and highly efficient. These jobs require skills, knowledge, and abilities across a broad range of core areas, including production, but also in R&D, design, and marketing. Many manufacturing jobs are not in production (less than half are in actual assembly⁵), but are found in manufacturing design, development and

¹ March 2012 Harvard Business Review, Reinventing America.

² States in the NGA Policy Academy, funded by NIST-MEP and the Economic Development Agency, included: California, Colorado, Connecticut, Illinois, Kansas, Massachusetts, New York, and Pennsylvania.

³ C. Wessner and A. Wolff, eds., Rising to the Challenge: U.S. Innovation Policy for Global Economy, Washington DC, Committee on Comparative National Innovation Policies, 2012.

⁴ S. Helper, T. Kruger, H. Wial, "Why Does Manufacturing Matter? Which Manufacturing Matters? A Policy Framework", Brookings Institution, Washington D.C., February 2012.

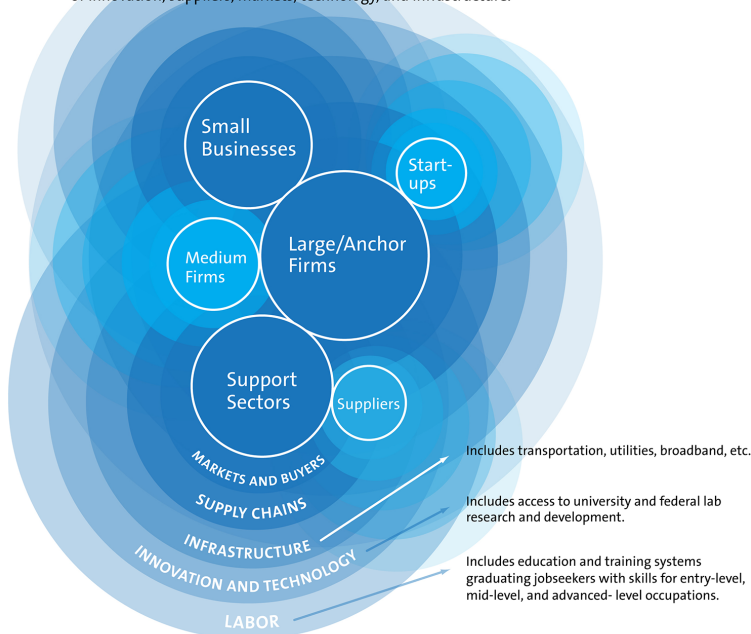
⁵ McKinsey Global Institute, Manufacturing the Future: The Next Era of Global Growth and Innovation, November 2012.

marketing. This is in large part due to manufacturing's significant complexity and is driven by rapidly advancing technologies in nanotechnology, synthetic biology, robotics, and cloud-based computing. An additional dramatic shift is the emphasis on quick prototypes, smaller runs and custom-designed products, which call for agile and adaptable workplaces, business models, and employees, including both budding and experienced technology entrepreneurs.⁶

These trends are important because they are strong indicators of an increasingly intertwined system of innovation and technology, R&D, value chains, infrastructure, markets and buyers, and skilled labor. Increasingly, firms, policy makers and state governments see themselves as part of a complex and well-developed ecosystem of innovation,⁷ supporting the increasingly intertwined features of 21st century manufacturing. It is the same set of principles that create industry clusters. But manufacturing clusters are now different in at least one way: firms not only share common markets and labor pools and benefit from synergies of association; they rely on, and proactively leverage, that connectivity for their own growth and competitiveness. (See figure below)⁸

Industry Cluster

An industry cluster consists of large and small firms in a single industry. Firms in industry clusters benefit from synergies of association related to shared labor, sources of innovation, suppliers, markets, technology, and infrastructure.



Renewing the Focus on Workforce Development

A promising and critical trend is a renewed focus on the importance of a skilled manufacturing workforce to the innovation ecosystem. In fact, across the country, signs that workforce development is a core part of economic development are emerging, not just in rhetoric, but in practice. Companies in every sector know that maintaining their competitive edge means recruiting, supporting and retaining a competitive workforce. This could not be truer for SMMs. Knowing the importance of a skilled workforce versus being able to proactively recruit and sustain it, however, are two different problems. When it comes to finding and keeping skilled workers, SMMs run up against a recurring set of challenges that larger manufacturers do not:

- Rapidly changing equipment and technologies make it difficult and costly for firms, workers, educators, and training providers to stay current;
- It is difficult to find middle-skill workers with significant engineering and technical skills, plus the needed years of experience, that SMMs need;
- Education and training programs are often misaligned with the actual needs of industry; and
- The public perception of manufacturing is still what manufacturing was (dirty factories), not what it is (clean, high tech, high wage).

Faced with these challenges, the role of MEP Centers and their workforce and education partners is more important than ever. Successful interventions engage directly with manufacturers to assess the skills needs of their critical occupations, and develop training and education programs in real time. Other interventions may not require re-training, but instead may focus on human resource policies and practices, and targeted recruitment of niche talent. MEP Centers can directly support manufacturers in making the workforce intervention choices that best fit their clients' needs.

⁶ E. Sparks and Waits, M. "Making our Future: What States are doing to encourage growth in manufacturing through innovation, entrepreneurship, and Investment", National Governors Association, January 2013.

⁷ Ibid.

⁸ Figure 1: Woolsey, L. and Groves, G. "State Sector Strategies Coming of Age: Implications for State Workforce Policymakers," National Governors Association, February 2013.



Choices and Strategies for Building a Manufacturing Workforce: Make or Buy?

Ultimately, the “make or buy” question is about the pressures for industry of immediate, short-term and long-term workforce needs. It is inevitable therefore that an individual firm will need to employ both “make” and “buy” strategies to fill their needs depending on a variety of factors. These factors might include:

- The type of company (a technology gazelle versus a mid-sized assembler, for example);
- The urgency of the need (today, six months from now, or ongoing);
- The immediate availability of an accurately skilled worker (are they needed now);

- The size and scope of the need (one niche talent worker, or several skilled machinists); or
- Whether the position will be temporary or permanent, part-time or full-time.

Additionally, the strategies employed can be cut two ways: first, those that can be directly implemented by individual firms; and second, those that employ a public-private partnership. The matrix below offers a snapshot of current “make” and “buy” strategies across both of these approaches.

	MAKE	BUY
Individual Firm Approaches	<ul style="list-style-type: none"> • Incumbent worker training • Employer-based work readiness and basic skills training • Internship programs 	<ul style="list-style-type: none"> • Succession planning and internal workforce development • Nationwide talent searches • Targeted advertising
Public-Private Partnership Approaches	<ul style="list-style-type: none"> • Sector/Cluster Partnerships • EP Centers partner with Workforce Boards/One-stops for Layoff aversion • Internship programs • Apprenticeship programs • Employers partner with community-based staffing organizations • College-industry partnerships for specific jobseeker training programs • Public-private partnerships that create basic and work readiness training, and/or assess and credential work readiness • Public-private partnerships to develop bridge and career pathway programs 	<ul style="list-style-type: none"> • Creation of manufacturing-focused career centers • K-12 STEM initiatives • Industry awareness campaigns • Regional/State marketing and branding • “Ambassador” or welcome to the community campaigns • “Come Home” campaigns

When, Why and How to Make a Skilled Manufacturing Workforce

It is fair to assume that the gold standard of building a manufacturing workforce in the United States would mainly rely on growing your own talent pool. In other words, local or regional economies would start early by exposing youth and young adults to the opportunities in manufacturing, and then would guide them toward career pathways in education and training leading to a good manufacturing job. This targeted activity for young people is already happening, but should happen more. But to assume that this alone will solve the skilled worker shortfalls present today is short-sighted.

“Making” the skilled workforce that manufacturers need means targeting more than young people. Consider that today in the U.S., the majority of the current workforce (working age adults) is the same workforce of 2020. This means that manufacturers will have to wait at least seven years for the nation’s young people to graduate from high school, let alone earn a post-secondary credential or degree and gain some work experience that will qualify them for employment. Simply put, manufacturers cannot wait that long. Working adults, of all age ranges, therefore must be a significant part of a “make” portfolio. “Making” a skilled workforce today means targeting adults that have been dislocated from trade-affected sectors; adults that are interested in a change in career; adults that are stuck in low-wage, low-skilled jobs; and adults that are just simply unaware of the good jobs in manufacturing.

Individual Firm Approaches

A strategy that should be familiar to most companies is incumbent worker training. Large companies have conducted their own training for decades and will continue to do so, but gone are the days when any manufacturer was heard saying “Just give me someone I can train.” Today,

all manufacturers want the right skills, and they want experience, and few are willing or able to provide their own training to make sure their employees are up to par. This can be especially challenging for SMMs as cost reductions and new automation accelerate churn. The most common types of incumbent worker training for manufacturers, which MEP Centers help deliver, are lean and quality processes, Six Sigma, job safety, and machine-based upskilling. These can be critically important to operations efficiency, as well as worker satisfaction, which often improves once a sense of teamwork, clear roles and responsibilities, and new knowledge is shared and established. Some companies provide training on new equipment, training for industry certifications, supervisor training, or other specific on-the-job up-skilling.

Many companies participate in internship programs, a critical strategy to ensure individuals get the relevant work experience that firms need. Internship programs allow both employers and jobseekers the opportunity to test out whether the job and jobseeker are a good match. For both, it begins to solve the problem of lack of on-the-job experience. Other companies proactively develop talent among their existing employees and plan for succession, knowing that pending Baby Boomer retirements will arrive soon. This requires training, finding ways to advance workers to better positions, and removing human resource barriers to advancement and recruiting. Companies are increasingly recognizing that it is not enough to simply recruit employees. Long-term retention depends on how those employees are deployed and developed after they have been hired. Talent development literature offers many different examples of how companies can integrate it into their overall company strategy, and why it is important to do so.

Some companies choose to take an active approach to pipeline development by working directly with community colleges or other education and training providers to create and offer training courses to meet their specific worker needs.

Getting Off to the Right Start

In Michigan, Dow Chemical and two of its main suppliers (Dow Corning and Hemlock Semi-Conductor) worked with the local community college to develop a Fast START program for chemical process technology. This 16-week course is based on training that Dow originally offered on their own in 2007, but that is now being offered through the college. Stringent entrance requirements ensure that graduates are work-ready. While there is no requirement that Dow hire graduates, the program is only offered when Dow is anticipating hiring additional staff, avoiding training workers when there are no jobs actually available. This program has helped ensure a reliable pipeline of qualified workers, without flooding the market when hiring is down. The program has been so successful that other area employers have partnered with the college to develop Fast START programs geared to their business and industries.

Other firms choose to invest in basic skills development of their potential or incumbent workforce, in an effort to build the capacity for internal promotion. Such programs often begin through corporate social responsibility or diversity programs, but companies that engage in this model have seen good return on investment for their efforts and have transitioned the programs into the company's mainstream business model. Pioneer Industries, a small supplier of

component parts to the Aerospace industry in Washington State offers onsite GED classes to their workers. They set up a computer lab, offered workers one hour a day of paid study time, and partnered with South Seattle Community College for a GED tutor. Both workers and supervisors agree that the GED math and writing modules directly improved work quality on the floor. Workers say they never would have otherwise pursued their GED.⁹

At the Fort Morgan, Colorado facility of Cargill Meat Solutions, plant managers saw the need to develop both the English language and basic skills of their 85% Hispanic workforce. They began offering on-site English as a Second Language (ESL) classes in 1993, in partnership with their local community college. Since then they have expanded the offerings to include GED completion and college preparation programs. The program has been tremendously successful in terms of preparing workers to take on more advanced positions within the company. In California, Pacific Gas and Electric (PG&E) has created a network of educational programs to help produce the skilled workers needed by PG&E and the energy industry in California. This includes the Bridge to Utility Worker Program, which targets potential job seekers and focuses on the basic skills needed to enter the industry, as well as incumbent working training offered through two- and four-year postsecondary institutions.

⁹ Interview by author, Lindsey Woolsey, with Pioneer Industries supervisors and employees, April, 2013.

Public-Private Partnership Approaches

Over 1,000 regional sector partnerships are operating across the country, and more than 25 states are exploring options to promote the model as the way to connect public programs to industry needs. These partnerships are called different names in different places: Skill Panels in Washington State; Clusters of Opportunity in California; Sector Partnerships in Colorado and Arizona; Industry Partnerships in Pennsylvania; Skills Alliances in Illinois. Massachusetts has used and funded the approach for nearly three decades. Regardless of what they are called, at the regional labor market level, they are partnerships of employers within one industry (commonly manufacturing) that bring together education, training, economic development, labor and community organizations to focus on the growth needs of the target industry. Traditionally

sector partnerships have focused just on workforce issues, and sometimes only on low-skilled worker advancement. Today's sector partnerships are quite different. These partnerships focus on critical competitiveness issues, one of which is usually the need for skilled workers.

A growing body of evidence supports the model as one of the most effective ways to assess and address the workforce needs of like companies in a shared labor market region. In Pennsylvania, 84 percent of employers participating in industry partnerships reported increases in productivity. In a Massachusetts study, 41 percent reported a reduction in turnover; 19 percent reported reductions in re-work on the job; and 23 percent reported a reduction in customer complaints.¹⁰

Hampden County Precision Manufacturing Regional Alliance Project (PMRAP)¹¹

The high technology precision machining companies in the Pioneer Valley Region of Massachusetts, led by the Western Massachusetts Chapter of the National Tooling and Machining Association (WMNTMA), are contract manufacturers primarily engaged in supplying precision mechanical components and sub-assemblies to the aerospace, defense, medical device, and power generation markets, both in the United States and internationally. The companies perform value-added precision manufacturing processes and operations utilizing high technology equipment, lean manufacturing, and world class technology development. The availability of an agile, appropriately sized, and well trained workforce is the differentiator that gives the regional precision manufacturing industry the competitive advantage. Currently, however, the companies are experiencing a critical shortage of qualified CNC machinists, machinists, quality control inspectors and CNC operators. The companies are collaborating in a sector partnership to implement the following goals:

1. Build a well-educated, technologically skilled and highly adaptable workforce.
2. Strengthen cluster development and increase business competitiveness.
3. Promote industry awareness of the region as an innovative precision manufacturing hot spot.
4. Transform industry capability to improve manufacturing processes.

PMRAP identified a need for over 1,600 new workers, and by collaborating with the Hampden County Regional Employment board, the region's seven vocational schools, Springfield Technical and Holyoke Community Colleges, UMass Amherst and other education and training partners, they were awarded a \$750,000 state grant to conduct the training.

¹⁰ Woolsey, L. and Groves, G. "State Sector Strategies Coming of Age: Implications for State Workforce Policymakers," National Governors Association, February 2013.

¹¹ Precision Manufacturing Regional Alliance Project/2.0 (PMRAP 2.0) Workforce Development Report, Findings and Recommendations, Regional Employment Board of Hampden County, Inc., April 2012.

Another powerful approach to “making” a skilled workforce is public-private sponsorship of incumbent worker training. This can often be for layoff aversion purposes. Workforce Investment Boards (WIBs) and their one-stop career

centers often use their funding for customized training of a company’s existing workforce in order to avoid possible layoffs due to competitiveness issues.

Southern California MEP Partners with WIBs for Layoff Aversion

When the Southern California MEP (California Manufacturing Technology Consulting – CMTc) heard that small and mid-sized manufacturers were struggling to keep their doors open, they provided holistic assessments of those businesses and recommended solutions, including workforce training. By partnering with local workforce investment boards (LWIBs) and their one-stop career training offices, CMTc established, over time, a pro-active way to identify manufacturers at risk for layoffs, and the best ways to work with them to create the right customized intervention (whether training or something else). CMTc provides the expertise, and the LWIBs provide layoff aversion funding. CMTc has engaged with 16 LWIBs, have partnered with 10, and have ongoing Layoff Aversion programs with 5. CMTc continues to work closely with the WIBs to establish shared criteria for business assistance, shared goals and individual commitments. The effort has been highlighted as a best practice by the U.S. Department of Labor.

Accurate Dial & Nameplate, Inc. in Glendale, CA required workers to have a new certification, due to a change in policy by clients to secure business contracts. CMTc partnered with the Verdugo Workforce Investment Board to provide a customized training program that certified workers. Certification led to renewal of existing contracts with clients, new contracts, 20 retained jobs, and 3 new jobs. Stolo Cabinets in Brea, CA wanted to develop new product lines, but could not invest in growth initiatives due to rising costs and inefficiencies with current production. CMTc partnered with the Orange County WIB to provide lean simulation training to employees. Stolo Cabinets realized \$800,000 in new sales; retained 12 jobs; and created 5 new ones. They also were able to invest \$20,000 in new products and \$20,000 in plant and equipment upgrades.

Apprenticeship programs prepare individuals for a specific occupation or set of related occupations by combining classroom instruction and credentials with on-the-job training at a place of employment. For thousands of jobseekers, apprenticeship programs can be the most

promising avenue for obtaining a credential and the needed experience to secure a good manufacturing job. Apprenticeships require employer sponsors, and are most often a public-private partnership among employers, education institutions, and labor unions.

Renewed Interest in Apprenticeship Programs

Partners for a Competitive Workforce, a workforce intermediary operated by the United Way, serves companies in the Ohio, Kentucky, Indiana tri-state region. Increasingly employers are coming to the organization for help in establishing apprenticeship programs. Many of the companies previously had such programs but had let them lapse when the loose labor market allowed them to easily recruit workers. But increasingly they are finding that they can no longer recruit the skills they need, and are turning back to apprenticeship as the answer. The employers who are adopting this strategy recognize that it requires top level management commitment for a sustained period of time. Apprenticeship programs require internal resources such as staff to develop, administer and track programs. Partners for a Competitive Workforce is able to provide funding and support to companies interested in setting up such programs, and also works to connect companies who are willing to share their programs and structures with one another.

Washington's Aerospace Joint Apprenticeship Committee – A Statewide Partnership¹²

In Washington State, there is a shortage of skilled workers in the aerospace industry and, as more workers retire, the trend is growing. "A skilled aerospace workforce is not something the industry can buy, but something that it can and must create."¹³ To address this, Washington State developed on-the-job training programs for workers in the aerospace industry as apprenticeship programs.

The Aerospace Joint Apprenticeship Committee (AJAC) manages and facilitates the development and growth of registered aerospace and advanced manufacturing apprenticeship programs. AJAC designs, develops, and implements these apprenticeship programs for multiple aerospace and manufacturing occupations. The AJAC committee comprises employers, employees, and the International Association of Machinists and Aerospace Workers (IAM) and has equal representation from the different segments of the aerospace industry. Programs operate in Seattle, Tacoma, Everett and Spokane. Ninety-three percent of the education takes place as paid on-the-job training. Apprentices also attend classroom instruction to learn basic theories.

As noted earlier, some individual firms are pro-active about approaching and working with a community college or other education and training partner to develop a training program that specifically addresses their needs. This can develop into either a customized training program just for their company (often short-term), or can evolve into a regularly offered college program. In other instances, several firms will come together, either on their own or in response to the efforts of an external convener, in order to develop industry-specific training programs. For example, the South

Carolina MEP Center is partnering with the South Carolina Regional Development Alliance to set up a welder training program to address welding industry needs across six counties. The MEP is responsible for arranging the training program and has engaged a top international firm to deliver the material and organize the training delivery. In Louisiana, the Louisiana Community and Technical College System responded to requests from the petrochemical sector and developed a training strategy for new process technicians (PTEC). The PTEC curriculum has been standardized and is

¹² About the Aerospace and Joint Apprenticeship Committee, www.ajactraining.org/about-AJAC.asp.

¹³ AJAC, Aerospace Joint Apprenticeship Committee, Washington State Aerospace Training Initiative brochure.

delivered at six different community and technical colleges. Petrochemical companies partner with the campus to support PTEC projects, offer feedback on courses and provide internships to students. PTEC graduates earn an associate of applied science degree, which prepares them for careers as operators in the petrochemical, refining, power generation, pharmaceutical, and pulp and paper industries.

Companies, like Pioneer Industries and Cargill Meat Solutions, can establish basic skills programs for their workers, while other companies can benefit from bridge programs established by colleges or workforce organizations to provide job seekers with basic skills. They are typically operated by community colleges, sometimes in conjunction with community-based organizations. They rely on connections with employers so they can provide targeted technical training, as well as basic skills preparation such as reading and math. At Daley College in Chicago, students in their manufacturing bridge program earn industry-recognized certifications, such as CNC, while attending a free eight-week course focused on reading and math remediation and work-ready skills. None of these programs can succeed without active engagement by manufacturers providing input, guidance and concrete advice.

To aid manufacturing companies in meeting their needs, several localities have created industry specific career centers within their state workforce system. Chicago's Manufacturing Works offers a wide array of products and services for regional employers, such as hands-on skill testing/assessment, recruitment project management, production shop floor consulting, and customized incumbent worker training and career pathway development. A similar center will be opening up this year

in Kentucky. This type of center not only provides employers with workers that are prepared for their specific industry, it also helps build awareness among jobseekers about local job opportunities in manufacturing.

Although today's manufacturing operations are highly technical and clean, the manufacturing industry faces an image crisis. Many do not believe that manufacturing is a promising place for a career after hearing about stories of outsourcing and off-shoring. At the same time, manufacturers report ongoing challenges recruiting highly skilled technical talent. So when it comes to attracting young people to manufacturing careers, manufacturers must address this image head on through industry awareness campaigns and activities. This can include such things as developing brand ambassadors, getting involved in curriculum development, conducting plant tours and awareness programs for high school students, and developing a web presence that is attractive and compelling for younger workers. While individual firms can and do engage in industry awareness campaigns, such activities are more frequently coordinated regionally. "Amp it Up" is an effort by Massachusetts to build awareness of careers in manufacturing across its regions. The state has provided grants to recruit manufacturers, provide local outreach, develop career information, and create YouTube videos targeted at young people. The Dream it, Do it network provides a resource to support industry awareness activities across the country (<http://www.themanufacturinginstitute.org/Image/Dream-It-Do-It/Dream-It-Do-It.aspx>), as does "Manufacturing Day, co-sponsored by NIST MEP, FMA, ISM and NAM. (<http://www.nist.gov/mep/mfgday.cfm>).

Dream It, Do It Builds a Pipeline of New Manufacturers through Awareness

Dream it, Do it is a national network of stakeholders that are committed to promoting manufacturing careers as a top tier career choice. The network was launched and is supported by The Manufacturing Institute. Implementation of the Dream it, Do it campaign is customized by industry leaders and workforce development innovators in order to meet specific local, regional and state needs. Dream It, Do it websites associated with state campaigns are frequently targeted at youth and may feature videos, games, and other interactive elements, as well as information on career paths, training and job openings.

When “Buy” Strategies are the Right Approach

Over-reliance on recruiting talent from outside sources is inherently unsustainable over the long run. But it is not always a “wrong” choice. Many manufacturers have very specific, small-scale needs that cannot be met by the current or developing labor pool in their areas. In these cases, they will choose to sub-contract to an outside worker, use a temporary staffing agency or employ a national or foreign recruitment strategy to find the right talent.

In other cases, regional stakeholders (economic developers, workforce developers, MEP Centers, cities and counties) may realize that they can play a powerful role in marketing and branding their region to a certain professional demographic, with the goal of increasing the overall local talent pool into which manufacturers can tap.

Individual Firm Approaches

For most firms, the most straightforward approach to getting their talent needs met involves simply recruiting appropriately skilled candidates for jobs. Yet, this is not always as simple as it seems. Occasionally companies will contract for very specific work of short duration. The “Buy” approach can often include nationwide or global talent searches, website job postings, the use of headhunters or talent search firms. This strategy is often used for management candidates or skilled workers requiring very specific knowledge and skills. For moderately skilled positions, and when many positions need to be filled at once, firms may conduct targeted advertising campaigns in regions known to have high unemployment, such as southern manufacturers targeting laid off workers in Michigan and other Rust Belt states. Competitive incentive programs may be necessary to recruit the best workers. A recent report on the manufacturing skills gap indicated that the gap may be caused as much by manufacturers’ unwillingness or inability to pay competitive wages as

an actual lack of skills in the marketplace.¹⁴ Competitive incentive programs include not only cash benefits but other quality of life components that may be particularly appealing to workers. These programs can be very successful in attracting the best talent to a new location.

Many companies take advantage of the services of temporary staffing agencies. These firms offer recruiting and screening services that are crucial to small and medium-size companies who lack the resources to effectively perform these functions themselves. Traditionally companies may have used staffing firms primarily to staff up for short bursts of increased business. Now, an increasing number of companies are adopting temp-to-perm models where potential permanent hires are first brought on temporarily through a staffing agency, then hired permanently if a good fit. Another bridge between “make” and “buy” strategies is the use of alternative staffing organizations (ASO). These temporary staffing firms are operated by community based organizations and usually have a mission to serve a particular population, such as low-income or lower skilled workers. These firms often provide job readiness and basic skills training to potential employees before placement. While many companies turn to these firms from a corporate social responsibility perspective or out of a need to meet diversity requirements, they find that ASOs perform competitively with conventional staffing agencies. They are often better suited for supplying entry level or low-skilled positions. And because of their mission-driven focus, the staffing organization is highly motivated to ensure that each individual worker succeeds, as opposed to the high-volume, low-margin strategy of some conventional agencies.

¹⁴ “Made in America, Again: Understanding the U.S. Manufacturing Skills Gap and How to Close It,” Boston Consulting Group, October 2012.

Public-Private Partnership Approaches

In many regions with a long history of manufacturing, the local labor market provided more than adequate numbers to fill jobs in the industry, and employers had their pick of eager applicants. However, as the economy, labor market, and skill requirements of manufacturing have changed, access to a qualified labor force has become one of the most critical issues for companies and economic developers. When jobs go unfilled, it creates real impact on business

retention and competitiveness, so filling these openings is sound economic development. Consequently, some economic development organizations have begun looking for opportunities to help regional employers improve talent recruitment and attraction efforts through regional/state marketing and branding, “welcome to the community” campaigns, and “Come Home” campaigns targeted at former residents or alumni of regional colleges and universities.

Yakima County Development Association launches a Talent Attraction Campaign

Yakima Valley, WA employers were facing a difficult time filling skilled or technical positions. There are few higher education or technical training institutions in the area, and they felt that it would not be possible to wholly meet their talent needs through these institutions. In response, the Yakima County Development Association (YCDA) launched a talent attraction campaign. YCDA created two websites to highlight the “live and work” opportunities in Yakima Valley. The initiative also trained over 60 local leaders to act as ambassadors, hosting key job applicants and new employees, and helping them transition into the community. YCDA hosts welcome receptions several times a year for new employees.

This “buy” strategy is complemented by a “make” strategy for the region’s manufacturing workers focusing primarily on Lean training for existing workers of local companies.

While some states still have high unemployment rates and unemployed workers, other states are now finding themselves in a tight labor market. Just as individual companies may target their recruitment efforts to regions known to have a high number of skilled manufacturing workers, states can also act broadly on behalf of all businesses in the state.

North Dakota Needs Workers!

North Dakota made it through the recession in better shape than many other states and with unemployment at 4.4%, it was facing broad talent shortages in 2012. In response to business leaders expressing concerns about a lack of qualified workers, the state decided to take matters into its own hands. They hired a recruiting firm, Manpower Group, to recruit 1000 workers to North Dakota, including 700 in manufacturing. The state is paying up to half of the recruitment fee for placed workers, with the other half being paid by the hiring company. The recruiter uses LinkedIn profiles and its own national database to target candidates across the country, touting such quality of life factors as recreation opportunities, low cost of living, non-existent state income tax, high graduation rates and low crime.



Recommendations

The encouraging signs of manufacturing's renaissance will not be enough to ensure American manufacturing growth. Automation and distributed manufacturing models require entry-level and advanced workers to have a strong foundation in STEM-related skills and knowledge. Increasing demands for highly skilled designers, managers and marketing specialists (more than half of all manufacturing jobs) will continue to pressure workers, education and training institutions, and companies to act.

The following recommendations provide guideposts for manufacturers and MEP Centers.

For Manufacturers

1. Be Strategic. How does your workforce support your business goals? How do you quantify that value? How do you ensure alignment between critical skills and critical business processes? How do you adjust your workforce investments if they need to change? Before making any decisions about your business, you must assess how well your workforce's skills match up with the type of manufacturing your business conducts. Are you managing your workforce system processes the same way you manage your other business processes? You should.
2. Get in the training game. Today's manufacturers must commit to training their workers in the skills and competencies they need to be successful on the job. SMMs must also commit to working closely with education and training partners to change old curricula and credentials to match current business realities.
3. Host internships. SMMs see a lack of skills as only one problem with today's workforce. They also see a lack of experience, specifically a dearth of workers with two to five years of needed experience. In the next five years, some manufacturers may lose sixty percent or more of their workforce to retirement. This will leave an even larger gap in experienced workers. In the meantime, thousands of jobseekers are struggling to balance education and training and getting a foot in the door to a manufacturing career. SMMs can change this by sponsoring and pairing interns with experienced staff on-the-job. Internships, paid or unpaid, short-term or long-term, can be filled through advertising, or in partnership with colleges and training programs.
4. Sponsor apprenticeships. Increasingly, the apprenticeship model is regaining its appeal, but there aren't enough employers willing to provide them. Taking on apprentices entails filling an open position, paying part of their wages, and pairing them with experienced mentors. The pay off can be great for employers, and, in the long run, it turns out to be an economical option for filling shortages, testing out candidates for hire, and ensuring exactly the right hands-on training. The risk of not providing apprenticeships leaves potentially good trainees lingering in the pipeline, never getting the chance to get real work experience, and therefore never expanding the skilled workforce base. Not all apprenticeships are union-based, and they can be replicated for any industry, anywhere.
5. Work with other companies. They are not just your competitors. They can be partners in building a highly skilled, readily available, regional labor pool. You cannot do this alone, and neither can they. In most regions, there is a local organization that is able to convene multiple local companies with similar needs and create training programs at a lower cost than an individual company can get.
6. Partner with MEP Centers, and encourage them to partner with education and training. Local or state MEP Centers have a powerful role to play in understanding SMM workforce challenges. Make sure you are connecting with your MEP center to take advantage of their workforce services and partnerships.

For MEP Centers

1. Be Strategic. Before making any decision about client solutions, assess how well the skills of your clients' workforce match up with the type of manufacturing they conduct. Do they plan and manage their workforce processes in the same way they manage their other business processes? They should.
2. Help manufacturers understand the "when and why" of Make and Buy approaches. MEP Centers can create Make or Buy options, including descriptions of potential conditions in which an SMM might choose one strategy over another. Be ready to respond with assistance for either strategy. Build strong relationships with relevant partners in your region, including colleges, workforce development systems, alternative staffing organizations, and others to facilitate a number of good solutions.
3. Participate in collaboration. Participate in manufacturing clusters, partnerships or innovation ecosystems that provide comprehensive connections to resources for manufacturers. The sector partnership example provided in this report is one model. There are many more around the country. These partnerships can be convened by any organization, as long as that organization has credibility with the private sector, and can neutrally coordinate solutions across a multitude of strategic partners, including workforce development, education, economic development, community based organizations and labor.
4. Facilitate solutions between education programs and SMMs. Do not assume that education and training providers understand next generation manufacturing. Educators need help to translate the needs of manufacturers into useful curriculum and relevant credentials. MEP Centers can play a powerful role as a facilitator, such as the South Carolina MEP welding program model highlighted earlier.
5. Include talent management as part of your services. MEP Centers can help SMMs understand how to manage their talent as a business process, making decisions that are pro-active, reliable, insightful and economical in both the short and long terms.
6. Participate in a regional manufacturing image campaign. Manufacturers everywhere and in every sector cite the old image of manufacturing as a major impediment to securing a strong pipeline of skilled workers. There are many models out there to demonstrate the appeal of next generation manufacturing, such as Manufacturing Day.



Conclusions

The conversation around manufacturing has changed dramatically in the last several years. No longer is the national dialogue about saving manufacturing, but about growing it. But “leadership in this new manufacturing is still up for grabs,” according to a recent National Governors Association report.¹⁵ This same report, like so many recent reports focused on manufacturing in America, highlighted the development of a manufacturing workforce as a persistent challenge, and a critical building block for strong U.S. manufacturing.

Growing U.S. manufacturing will require an integrated and thoughtful set of workforce strategies. SMMs cannot effectively create them alone. They require partnerships across multiple stakeholders. The Make versus Buy dialogue in this report provides guideposts for manufacturers and MEP Centers to work together for both short and long-term solutions to the skilled worker gap.

¹⁵ E. Sparks and Waits, M. “Making our Future: What States are doing to encourage growth in manufacturing through innovation, entrepreneurship, and Investment”, National Governors Association, January 2013.

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