

**2006-878: RECRUITING STUDENTS WITH A NEW IMAGE OF  
MANUFACTURING**

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## Recruiting Students with a New Image of Manufacturing

Whether it is in spite of or because of an apparently improving American economy, the US is facing a national shortage of highly skilled employees for today's advanced, highly technological manufacturing industry. The already existing shortage is growing rapidly, and both government agencies and industry are consistent in this single message: *Find and educate new workers and upgrade the skills of incumbent workers, or face a diminishing ability to grow or to compete globally.*

Department of Labor data indicates that the shortage of skilled workers will exceed 10 million by the year 2020. Because of the changing nature of work and jobs, especially in manufacturing, future workers will need ongoing and continually upgraded training and education. The worker and skills shortages are emerging for a number of interacting factors:

- The US is losing workers through the retirement of skilled baby boomers.
- Emerging jobs will require more advanced skills. The Bureau of Labor Statistics estimates that the economy will generate 28 percent more jobs that require higher technical skills during the next two decades.
- There will be fewer entry-level workers in manufacturing due to a lack of interest in technically based jobs in general and manufacturing jobs in particular. This is due to the poor image held by young people and their parents of the traditional skilled jobs in manufacturing and the poor image of the new technician careers.
- A greater percentage of potential younger workers are graduating from four-year colleges (meaning a lower percentage of workers entering the skilled technician labor force).

These and other factors will cause the US workforce to fall short of the numbers of skilled technician workers needed in the future. While the shortfall will impact all sectors of US business, the impact to manufacturing is expected to be more dramatic than in other areas. In the context of looming workforce shortages, the US manufacturers face two significant challenges: (1) the poor images and misperceptions that leave parents, counselors, and students unwilling to pursue technical degree programs that serve the manufacturing sector, and (2) the urgent need for highly skilled workers who can function effectively in the current advanced and technologically sophisticated manufacturing environment.

Manufacturing suffers from a negative—and outdated—view of its role in the national economy. There is a common misperception that the importance of manufacturing to the US economy is diminishing. This perception is often accentuated by policymakers and economists who, in support of a global economy, accept the move of manufacturing off

American shores as an inevitable and natural transition. Still others adhere to the belief that a knowledge-based economy will replace a manufacturing economy, and that manufacturing is becoming obsolete in the 21st century. The result is that manufacturers have weakening support and little interest from the American public. To compete for our most talented human resources, the misperception of manufacturing as an insignificant and unimportant part of our current economy must change.

Manufacturing also suffers from a poor image of its career potential. The image of repetitive, unsophisticated, and poorly paid jobs makes manufacturing unattractive to students, parents, educators, and career counselors. Many Americans see manufacturing as the road to dark, dirty, dangerous, and dead-end employment—or lack thereof. The general public does not understand the innovation, creativity and technological advances that make possible the effective operation of a modern manufacturing facility. The poor image has a subsequent and critical negative affect. Educators who hold a poor image of manufacturing, may resist making investments to improve the pipeline of preparation for future technicians. Furthermore, these educators may not recommend manufacturing as a good career choice. School counselors often promote a four-year degree as the only next education step following high school graduation. Industry, government, and academic institutions must unify to present an accurate and current picture of the highly sophisticated careers available at the technician level.

In addition to these two challenges—perception of importance of manufacturing to the economy and perception of the quality of manufacturing jobs—constant headlines about layoffs, closings, and outsourcing lead to the belief that recruiting workers should not be a problem for American industries, as workers ought to be in abundant supply. In fact, while many workers are indeed seeking employment, too few have the skills required by America's emerging advanced manufacturing sectors. There is an enormous skills gap between the manufacturing workforce we have and the workforce we need and will increasingly need. And this shortage will accelerate as the new technologies in advanced manufacturing demand workers with significantly higher skills. This skills problem will be exacerbated by the loss of skilled workers who will be reaching retirement within the next ten years.

Despite the unprecedented challenges facing U.S. manufacturers today, manufacturing has been and continues to be critical to the economic well-being of the nation. Even as it has been diminished by the recent economic climate, it continues to be central to prosperity. The potential return-on-investment for working with the manufacturing sector to address its challenges is evident in the following summary of manufacturing attributes.

- Manufacturing has contributed 16 to 19 percent of gross domestic product since the 1940s. Its present contribution to total economic output (counting intermediate activity) is over 25 percent.
- Manufacturing was the largest contributor to economic growth during the 1990s.

- Manufacturing has employed an average of 16.5 million people since the 1940s.
- Manufacturing wages are higher than other sectors. (In 2001, the average manufacturing wage was \$46,000 per year, 18 percent higher than the average of all other sectors.) A good manufacturing job supports a family and a good quality of life. That is not the case in many other sectors.
- Manufacturing provides its workers with more health, retirement, and other benefits than any other sector except government. (In 2001, 84 percent of manufacturing workers received direct health benefits.)
- Manufacturing contributes two-thirds of U.S. exports.
- Manufacturing contributes 62 percent of all U.S. research and development.
- Manufacturing's multiplier effect in terms of generating jobs and intermediate economic output is higher than any other sector's. The multiplier factor suggests that every job in manufacturing causes the creation of two additional jobs in a local economy.

In an attempt to respond to the significant challenges in recruiting students into the advanced manufacturing workforce, a consortium of National Science Foundation Advanced Technological Education (NSF-ATE) Manufacturing Centers and the National Association of Manufacturers (NAM) have partnered to implement strategies that can address the image of manufacturing as a viable and lucrative career path and reduce future worker shortages. In response to NSF's solicitation for planning grants for technician level education, the ATE Manufacturing Centers and NAM are developing regionally specific strategic plans to conduct broad and widespread advertising and informational campaigns to recruit students into manufacturing careers. This planning effort should ultimately address the need for institutions to more effectively develop life-long career and educational pathways for technicians, and encourage academic institutions to reform their traditional recruitment practices. Academic and industry institutions, as well as economic development coalitions, must begin to approach recruiting students into the workforce with a focused and unified message, rather than the current model of fragmented efforts by individual program chairs and individual companies.

In order to effectively change the negative perceptions of potential students regarding advanced manufacturing careers, a collaborative, regional effort between education, industry, government and workforce development partners is being launched by the ATE Centers, using a campaign known as *Dream It! Do It!*, which was created by NAM. With the realization that institutions can no longer do it alone, the ATE Manufacturing Centers, through their home institutions, are forming pro-manufacturing coalitions that will develop regionally focused strategic plans for recruiting students into manufacturing careers.

These regional plans will specifically address the root cause of institutional recruitment problems by working to change the negative images and misperceptions of potential students regarding the manufacturing industry sector and its available careers. Ultimately, the planning process will result in several recommended approaches for effective student recruitment into manufacturing careers. The potential widespread impact of this initiative is evidenced by its involvement of academic institutions, manufacturing enterprises, other industry sectors (for example, finance), other degree programs (for example, other engineering fields and beyond), and NSF's ATE program in general.

The *Dream It! Do It!* campaign, intended to be customized regionally, consists of the following basic elements:

- **Pro-Manufacturing Partnership Building:** Enlist the assistance of local political/social leaders and public workforce leaders to support the campaign, and engage educators and educational institutions – resulting in a small number of powerful partnerships to provide local leadership for the campaign.
- **Media Campaign:** Establish a useful and memorable logo. Launch a customized, comprehensive media/ad campaign to improve the image of manufacturing and attract the targeted audience to seek additional information. The ad campaign will employ vehicles that will reach the targeted audience such as radio, movie trailers, billboards and selected periodicals/magazines.
- **Events:** Organize and provide a series of local events to occur monthly within the region (job fairs, career days, media events, etc.).
- **Website:** Promote a powerful website as the vehicle through which interested individuals will seek additional information.
- **Response-to-Inquiry:** Provide a series of (a) information pieces that will respond to the inquiries of interested individuals from the targeted audience. These will feature persuasive and engaging information about manufacturing careers and degree programs; (b) opportunities for interested individuals to investigate manufacturing through personal contacts with educators and industry representatives; and (c) invitations to attend events.
- **Education:** Ensure the institutions have capacity and quality programs to serve interested individuals. Adopt and/or adapt curricular materials developed by community college faculty as appropriate. The NSF-ATE Manufacturing Centers are well suited to provide curricular materials for a broad array of manufacturing degree programs.
- **Local Champions:** Develop a local group of manufacturing champions who will conduct a structured public relations campaign linking the targeted audience(s) to local manufacturers and educational opportunities.

The goals of the Dream It! Do It! initiative are impressive and important—and realistic. With a unified message from industry, government, and academia, the manufacturing sector can increase the quality and quantity of workers, including technicians, entering manufacturing careers, and thus can experience a resurgence of productivity and competitiveness. Negative stereotypes about manufacturing careers can be changed with an increased awareness of manufacturing as a positive career choice, the targeted audience can be engaged in follow-up activities relative to investigating a manufacturing career (internships, career days, National Manufacturing Day). In addition, the *Dream It! Do It!* campaign can motivate educators, government, and industry to work together to supply highly skilled workers for the US advanced manufacturing sector.