

Universities and Technology Outreach

"The modern achievements of skill, enterprise, and science, new ideas with germs of power, must be recognized, and diligently studied, as they have brought and continued to bring daily competition which must be met. If the world moves at ten knots an hour, those whose speed is but six will be left in the lurch."

—Sen. Justin Morrill (late 19th century)

Mr. Chairman. On behalf of the 160 institutions of higher education that comprise the National Association of State Universities and Land-Grant Colleges (NASULGC), I am pleased to submit testimony on H. R. 820, The National Competitiveness Act of 1993. We are gratified that President Clinton has emphasized the importance of technology outreach to small and medium-sized industries in his economic stimulus package presented to Congress on February 17, and we see H. R. 820 as a crucial element of that program. I believe, therefore, that the nation's public research universities are an important component of an integrated approach to enhancing the competitive position of U.S. small and medium-sized manufacturing industries in the global economy.

The nation's public research universities can be effective in two of the major roles for a National Technology Outreach Program: industrial modernization, bringing advanced technology to small and medium-sized manufacturers; and the development of new products, processes, and jobs, many of them emerging from innovative university research. All that is needed is enough funding to "walk these innovations into the private sector," as Germany and Japan have done with their manufacturing technology centers.

To help small and medium-sized companies, twenty-three state governments and more than a hundred universities have established technology transfer, industrial extension, and business assistance programs driven by private sector industry needs. Current federal funding for these programs, while necessary, is not sufficient adequately to transfer technology rapidly and effectively.

We believe that any plan to speed technology development, transfer training, and adoption and conversion by American manufacturers should involve university-industry linkages in a national Manufacturing/Industrial Extension Service modelled after the Cooperative Extension System. The Morrill, Hatch, and Smith-Lever Acts that created this successful model based it on the essential linkages between university basic and applied research, development and dissemination of progressive ideas and techniques, and federal, state, and local units of government. Cooperative Extension's linkages and base in the nation's great public universities provided the infrastructure and transfer mechanism that helped develop the unparalleled

productivity of American agriculture, the millions of value-added jobs and industries related to agricultural production, and today's exciting developments in new biotechnology enterprises.

The universities already are making great strides in industrial and manufacturing extension, and are demonstrating that small and medium-sized industries that work with university programs are increasing their productivity, profits, products, efficiency, and jobs. The universities have established a strong infrastructure that includes basic and applied research and partnerships with small and medium-sized industries. In addition, universities are applying a concept of industrial extension that goes beyond technology transfer to include improvements in management, marketing, productivity, and worker training. Here are a few examples:

- CONNECT, the University of California, San Diego's extension program on entrepreneurship for high technology industries, fosters scientific and technical information exchanges, venture capital connections, worldwide links with potential partners, and education on legal, financial, and marketing issues for 170 emerging high-tech company members.
- Purdue University's Technical Assistance Program has worked with more than eight hundred companies since 1986 to implement new and advanced technologies in product development, manufacturing methods, and industrial management. Client evaluations show nearly \$14 million in capital investment increases, \$6.4 million in cost savings, \$106.7 million in sales increases, 447 new jobs added, and 499 jobs saved.
- Cornell University is completing a university-wide strategic plan for integrating a large number of highly successful applied research and extension programs for small and medium-sized manufacturing firms in New York State. Another component is the Cornell Center for Advanced Technology in Biotechnology, in which an extension agent matches small firms seeking new products with university scientists conducting research, resulting in the commercialization of discoveries. Cornell's industrial innovation extension specialists have served nearly two hundred firms in one ten-county region on joint university/industry projects, ranging from laser fuel ignition to plastic injection molding and manufacturing plant and system layouts. The projects have resulted in successful product and process innovations, efficiencies, plant expansions, and new jobs.

The significant advantage of locating industrial/manufacturing extension centers in higher education institutions is that the universities already are engaged in delivering extension services to industry utilizing university research and expertise in engineering, science, and business. By placing the extension centers at public research universities, Congress will be able to minimize start-up costs for new programs, thereby freeing up funds to be used to enhance programs, expand linkages, and coordinate existing resources in engineering, science, and business disciplines with a network of field agents.

Our vision for the future goes far beyond scattered grants for competitive proposals from a variety of agencies and institutions. Instead, we envision a broad-based university response from a united front of research and extension, and a national network of universities engaged in coordinated activity that has national impact. Such a network would integrate and share resources and information from

all relevant sources, provide continuity in programs, establish problem-solving linkages with industry, and provide focus and critical mass of resources that can be shared nationally.

The elements for such a successful approach include the following:

- A national coordinating mechanism and database to link specialized expertise and research from many sources (universities, federal laboratories, private-sector sources) dispersed throughout the country, along with a central clearinghouse for scientific and technical information.
- University teams of faculty and field agents with expertise in many relevant areas, including engineering, small-business development, management, marketing, community economic development, and infrastructure and other fields.
- A network of highly trained field agents to relate the needs of small manufacturers directly to appropriate university experts.
- A central administrative structure in each participating university to:
 - coordinate statewide efforts,
 - provide a single-access point for industries,
 - draw upon and unite relevant expertise in many fields,
 - coordinate related programs that support community infrastructure and local government education,
 - provide linkages with relevant public and private agencies and organizations, and
 - couple university efforts with cohorts in the national network.

Mr. Chairman. America's public research universities are eager to join President Clinton and this committee to craft legislation that will provide stimulus for America's manufacturing and industrial sector. We offer our resources to the task and intend to work with the committee to integrate the nation's public research universities into the effort.

Note

This article is a reprint of the author's testimony to the U.S. House Subcommittee on Technology, Environment, and Aviation on February 23, 1993. Dr. Magrath is president of the National Association of State Universities and Land Grant Colleges.