The modernization of American manufacturing enterprises became a major concern of government and industry in recent years. The principal causes for this public-private concern over industrial strength and economic growth have been based on the perceived decline in American industries share of world markets, the dislocation of workers as a result of the cutback in defense spending, and the successful and massive introduction of foreign made products into American markets. The evidence of the economic problems are wage stagnation and job losses in many industries, a decline in world market share, a loss of employment opportunities, and a severe imbalance in trade with foreign countries.

The responses to these problems, after the initial reactions such as restraints on imports, were that industry needed modernization, access to research, and incentives to bring new processes and products into the market. The long standing faith in technology combined with the realization that major competitor countries were focusing on manufacturing brought into focus the need to spur the introduction of technologies into the markets and processes. The need to interject appropriate technologies into products, processes and systems demanded interventions into the existing processes of transferring technologies. There was also the realization that large companies had the human and financial resources but the smaller companies lacked these capabilities. Technological solutions, along with the implementation of new management techniques and more attention to the needs of national and international customers, became the focus of industry and government. Along with this realization were the studies that revealed the dearth of automation in smaller American companies as compared to those in Japan.

Introducing new concepts and technologies that would make manufacturing companies more adept and modern, carried the assumptions that these technologies would mean lower costs, better products, and more employment. Firms producing better quality goods at lower costs would be able to compete with foreign firms, thus solving many of the balance of payment, economic growth, and wage issues. Strengthening the manufacturing sectors would also mean a stronger nation in economic and military terms. The common good in government and private terms was seen as the reason for introducing new partnerships that would focus on modernizing manufacturing companies. Better products and lower costs would mean expansion of market share, wealth and influence.

The issue of how to accomplish the goals of economic growth through technology utilization under the constraints of a drive to reduce the federal budget. This meant that the states and industries would have to participate in the endeavor and that the results would need to be realized quickly in order to sustain political support. Politics of the day also demanded that the programs and incentives be directed at the smaller manufacturers. Large companies were assumed to have the capabilities to pursue modernization and foreign market penetration without the help of government. Many of the large companies already had proven their ability to successfully compete aircraft, electronics, computer, software, pharmaceutical and several other industrial sectors. But it was painfully clear that smaller companies lacking these capabilities and resources were not adopting newer technologies and were losing market share domestically and internationally. Smaller firms by nearly every measure used fewer technologies than larger firms and indeed fewer than their overseas counterparts.

A variety of alternatives were implemented by states and the federal government to remedy the problem. Lower corporate and personal taxes, public money to support applied research, tax incentives for investments in equipment and research, removal of some regulatory constraints, assistance in examining foreign market opportunities, and technical assistance programs were implemented. The later, industrial outreach, is the focus of this paper and is evidence of one of the most dramatic shifts in support for industry in several decades. The federal government, after years of offering
very small programs in technical assistance, decided that industrial outreach would be a major focus. The
basis for the technical assistance, other than the problems to be addressed, was the successful agriculture
extension service that helps farmers in every state access new techniques and research. The agricultural,
or cooperative extension service, was a part of the effort that made American agriculture the most
productive and efficient in the world. Perhaps a similar, but less extensive program would work in
industry.

The federal government effort in industrial extension was welcomed by the handful of states that had
committed resources to helping industry for many years. The state programs, except for a few instances,
were small and located at public research universities. Several states including Iowa, Georgia, Tennessee,
and Pennsylvania had university programs that assisted industry for decades, and offered models for the
federal government to build upon. However, the uniqueness of this federal program, compared to many
federal programs, was insistence upon industry-state-federal partnerships that focused the needs of
industry rather than the needs perceived to be important by a government agency. The delivery model was
also left to agreements between the states and the federal government.

Congress allocated a small amount of funds to the Manufacturing Extension Partnership (MEP) program
in 1991. Congress dictated that the partnerships would address the needs of industry, improve
international competitiveness, and concentrate on the technological needs of small and medium size
companies. Funds were to be matched by the states or other entities and assistance would be given to
states in planning these services. Congress also stipulated that existing organizations serving industry
would become a part of the programs, thus avoiding conflicts with existing organizations. Starting with a
few million dollars and three centers program MEP now has programs in 42 states and Puerto Rico. The
1996 federal portion of the program is $80 million, and this is more than matched by the nonprofit
organizations offering the technical outreach services.

The Manufacturing Extension Partnership (MEP) has specific mandates: delivery of technical services
through existing organizations, development of a national system to deliver technical assistance, the
modernization of industry, improving the international competitiveness of industry, partnering with the
states and other non profit entities in funding and management, addressing the needs of small and medium
size industry, and offering technical services that are not readily available through the private sector.
The models developed in cooperation with MEP are based upon the needs and culture of the specific state
joining the partnership. These models range from nonprofit stand alone corporations to state agencies or
universities. Selecting the model for outreach is sometimes determined by the existence of an existing
strong state wide program, but more frequently the model is selected after an intensive examination of the
needs of industry and the type of services available in the state or region. In all cases federal support is
dependent upon the identification of a well managed program that can coordinate existing services in
solving the problems of industry. The planning process, critical to success, is called STEP, or State
Technical Extension Program. The STEP funding and process leads to the need identification and the
structure that will be used in the development of a statewide program, or center.

As a result of the infusion of federal funds and a planning process MEP currently has 60 partnerships in
42 states. There is also an effective evaluation system that is used by all centers, frequent meetings of
center directors for the exchange of ideas, and management support systems to help the centers become
more effective in their outreach.

The models used in delivering technical assistance are an amalgam. Mid America MTC (Kansas) is
entrepreneurial and offers fee based services in several states. The program is the most unique and
sometimes controversial among the MTC’S, but clearly offers effective programs. The Mid America
agents assess company problems, offer solutions, contract with others for the delivery of more complex
services, and collect fees for the service. Aggressive, entrepreneurial, and bottom line.

The Georgia Manufacturing Alliance is based on a statewide 35 year old engineering extension program
with strong state support. Concentrating upon engineering related issues in manufacturing and free
services for the first five days, the Alliance has numerous partners for training and management problems,
including Small Business Development Centers, a utility company and the technical colleges. The
engineering services are delivered through regionally based full time staff with industrial experience in
This map shows the growing network of manufacturing centers including established operations and new centers coming on-line. The symbols encompass headquarters and field office locations. Since 1989, MEP has made 80 awards for extension center operations in 42 states and Puerto Rico.
advanced manufacturing.

The Iowa MTC has another unique model. The MTC contract from MEP is through Iowa State University but is based in a community college and contracts for all technical assistance through other providers. University extension, the small business development center, community colleges, state technology transfer centers and others are all sub contractors that provide assistance directly to industry.

The technical service programs in the 42 states may appear very different in management structure and design, but they do have common features: all having matching funds from non federal sources, all provide services in a specific geographical area, all are committed to addressing the needs of small and medium size industry, all have clear management structure and controls, all have evaluation systems to measure their effectiveness, all have partners that can provide services, all have plans for implementation, and all understand that the federal support may not be available in the future.

The continuation of federal and state support for outreach programs to industry depends on the ability to deliver useful services. Plant layouts, JIT, new equipment recommendations, ISO 9000, quality programs, new materials, other advice must be measured in these programs. The evaluation measures used by the centers vary internally, but all report on the hard measures of cost savings, increased sales, new capital investments, and jobs added or saved. Additionally some centers measure reduction of waste, increased exports, company hours dedicated to the solutions, profitability increases, and general satisfaction with the services. Reports indicate benefit multiples of 20:1 to 3:1. A less reliable, but important measure of success is perception. Measures of satisfaction and timeliness are common. A recent soft measure of effectiveness was political. During 1995 manufacturing executives sent over 1,000 letters of support to Congress when the MEP program appropriations were threatened.

The publicly funded technical outreach programs for industry are evolving, but they are clearly a part of the industrial and governmental frame of reference today. The federal role may diminish, but systems have been set in place that should assure a nationally linked system. The models that remain will vary in structure, but they will have common elements. The elements are:

- Dedication to improving manufacturing profitability
- A secure public funding base
- Availability of competent and experienced staff
- Unbiased recommendations
- Responsiveness to the needs of industry
- Excellent leadership and management
- Accurate evaluation systems
- Cost effective delivery systems
- Political and industrial support
- Links to training, education and research
- Defined plans and objectives

Biographical Information

DR. DAVID H. SWANSON
A guest researcher at the National Institute of Standards and Technology from the Georgia Institute of Technology. Former director of the Economic Development Laboratory. Directed the Center for Industrial Research and Services at Iowa State University and several private and public economic development and technology programs in Iowa, Wisconsin, and Louisiana. Past president of the American Industrial Extension Alliance and several organizations.

MR. RICHARD KORCHAK
Associate director of the Manufacturing Extension Partnership at the National Institute of Standards and Technology with responsibilities for regional programs. Several years of industrial experience in machining and computer integrated operations.