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Global Manufacturing Competition

The United States has been experiencing enormous trade deficits, largely due to inability to compete in the production of high-quality, low-cost durable goods. The situation will not be quickly remedied, but emerging new technology and better management practices hold the promise of better days. A crucial determinant in the outcome of global competition will be activities occurring in Michigan, the leading manufacturing state.

Until the late 1970's, a smug arrogance was the dominant mood in the automobile industry. To a major degree, the research laboratories of the big three automobile manufacturers were merely window dressing. In 1979, when a Japanese engineer described at a symposium his painstaking analysis of stresses in the shell of a Honda, he was an object of derision. The industry had little contact with universities except to hire some of the graduates. The state government's principal actions were to pile taxes and regulations on the industry while cutting back support for engineering at the universities.

The oil crisis, demand for high-quality small cars, and a recession that brought Michigan unemployment in 1981 to 17 percent had the effect of that of a two-by-four on a mule. The state government, industry, universities, and citizens in general recognized the need for change as well as to learn some lessons from the Japanese.

On a recent visit to Ann Arbor and Detroit, I noted evidence of changes that have occurred in the intervening years. The state government has provided $70 million for construction at the University of Michigan of new buildings for engineering. It has substantially increased its support for the engineering faculty and their research. The state is assisting in the financing of start-up companies such as those in robotics and machine vision.

The automobile industry is in the midst of change in the use of electronics, robots, machine vision, and new materials, as well as in supplier and employee relations. A new Buick-Oldsmobile-Cadillac plant at Hamtramck has 260 robots and many new computer-controlled features. To meet the needs for robots of various kinds and for machine vision, a large number of new small companies have become active in southeast Michigan. They bring an excitement reminiscent of that of an early Silicon Valley.

Two nonprofit institutes in Ann Arbor have impressive leadership and roles of increasing importance. The Environmental Research Institute of Michigan has some of the world's best experts in remote sensing. They have produced robots with good shape discrimination, devices for very accurate measurements of features of automobiles, and a device for inspecting the complete exterior of an automobile for proper trim, taillights, and other features. The machine vision is fast, cheap, and capable. They have also developed a computer with parallel processing especially suitable for processing the complex data related to machine vision.

The Industrial Technology Institute has activities that include a flexible machining group looking at machine tools, sensors, materials handling, and automated design for manufacturability. It is a robotic evaluation center. The institute is helping to write the specifications for a manufacturing automation protocol. This will provide a common computer and control language that will allow robots and other equipment to communicate no matter who makes them.

The University of Michigan has been positioning itself to interact with these institutes and with companies large and small. In turn, auto companies now welcome professors and their students and permit them to use assembly plants as laboratories. One of the aims at the university is to achieve interaction of experts in robotics, machine cognition, machine vision, and machine action with experts in computer-aided design of systems involving those technologies and new and superior materials. A goal is to develop highly adaptable robots with large-scale computing capability and expanded artificial intelligence.

One can encounter a great deal of enthusiasm and a climate of can-do in Ann Arbor. A new culture seems to be evolving there. If the rate of evolution continues, something will be created that will have impact beyond Michigan.—PHILIP H. ABELSON