# Machine tools: Symptom of America's waning competitive edge

It's not the most glamorous industry, nor a particularly large one. Most people would even be hard pressed to give a succinct definition of its primary product. Yet the nation's machine-tool industry is unarguably strategic — both to the nation's economy and its national security. In fact, the National Academy of Engineering (NAE) notes "it would be hard to overestimate the importance to the nation of a healthy domestic machine-tool industry." As a new NAE study documents in vivid detail, however, America's machine-tool industry "is currently far from healthy."

This industry involves those who make and use nonportable power-driven machines that shape metal by cutting, impact, pressure, electrical techniques or a combination of these processes. Almost without exception, every manufactured product is made on machine tools or on machines built by machine tools.

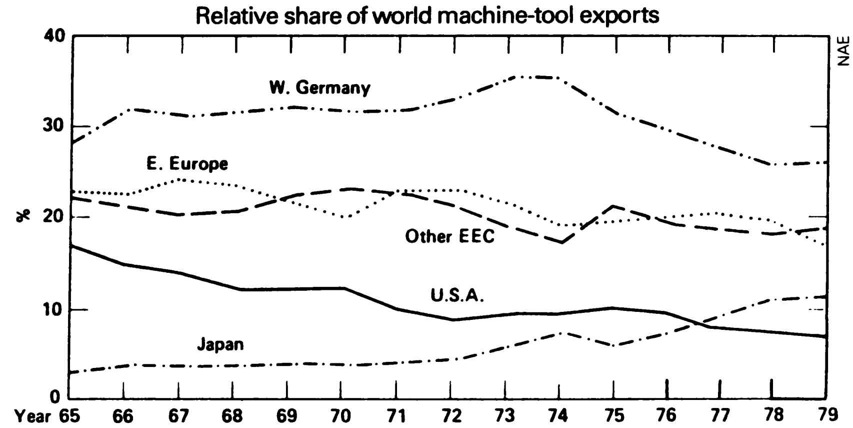
A nation's machine-tool leadership can even have a "multiplier effect" on other industries involved in foreign competition. "Many domestic manufacturing interdependencies lie behind a nation's international trading success in any one product," the NAE study explains. The study warns that if the U.S. metalworking industry does not take the lead in developing the newest innovations, "prospects exist that important advances in manufacturing technology for many industries might be significantly delayed, or escape development."

But the most pressing problem, machine-tool analysts believe, is the U.S. industry's declining share of sales in both domestic and international markets. In the world export market, the U.S. industry's share of sales has dropped from 23 percent in 1964 to less than 7 percent in 1980. Today it trails both West Germany and Japan in the share of the export market it commands. Far more important, while losing leadership in the export market, the U.S. machine-tool industry was also being eroded at home. In 1964, imports accounted for less than 4 percent of U.S. sales; by 1980, imports represented 24 percent of all machine tools sold in the United States.

The opposite is true for Japan, now the largest foreign supplier of machine tools in the United States. In 1960, 31 percent of the machine tools sold in Japan were imported. By 1980, imports accounted for a mere 8 percent of Japan's domestic sales.

Loss in market shares spells far more than a simple loss in revenues for U.S. machine-tool builders. According to the NAE report, international trade "is a major way for domestic machine-tool builders to moderate one of their most chronic and burdensome problems: the 'boom or bust' cyclical variation in machine-tool demand."

Relative share of world machine-tool exports




Traditional oscillations in machine-tool demand may run 10 years from peak to peak, with sales fluctuating 30 percent on average, much more during individual cycles. Cycles occur because small changes in demand for commercial products may require relatively large changes in capital equipment.

Consider a manufacturing company that uses 10 lathes, ordinarily replacing one each year. A 10 percent increase in sales of its product may require purchase of an eleventh lathe. For one year, its machine-tool purchases will increase 100 percent; the next year purchases will tumble 50 percent. If such proportionately large upturns or downturns in demand coincide for most of a machine-tool builder's customers — and that often happens (their customers are frequently very responsive to changes in the economic climate) — a manufacturer's production planning can be severely destabilized.

Consider also that U.S. machine-tool firms tend to be small: 65 percent employ fewer than 20 people. And employees are highly skilled; apprenticeships frequently last four or more years. If an employee laid off during a downturn in the economy cannot be hired back, a machine-tool builder may eventually face a worker shortage lasting years until a new apprentice is fully trained.

What's more, many builders offer very specialized tools. If one firm gets more orders than it can handle, another firm cannot usually be substituted without costly and time-consuming retooling. To level demand, toolmakers try to defer excess orders to those periods that might otherwise be slack. And increasingly, toolmakers have looked at international sales for demand leveling. (Though most countries experience their own cycles in demand, peaks alternate.)

So why are U.S. toolmakers losing their competitive edge? "What I hear our salesmen saying is that some Japanese firm has a warehouse full of [machine tools] that they're offering at 30 percent under our prices, with one week delivery," notes Charles Carter of Cincinnati Milacron, the nation's largest machine-tool builder. "How do you combat that? The most pragmatic inroad the Japanese have made in this industry deals primarily with price and delivery, not technology."

Carter, who is also president of the Society for Manufacturing Engineers, points to Germany and Japan, saying, "Look at the business cartels, low-bank loans for favored industries, special credits for export. Those in my opinion have more to do with the viability and competitiveness of their machine tools than technology does."

John Deam, technical director for the National Machine Tool Builders Assn., agrees technology is not the problem. His organization sees the Commerce Department's interpretation of which tools should be restricted from trade with the Soviets as a major obstacle to world-market shares. Under COCOM (for Coordinating Committee) — an agreement among NATO members and Japan — certain high-technology items are prohibited from trade with the Soviet Bloc. But the Commerce Department's interpretation of what is restricted has been more sweeping than that of its COCOM counterparts, Deam says. Acting under the same guidelines, Germany exports tools the United States withholds. As a result, Deam says, the United States gets only about 1 percent of the Iron Curtain sales — a market that accounts for roughly 50 percent of machine-tool export sales worldwide.

In many ways, Carter says, his industry's predicament is symptomatic of the situation facing so many industries in the United States — from automobiles to semiconductors: world competition. The Japanese have learned to "target" their exports — to seek only those market segments promising large sales and involving innovative technology. And generally, what Japan targets it conquers; in machine tools, Carter notes, that has been the more general-purpose tools.

The U.S. industry faces an uphill battle. But Carter says, "If there seems to be a large perception that there's a war on, that's usually half the battle. And I'd say the machine-tool industry knows it's in a battle." —*J. Raloff*