Something's Happened to Yankee Ingenuity

INNOVATE, From G1

Northwestern University, blames the research lag on the increasing emphasis American business places on short-term results. Rappaport asserts that management incentive programs are biased toward quick profits at the expense of perhaps smarter long-term investment.

"American business would do well to re-examine its own self-administered incentive systems," Rappaport concludes.

Industrial research today is dominated by a small number of very large corporations. The top 10 percent of these firms doing R&D in 1956 performed almost 70 percent of the total U.S. R&D effort. Ten firms accounted for more than 30 percent of all expenditures that year. This concentration may itself work against innovation.

"A large part of the blame for the lack of innovation lies with the oligopoly nature of American industry," said Mark Green, director of Ralph Nader's Congress Watch. "Big companies get fat situated to their products and there is a reluctance to break through. If you already dominate an industry, where is the incentive to take a chance on a new and costly approach?"

But the history of innovation in America is ambiguous on this point. Studies done on whether big business or little business is more inventive have come to no conclusive end as a whole.

Certainly, many major innovations have come from outside an established industry. The ballpoint pen, for instance, was invented by a sculptor, the dial telephone by an undertaker. It took an electrical engineer employed by a shipbuilding firm in the 1930s to develop the automatic transmission, called by some the last major innovation of the auto industry. IBM's disk memory unit, the heart of today's computer, was not the logical outcome of a decision made by IBM management—rather, it was developed in one of its labs as a hobby project, over the stern warning from management that the project had to be dropped because of budget difficulties.

At the same time, certain large firms in the fields of electronics, pharmaceuticals, telecommunications and computers have been highly innovative.

In their seminal study in 1958 on the sources of invention, Harvard professor John Jewkes and his colleagues said they could not conclude that inventions flow primarily from any one source. When the study was revised in 1969, the authors stated only the obvious: that inventions can come from firms of varying size.

Business leaders, of course, refute the charge that they are less innovative today than in the past. "There's no lack on the part of big business to be innovative," said General Motors Corp. Chairman Thomas Murphy in a phone interview. "It's a big country, so we have to be big. We couldn't do all of the things we do if we weren't as large as we are."

To the public, a car may still look like a car. But auto officials say the changes which have taken place inside during the past five years have been as revolutionary as anything which has come before.

"There's a perception problem," said Thomas J. Feaheny, the man in charge of car engineering for Ford Motor Co., where "better ideas" were once not only a management dictum but a successful ad slogan. "We've never been as innovative as we are now. But the things we're doing aren't as glamorous and aren't noticed much by the consumer."

Critics note, however, that what the auto industry heralds as advances in development (the catalytic converter, on-board use of minicomputers to govern fuel efficiency and control pollution, greater use of aluminum and other lightweight durable materials) are, in fact, only more logical applications of off-the-shelf technologies rather than breakthroughs in the state of the art.

Of even greater concern, though, than what has or hasn't happened is the prospect for the future. Many major corporations have tailored research budgets to yield more practicable and immediate results. In 1968, industry allocated as much as 20 percent of its R&D dollar to the "R" part. By last year, this had dropped to 25 percent.

Corporations say the reasons for this shift from research into development have nothing to do with being too big or too comfortable. The reasons, basically, are greater pressures from government regulators to meet health, safety and environmental standards as soon as possible, and greater uncertainty about the likely profitability of longer-term, riskier ventures.

"It used to be much easier to bring new products to market," said Du Pont Chairman Irving Shapiro in an interview. "If you hit something, you'd have more time to develop it. Now it's more difficult.

"Also, the pot of gold at the end of the rainbow just isn't there. The economic environment has changed. Our thinking has had to change, too. It's become more short range."

Added Richard Heckert, Du Pont's senior vice president for R&D: "We're not exploring wholly new areas. We're concentrating instead on opportunities for research in established areas . . . . We are less able to take risks. We have to concentrate on surer projects."

The degree of such thinking does vary from company to company and industry to industry. Certain high-technology fields (instrumentation, computers and electronics) remain rooted in innovation and continue to churn out impressive new products. In other industries, though—particularly those most apt to be subject to regulation and high energy costs (steel, chemicals, paper, packaged goods and autos)—product innovation has leveled.

Part of the difficulty in deciding what to do about the innovation lag is figuring out how to define it. To begin with, innovation defies measurement.

"There are no indicators which you can look at to measure the advancement of knowledge," said NSF's Dr. Bean. "Some people count patents, but that's unreliable in part because some firms don't like to patent things and would rather rely on trade secrets rather than disclose important discoveries. Others count citations in the research literature, but that's unreliable, too."

But even without sure data, many have not hesitated to push the panic button. "You can't use statistics to say there's a problem," said Jordan J. Baruch, the assistant Secretary of Commerce who is directing the government's innovation policy review. "But you'd have to be blind not to see it."

Urgency about the problem is all the greater because America seems uniquely stricken. Western Europe and Japan grow more inventive, or so it appears, while U.S. firms age. Examples abound of foreign firms taking the lead in both new and traditional product areas. The Japanese, for instance, totally eclipsed the American communications industry in the development of video tape recorders. The Germans and Swiss now set the pace in textiles. Inventiveness in the steel industry has centered in Belgium and Austria. Some U.S. cities are even going abroad to scout for new ways to handle old problems. (The Council for International Urban Liaison here publishes a monthly newsletter called Urban Innovations Abroad that goes to 5,000 city officials in the U.S.)

Moreover, U.S. productivity rates have been in a rut for a decade—and that has serious consequences for everyone's real income and for the nation's overall standard of living. Of course, technological change by itself does not make or break productivity. There are other contributing factors, most important among them being capital investment and improved labor skills. But technology is an important ingredient in the mix.

With industry's current bent toward the here and now, there is concern that the U.S. may be cutting its innovative bridges. Some economists, notably Charles P. Kindleburger at MIT, have drawn disturbing parallels between the way U.S. firms are responding to America's battered competitive leads and the responses of British firms in the twilight of the English empire. British firms, just as American firms now, became defensive—that is, rather than redoubling efforts to generate innovations, they curtailed investment and demanded government protection against imports.

Does the current emphasis on small, incremental kinds of advances rather than on big breakthroughs threaten the dominant position the U.S. still holds?

No one is sure. Despite all the studies of innovation and productivity, no one can say whether there is an optimum rate of invention a society should adhere to, or how much innovation is enough.

There does seem to be general agreement, though, on this: The rapid technological growth which the U.S. experienced during the first two decades after World War II was unusual and is not likely to be repeated.

"We made an enormous investment in the war, made some great technological advances during it, and came out of it with a great belief in the power of technological progress," said J. Herbert Holloman, director for the Center of Policy Alternatives at MIT. "We also were handed an accidental lead, in having survived the war better than anyone else. But one of the things that is increasingly going to be the case is that new technological innovations are going to happen outside the U.S."

Holloman said that American business has in the past displayed an NIH (not-invented-here) complex, meaning that U.S. managers have been arrogant toward anything not thought up first in America and slow to embrace it. This is one of the things that he said will have to change if American firms hope to continue to compete in world markets. American businesses must learn to be quick to adapt, to exploit foreign inventions as well as their own, he warned.

"The problem is not with basic science," Holloman said. "The problem really is how effective we can be in adjusting and adapting."

Some have argued that U.S. multinationals may themselves have hastened this competitive bind on America by transferring their best technologies to foreign markets in recent years. There who say this also urge legislation that would restrict further transfers of technology.

But most who have studied the innovation problem say the solution lies in fostering innovation at home—through a more liberal tax policy, a relaxed regulatory policy, less aggressive antitrust practices and, in general, a more cooperative spirit between business and government such as exists in Japan and the leading Western European countries.

And above all, they argue for greater certainty in government policy. "I think that more than an increase in government support of R&D or a reduction in regulation, what private industry people are interested in is a reduction in uncertainty about government action," said Dr. Bean. "Look, there's enough economic uncertainty in the R&D process without the government."