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finally start the process of development.

By the early 1970s, however, casual accidents weren't good enough. Industries in other nations were watching closely for ideas elsewhere, notably in the U.S. And they have been very good at developing them. To cite only a single conspicuous example, the basic technology for consumer electronics was American, but the industry now is dominated by the Japanese.

Managers often don't understand the new technology, and in many cases are at the mercy of technical staffs "who are not tuned to the larger goals of their companies," the Brookings authors say.

What can management do? A book by Eric von Hippel, "The Sources of Innova-

Speaking of Business

By Lindley H. Clark Jr.

tion" (Oxford University Press), suggests that it's time for managers to organize the innovation process.

By innovation, Mr. Von Hippel, a professor at the Massachusetts Institute of Technology, doesn't mean just the major path-breaking changes. An innovation is anything that makes a product or process better, more useful.

To begin with, companies need to pinpoint the sources of innovation in their industries, and for that process Mr. Von Hippel offers useful suggestions. Firms obviously need strong technical staffs and, at a minimum, managers who are sympathetic to staff efforts.

A common misconception, the author writes, is that product innovations typically are developed by manufacturers. Sometimes that's true, but Mr. Von Hippel's research shows that in a number of industries innovations primarily are developed by product users. And therein lies part of the problem: It isn't always easy to

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get the innovation from the user and into commercial use and distribution.

The prime link between a manufacturer and users is a field service force, whose personnel visit customers and maintain and repair the products. They are equipped with manuals, spare parts and tools to deal with the manufacturer's standard products, and the employer evaluates their work on the basis of measures such as the amount of time repairs take.

But suppose the user has made major improvements in the product. Will the service personnel be delighted? Quite possibly not. They may not be able to fix the product rapidly, or they may not be able to fix it at all. A long delay at the consumer site may mean low marks for the service people when they report back to the factory. Service personnel may bad-mouth the innovation if they mention it at all.

Another manufacturer-customer link is the sales force. Salesmen visit customers regularly, Mr. Von Hippel notes, and should be in a position to spot customer needs, ideas and proposed solutions. But they seldom are trained to do this; they score with the boss primarily on the number of existing products they sell.

Even a manufacturer's marketing research group may be an unreliable link with the customers. Such groups are expected to stay in close touch with users' needs, but seldom do they spend time looking for users' ideas for meeting those needs. Meeting the needs is expected to be the job of the manufacturer's research-and-development department.

Such problems are not insoluble. In a number of cases, Mr. Von Hippel says, companies are already applying remedies, including applications laboratories, where manufacturers provide free or low-cost research-and-development help to users interested in fitting a standard product to a new application. Some companies have custom groups to make special products and product adaptations at customer request. And manufacturers can encourage formation of user groups, where users of a particular type of product get together to exchange ideas and information.

In industries where manufacturers are the major sources of innovation, companies simply are going to have to put more of their best people into the development phase of research and development. In the Brookings study, Mr. Baily and Mr. Chakrabarti say the U.S. has been generating a lot of new ideas, so the Europeans and Japanese have been able to assign their best people to development and thus enjoy a major advantage.

The Brookings authors see a role for government, in part through an expanded tax credit for research-and-development spending. Government also should encourage the improvement and expansion of education in science and technology. But the biggest responsibility, it seems to me, still belongs to management. Managers need to upgrade technical staffs. They also must do a better job of using the resources they have to promote both a continuing flow of new ideas—and applications of those ideas. Their performance up to now has left something to be desired.

Notable & Quotable

Speaker Jim Wright on the opening of the 101st Congress last week:

Contrary to certain misconceptions, this supposedly staid institution is the scene of continual change and constant turnover. A majority of the members here in the chamber today were not here at the beginning of this decade. Only about one-fifth of our membership has served for more than 15 years.

In this, as in our essential character, this House reflects the nation—ever changing, ever moving and growing, struggling often uncomfortably and somet[illegible] wardly to[illegible]

N.Y. Times 1/12/89

Need for High-Tech Consortiums Stressed

By LAWRENCE M. FISHER

Special to The New York Times

SAN FRANCISCO, Jan. 11 — Executives in several high-tech industries and some academics and Government officials say that if the United States is to remain competitive, it must begin forming a large number of cooperative research and development consortiums. The joint research efforts would substantially alter traditional relationships among business, universities and the Government.

Such consortiums are relatively common in Japan and Western Europe, and in many cases they are credited with giving foreign companies an edge against their American competitors in such high-stakes industries as automobiles, semiconductors and biotechnology. But their widespread use in the United States will require altering the laws governing antitrust, revising the way the Government finances research and development, and even rethinking traditional American concepts about competition among companies.

Some industrial and academic experts, however, are cautioning that consortiums are not appropriate in every industry, and are only one component of competitiveness, not a panacea.

Because companies are loath to share strategic information, consortiums are most effective when their objec-

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