

International Cooperative R&D

Companies in various industries, faced with mounting R&D costs, could benefit through cooperative efforts

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Industrial and governmental research and development, which we will call R&D during this lecture, become more complex and more costly with each passing year. A question could be raised as to whether our present level of R&D should be maintained. The answer lies in the needs of progressive and successful industrial societies such as those in Japan, in the U.S.A., and in many other countries of the world. In those cases, and in most advancing economies, continuation of R&D is the very lifeblood of a company, an industry and yes, even a country.

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Without successful R&D, new or improved products and processes are not developed and industrial growth stagnates. Formerly successful companies find that their products are being replaced in the marketplace by new or improved products developed by more enterprising competitors. This type of trend is sadly difficult to change. Thus producers must plan ahead if they wish to avoid moderate to serious negative growth.

International cooperative research and development should be given serious consideration as a growth strategy by companies, industries and government entities. The needs for and potential benefits of this strategy can be best illustrated by industrial history in the U.S.A. during the last 40 years.

America entered World War II with a faltering consumer economy and industrial research impaired by the effects of the great depression. However, large-scale national government sponsorship of industrial modernization and the accompanying R&D resulted in a substantial technological improvement of American industry by the end of the war. This industrial capability and the trained R&D organizations were thereafter quickly adapted to peacetime products such as automobiles, electronics, passenger aircraft, improved household appliances, and entertainment devices such as radios, hi-fis and television. America subsequently enjoyed large positive balances of trade and established a worldwide lead in science and technology, particularly as applied to industrial goods.

Figure 1 shows total funding of R&D in the U.S. from 1952 through 1984. Since the late 1970s, companies and governmental agencies have increased R&D expenditures

for new processes and products at rates substantially above the dollar inflation rate. Current U.S. R&D funding continues to exceed substantially the combined expenditures of Japan, Europe, and other Asian industrial economies. Despite a continuing growth in R&D, however, America has seen other countries gradually and steadily capture markets and trade with a reduction in its market share and a change to a growing negative trade balance.

World Market Share

The growth in world market share has been especially noteworthy among the Pacific rim countries of Asia. Advanced methods of communication and growing education in science and management have formed a base for larger and more successful R&D programs, and for more rapid and effective application of new technology either developed or obtained by licensing. Another aspect in the use and management of R&D has been the trend of developing countries to subsidize new plants that can take advantage of readily available low cost labor and indigenous natural resources. Such plants are often owned by inventive and creative foreign companies.

Despite the worldwide growth in R&D, most countries are generally experiencing a lower return per unit investment in research. The costs of facilities and technical people have increased rapidly. (See Table 1.) The average time to complete new R&D projects has substantially lengthened for many reasons, but most notably to take measure of and provide solutions to environmental problems that may be created by new developments. But if the increasing world populations are to be adequately fed, and if international political stability is to be improved, the R&D growth must continue. It is in this environment that cooperative research can perhaps provide many advantages.

Many companies in the U.S., including Union Oil Company, have been participating in cooperative R&D ventures in recent years to a growing extent. Establishing a cooperative research laboratory reduces the cost to each member to only a fraction of what it would be if done alone. Each member company can then participate in more projects, or can do more work on a single project without increasing the company's research budget. In the U.S., there are favorable tax considerations for joint ventures. All costs are taxable in the year spent, rather than capitalized over a long term. This is particularly attractive for high-risk and/or long-term projects. By choosing technical talent and equipment wherever they can be found, the cooperative research project can begin more quickly. There is no need to hire qualified scientists and engineers away from other companies, and often experiments can be started with existing equipment and

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