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Spinoff from DoD R&D? Not Much, Study Finds

A committee working under the auspices of the National Academy of Engineering, the nation's most prestigious organization for engineers, has come close to labeling as a sham the oft-made claim that the massive amount of money which has been poured into space and defense research has resulted in widespread spinoff benefits to society.

"With a few exceptions, the vast technology developed by federally-funded programs since World War II has not resulted in widespread 'spinoffs' of secondary or additional applications of practical products, processes, and services that have made an impact on the nation's economic growth, industrial productivity, employment gains, and foreign trade," the committee states.

It goes on to note that there is a huge amount of technology developed in federal laboratories which could be exploited for the public good, but "a plethora of structural and institutional barriers exist in the federal government and the private economy to prevent the efficient and effective use of this technology."

In 1972, when the now-defunct Office of Science and Technology put together Nixon's historic message on science and technology, the talk then was of finding ways of putting R&D to work in solving "critical national problems." Nixon's message promised that the federal government would seek to find ways to stimulate private investment in R&D and to get technology which had been developed in

(Continued on page 2.

IRS Querying Travel Writeoffs

One of the more charming perquisites of the scientific life, the tax-deductible conference trip with playtime thrown in, is drawing dirty looks from the Internal Revenue Service as part of a general crackdown on questionable "business" deductions.

With conferencing an historic ingredient of the research profession, and the provision of conference services and facilities a booming and increasingly competitive business, recreational aspects have come to be loudly touted in pitches for the patronage of scientific groups.

However, according to IRS Commissioner Donald C. Alexander, who discussed the subject in a speech last month in Washington, abuses have reached the point where IRS is disallowing what amount to no more than "vacations in disguise."

Citing the case of a physician who went to a convention and then took a post-convention cruise with "professional talks" on the ship, Alexander notes that a tax court decision allowed all the costs of the convention to be deducted, but accepted only 20 percent of the cruise costs.

Deductions claimed for cruises and other holiday-type activities, an IRS press release states, will henceforth be subjected to additional scrutiny, and where doubt exists, the taxpayer will be required to provide data to substantiate the claim that the holiday setting was actually devoted to professional activity.

In Brief

With gasoline supplies nearly back to normal, Washington is beginning to show a perceptible lessening of urgency about energy-related measures. A House-passed bill to give NASA $50 million for solar demonstration projects is bogged down in jurisdictional squabbles in the Senate, and the problem is compounded by the Administration's contention—as voiced by NSF Director Stever—that the present research base is inadequate for moving on to large-scale demonstration efforts.

Fulfilling the prophecy of space-shuttle opponents who described the multi-billion venture as a gold-plated solution that will search for problems, the manager of GE's Advanced Programs Space Division, David W. Keller, has proposed that the shuttle be used for orbital manufacture of vaccines. Processing in space, he said, "may help us find a solution to the common cold. . ." Gesundheit!

To help you keep track of Washington's shifting tables of energy organizations: By Executive Order, dated March 28, the President has abolished the Energy Policy Office, which he established last June, and has assigned its remnants to the Oil Policy Committee, which is chaired by the head of the Federal Energy Office.

Meanwhile, NSF announces the creation of an Office of Energy-Related General Research as part of its Research Directorate, and also announces the establishment of "a separate program on the Environmental Effects of Energy, in RANN's (Research Applied to National Needs) Division of Environmental Systems and Resources, to determine the effects of energy resource extraction, conversion, and use on the natural environment."

AEC Very Quiet about Failure of Rio Blanco Test

In keeping with the tradition that government agencies trumpet their successes but keep quiet about their failures, the Atomic Energy Commission hasn't been saying much recently about Project Rio Blanco, the 90-kiloton underground nuclear explosion which was set off last year in Colorado amid a gusher of protests. However, a check with AEC officials confirms that the experiment has turned out to be less than a resounding success.

Since a technical failure could well prove fatal to the AEC's already tottering plan to set off thousands of Rio Blanco-type explosions to blast natural gas out of a layer of sandstone deep under the Rocky Mountains, the AEC's silence on the matter is not altogether surprising, particularly in view of the fact that the plan has picked up a raft of opponents to whom news of problems is akin to manna from heaven.

A hint that something went wrong with Rio Blanco is buried in the sixth paragraph of a nine-paragraph announcement put out by the AEC's Denver office, but the blandness of the announcement belies the fact that the experiment failed to meet what AEC officials had previously described as its "major objective."

Rio Blanco was the third underground nuclear explosion in a series designed to see whether nuclear weapons technology can be used to get natural gas out of "tight" rock formations where it is trapped in small isolated pockets. The idea is to blast out a cavern about a mile underground, let it fill with gas released by fractures in the surrounding rock, wait until the radioactivity has declined to an "acceptable" level, and bring it to the surface.

If the technique is ever going to be used commercially, some method must be found for fracturing a thick layer of gas-bearing rock to produce a high

(Continued on page 4.)

Head of NAS Herbicide Study Assails Kistiakowsky

The venerable National Academy of Sciences continues to reverberate with angry exchanges following successful efforts by dissident members to get a jump on the Defense Department in making public a Vietnam defoliation study that the NAS carried out under a Defense contract.

The study, which was ordered by Congress, presented a horrendous picture of the effects of defoliation and was leaked to the press (SGR Vol. IV, Nos. 5 and 6) because of fears that if initial release came from DoD, the public impact would be blunted by obfuscatory statements from the military.

Among those taking the lead in getting the report to the press before official release and in criticizing it for not being even harsher, was George B. Kistiakowsky, retired vice president of the Academy, who has long been at loggerheads with Academy President Philip Handler. While serving as vice president of the Academy—he reached the mandatory retirement age last year and was required to step down while the report was in the mill—Kistiakowsky was responsible for appointing the panel that was required to pass on the quality of the report. The panel is widely credited with forcing the study committee to bear down hard on the subject and produce a report that demolished DoD's contention that defoliation had a relatively limited ecological effect.

Following widespread press coverage of leaked versions of the report, things quieted down for a while at the Academy, but just last week, the chairman of the committee that conducted the study, Anton Lang, of Michigan State University, took out after Kistiakowsky in the letters column of the *Washington Post*.

The committee, he wrote, "operated with the understanding that the report would not be released, nor commented upon, before it was in the hands of Congress and had been released by the latter. Other members of the Academy who were given the report for review purposes were under the same obligation.

"I do not know," he continued, "how Dr. Kistiakowsky was authorized to comment on and criticize a report before it was made public. This is not the normal procedure in science; and in this case represents a clear and blatant breach of confidence. . . .

"I find it particularly regrettable that while you gave great prominence to criticism of the committee and disagreements within the latter (although they were limited to one major problem among many), you did not say one word on the constructive aspects of its report. . . .

"Reading your account of the Committee's efforts one cannot help feeling that you and Dr. Kistiakowsky were much less concerned with the meaning of the military herbicide program to Vietnam and the Vietnamese — the country and the people directly concerned and let us not forget, our allies — and with a constructive approach to the problem than with having another horror story."

With the Academy's annual meeting scheduled for the end of this month, it may be assumed that we have not heard the last of this matter.

Law Suit Challenges Academy Committee Secrecy

The National Academy of Sciences' tradition of performing most of its government advisory work in mole-like secrecy is under challenge in a lawsuit filed by an independent, Nader-style organization known as the Public Interest Campaign.

The suit, filed March 15 in the US District Court of the District of Columbia, is specifically aimed at acquiring the records and opening up the proceedings of the Academy's Committee on Motor Vehicle Emissions, which is under contract to advise the Environmental Protection Agency on enforcement of the Clean Air Act. However, if successful, the suit could have a devastating effect on the Academy's operating style, which is predicated on the assumption that candor thrives in secrecy and that, therefore, specialists who are summoned to help the Academy fulfill its congressionally chartered role of adviser to the federal government should meet in private.

The challenge to the Academy is based on the Freedom of Information Act and the closely linked Federal Advisory Committee Act, which together were intended to let the public in on the operations of the Executive Branch by severely limiting the grounds for both holding back federal documents and closing advisory meetings to the public. The two measures are a long way from converting government to a fishbowl operation, but they have provided levers for prying loose a good deal of information that previously was arbitrarily withheld. The Academy has not yet formally replied to the suit, but on the basis of past attempts to open it up, it can be expected to contend that, though Congressionally chartered and deep in government work, it is a private organization and as a consequence is outside the scope of both acts.

The legalities are actually a bit fuzzy. Though the boundries between public and private have been greatly eroded in many American institutions, the Academy has most of the traditional attributes of a private organization, even though it is so tightly linked to the federal government that it is included in the *Congressional Directory's* list of federal agencies and until recently was entered in the Washington, D.C., telephone directory under US Government. Nevertheless, it is privately chartered, elects its own officers, and receives no direct appropriation from the Congress; rather, its government funds are received under contract from federal agencies. Furthermore, though the Federal Advisory Committee Act does not explicitly exclude the Academy from its provisions, it was stated during House floor debate that it was not intended that the measure apply to the Academy or organizations working for the government on contract.

Nevertheless, the Advisory Committee Act provides some support for the contention that advisory operations such as those conducted by the Academy are within its scope. Thus, the Act states that "The term 'advisory committee' means any committee, board, commission, council, conference, panel, task force, or other similar group. . . .established or utilized by one or more agencies, in the interest of obtaining advice or recommendations for the President or one or more agencies or officers of the Federal Government. . . ."

Before taking legal action, the president of Public Interest Campaign, Louis V. Lombardo, asked Academy President Philip Handler for a formal opinion on the applicability of the Advisory Committee Act to the proceedings of the Committee on Motor Vehicle Emissions.

A reply was furnished by the Academy's executive officer, John S. Coleman, who piously asserted, "That the Academy is able to obtain (privileged) information depends on large measure upon its unquestioned integrity, independence and objectivity. In itself, this ability is a valuable resource to the federal government. The application of the regulatory provisions of the Federal Advisory Committee Act to the deliberations of the Academy Committees could seriously compromise this independence and objectivity."

NIMH Puts Restrictions On Psychosurgery Support

The federal government's long-awaited guidelines governing the use of psychosurgery to control "abnormal" behavior are now undergoing final review in the top echelons of HEW, having been drawn up by staff members of the National Institute of Mental Health.

As set out in a memorandum signed by NIMH director Bert Brown and sent to Assistant Secretary for Health Charles C. Edwards, the proposed guidelines would prevent federal aid from being used to support the most controversial applications of psychosurgery—those operations performed on children, prisoners and mental patients detained in institutions against their will—but they would stop well short of calling for a flat ban on the irreversible behavior modification technique.

Since psychosurgery has generally been performed with hopelessly inadequate experimental controls, there's a great division of opinion whether or not it even works as its proponents claim, and until such basic disagreements can be resolved, NIMH is proposing that the technique should be re-

(Continued on page 6.)

Joint Atomic Committee Fights for Energy Role

There's probably no institution more prone to turf fighting and jurisdictional blood feuds than the US Congress, and a good example of bloodletting is about to emerge over the Bolling Committee's proposals for revamping the committee structure of the House of Representatives (SGR Vol. III, No. 22).

Although Wilbur Mills, the powerful Arkansas Democrat, is likely to be in the front line, protecting the authority of his Ways and Means Committee, which would be decimated by the Bolling proposals, the Joint Committee on Atomic Energy (JCAE) is the first off the mark with a counter proposal to extend, rather than diminish, its jurisdictional patch.

The Bolling proposals would designate the House Committee on Science and Astronautics as the preeminent committee on energy research and development, which means that it would handle some bills that are now the exclusive prerogative of the JCAE. Although the Bolling proposals say nothing about the JCAE as such—being partly a committee of the Senate, the Joint Committee is outside the purview of proposals for revamping committees of the House—the effect of the changes, if they are implemented, would clearly be to clip its wings.

Believing that the best means of defense is attack, the two senior Senate members of the JCAE, John Pastore (D-R.I.) and George Aiken (R-Vt), and House member Rep. Orval Hansen (D-Idaho) have introduced bills into their respective legislative chambers which would extend the committee's jurisdiction to cover not just atomic energy, but all aspects of energy research and development. The committee would be renamed the Joint Committee on Energy, and its membership would be increased from 18 to 28.

The Joint Committee is already about to be weakened because its two most senior House members, Chet Holifield (D-Calif) and Craig Hosmer (R-Calif), are leaving Congress after long stints at the helm of the federal government's nuclear energy policies, and there is considerable sentiment in Congress for setting up a new legislative structure to handle the slew of legislation that all Congressmen are now duty bound to purpose.

But, in the dim past, when environmental protection was all the rage, there were plenty of calls for new Congressional arrangements for dealing with that topic, so why should the energy crisis be more effective in bringing about changes in the Congressional committee structure?

One reason is that Congress is moving along with a proposal to set up an Energy Research and Development Administration (ERDA) by bringing together most of the energy research programs of the federal government into a single agency organized around the laboratories of the Atomic Energy Commission. Although the Administration, which strongly supports the ERDA proposal, has made great play of the fact that it wouldn't require any change in the Congressional committee structure, ERDA would come under the purview of about eight committees.

So the Joint Committee has seized its chance and proposed that ERDA should come under the jurisdiction of only one committee—the Joint Committee on Energy.

But the proposal has already fallen afoul of Senator Henry M. Jackson (D-Wash), the chairman of the Senate Interior Committee, who has carved out a place for himself as Capitol Hill's most prominent spokesman on energy matters—mostly by riding roughshod over other committee jurisdictions. Jackson said in a Senate speech that energy policy is too complex a matter to be left to a single committee. The proposal would also rob him of a major advantage in his quest for the Democratic presidential nomination in 1976.

In any case, nothing is likely to happen to the proposal until Congress has disposed of the ERDA legislation. Although the prospects are now bright for Senate passage of the bill, which passed the House in December, it's going to take some time to tie up the loose ends.

In the meantime, if the House of Representatives agrees on the Bolling proposals—or even just on those of them that deal with energy matters—the Joint Committee's pitch for more power would be preempted. The House is the sole master of its own internal structure, and so if it agreed that energy research and development bills should be sent to the Science and Astronautics Committee that's where they will go, no matter what happens to the Joint Committee on Atomic Energy.

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Global Competition

The New Reality





The Report of the President's Commission on Industrial Competitiveness

JANUARY 1985
VOLUME 1

Global Competition

The New Reality

The Report of the President's Commission
on Industrial Competitiveness

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PRESIDENT'S COMMISSION ON **Industrial Competitiveness**

John A. Young
Chairman

January 11, 1985

Dear Mr. President,

In forming the President's Commission on Industrial Competitiveness, you called attention to the new reality of global competition faced by American industry, both at home and abroad. Your request for recommendations on ways of improving our Nation's ability to compete was a welcome challenge, one to which our diverse members brought a wealth of experience and perspectives.

After more than a year of close scrutiny, the Commission has concluded that America's ability to compete in world markets must be improved, that we should view the challenge as immediate, and that the positive effects of the recommendations we make will be felt far into the future.

This report summarizes our findings and recommendations in the four areas we believe determine our present and future competitiveness--technology, capital resources, human resources, and international trade. In addition, we have also developed an overall policy framework for both private sector and Government actions required to improve America's ability to compete.

Mr. President, it has been a great honor to serve you and the Nation. The competitive challenge calls for the leadership only you can provide. We thank you for your vision, interest, and initiatives in making competitiveness a priority on our national agenda.

Respectfully submitted,

John A. Young

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SUMMARY STATEMENT

Americans were the first and only people ever to walk on the moon. That is because the very visible challenge of Sputnik spurred us to action.

Today, a less obvious threat calls for our concerted response. Our ability to compete internationally faces unprecedented challenge from abroad. Our world leadership is at stake, and so is our ability to provide for our people the standard of living and opportunities to which they aspire.

During the past year, 30 leaders from American business, labor, Government, and academia have come to remarkable consensus on the answers to the questions below.

Are We Meeting the Competitive Challenge?

Not well enough. Our ability to compete in world markets is eroding. Growth in U.S. productivity lags far behind that of our foreign competitors. Real hourly compensation of our work force is no longer improving. U.S. leadership in world trade is declining. Finally, pretax rates of return on assets invested in manufacturing discourage investment in this vital core of our economy.

What Is at Stake?

Many important national goals can be attained only if we are competitive in world markets. The U.S. position as a world leader, the ability to provide a rising standard of living for our people, our national security, and the ability of Government to fund domestic programs--all these goals depend on the ability of American industry to compete both at home and abroad.

What Has Changed?

In the past two decades, the global economy has been transformed around us. Vigorous new industries from countries in the Pacific Basin and elsewhere directly challenge many of our own largest and most successful industries, offering high-quality, attractively priced products. The currently strong U.S. dollar--which makes American products more expensive--has significantly compounded the competitive challenge. Technology is changing rapidly, and it quickly crosses national borders. An aging U.S. work force faces broad and relentless forces of change.

What Needs To Be Done?

The policies and practices we adopt should seek to strengthen our competitive performance in four major ways:

- Create, apply, and protect technology--Innovation spurs new industries and revives mature ones. Technological advances lead to improved productivity--an essential ingredient for our standard of living.

How Much Will It Cost?

The program of the President's Commission on Industrial Competitiveness does not require any major increases in Federal spending. In some cases--such as the organizational changes called for within the Federal Government--the consolidation can create cost-saving efficiencies. In the few instances where additional Federal expenditures are called for, they are minimal outlays that represent a prudent investment in the future.

Where Do We Go From Here?

Americans must take on the challenge of competitiveness as the economic agenda for the next decade. This report analyzes our current competitive performance and suggests how it can be improved. The recommendations represent a wide variety of ways that Americans in industry, Government, and academia can respond to the challenge of competitiveness. If we heed these calls to action with a shared sense of national purpose, we can shape a tomorrow for which future generations will be thankful.

What Competitiveness Means and What Is at Stake

What competitiveness means to a nation is, to some degree, a matter of choice. The definition below was chosen to highlight the significance of competitiveness to all Americans, as well as the manner in which the United States chooses to compete.

Competitiveness is the degree to which a nation can, under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously maintaining or expanding the real incomes of its citizens.

This definition shows the stakes involved. Our ability to compete in world markets is the very foundation for our rising standard of living. It is not our goal to compete by decreasing the real incomes of our people. Other nations may compete by having low wage levels, but that is not an option America would choose. The challenge, then, is to maintain our high standard of living in an increasingly competitive world environment.

The definition above contains another choice worth noting. A free and fair world trading environment is the ultimate test of competitiveness. Only in this environment can products be judged strictly on the merits of their cost, features, and quality--fundamental factors that influence any consumer's buying decision. Thus, a free and open world trading system best serves the interests of all consumers and all nations.

Any definition also includes a set of connotations and assumptions that need clarification. Among the important ones to note here are the following:

- Competitiveness is not a winner-take-all game. All nations should benefit from the economic growth of their trading partners. America seeks a healthy world economy. We need markets for our products and sources for the goods and materials we require. The goal of competitiveness is not to create disadvantages for our trading partners, but to strengthen and better deploy the advantages America has at her command.

- Competitiveness is not an end in itself; it is a means to an end. Competitiveness means a high standard of living and the growing wealth that allows us to attain other vital national goals--employment opportunities for our people and the domestic services and national security our Government provides. Being competitive is what pays for whatever public or private goals we choose to pursue (see chart 1).

- Competitiveness does not require American leadership in all economic sectors. Yet it is important for the United States to maintain a broad and diverse industrial base. The breadth of our industrial base provides a rich environment for the creation and full development of new technologies and markets. It is also vital to our national security.

THE NEW GLOBAL ECONOMY MAKES COMPETITIVENESS VITAL

Americans are not used to the idea of comparing our economic strengths to those of our trading partners. Our unchallenged leadership position after World War II and our vast domestic economy have led us to ignore the competitive consequences of our actions--or our inaction.

Yet the environment in which American business operates has changed dramatically over the past two decades. The interdependence of the U.S. economy with that of our trading partners, the rapid growth of opportunities in world markets, the transportability of technology, and the rise of aggressive new competitors--all these make improving our relative ability to compete in world markets an urgent priority.

Today, imports and exports represent twice as large a portion of our gross national product (GNP) as they did just two decades ago. Almost one-fifth of our industrial production is exported, and fully 70 percent of the goods we produce compete with merchandise from abroad. Quite simply, no longer is there a truly domestic U.S. economy. We are inextricably linked to our trading partners in countless important ways.

- Since 1970, the total dollar volume of world trade has grown sevenfold. International trade is growing faster than the U.S. economy, and it represents a vast area of opportunity for American business. If we are to reap the benefits of this growth, our competitiveness is an urgent consideration.

- The United States no longer commands an unchallenged lead. Our international competitors are closing the gap. Some slippage of our postwar dominance was both inevitable and desirable, since we need healthy trading partners. But we should be concerned about how rapidly the U.S. lead has diminished.

- New competitors represent a final change in the global environment in which U.S. firms operate. Japan and the newly industrializing nations of the Pacific Rim--including Taiwan, South Korea, Singapore, Hong Kong, and Malaysia--now represent our major competitive arena. The United States now does more trade with these Pacific Rim countries than with all of Europe combined. If our trade in this arena continues to grow at its current rates, by 1995 America's trade with the Pacific Rim will be double the size of our European trade.

- Technology is highly mobile, and these nations are aggressively applying it, along with their financial and human resources. They have benefited from governmental policies designed to nurture their export potential. These initiatives have distorted previous trade flows and constitute new rules of competition to which we have not yet responded effectively. Finally, our Pacific Rim competitors have focused attention on developing manufacturing expertise, and their products are often more attractive, in both price and quality, than our own.

10 sectors. Electronics posted an overall trade deficit in 1984, and our bilateral electronics trade deficit with Japan is likely to surpass our deficit in automobiles. Loss of U.S. position in vital, high-growth technology markets has enormous implications for our future competitiveness (see chart 6).

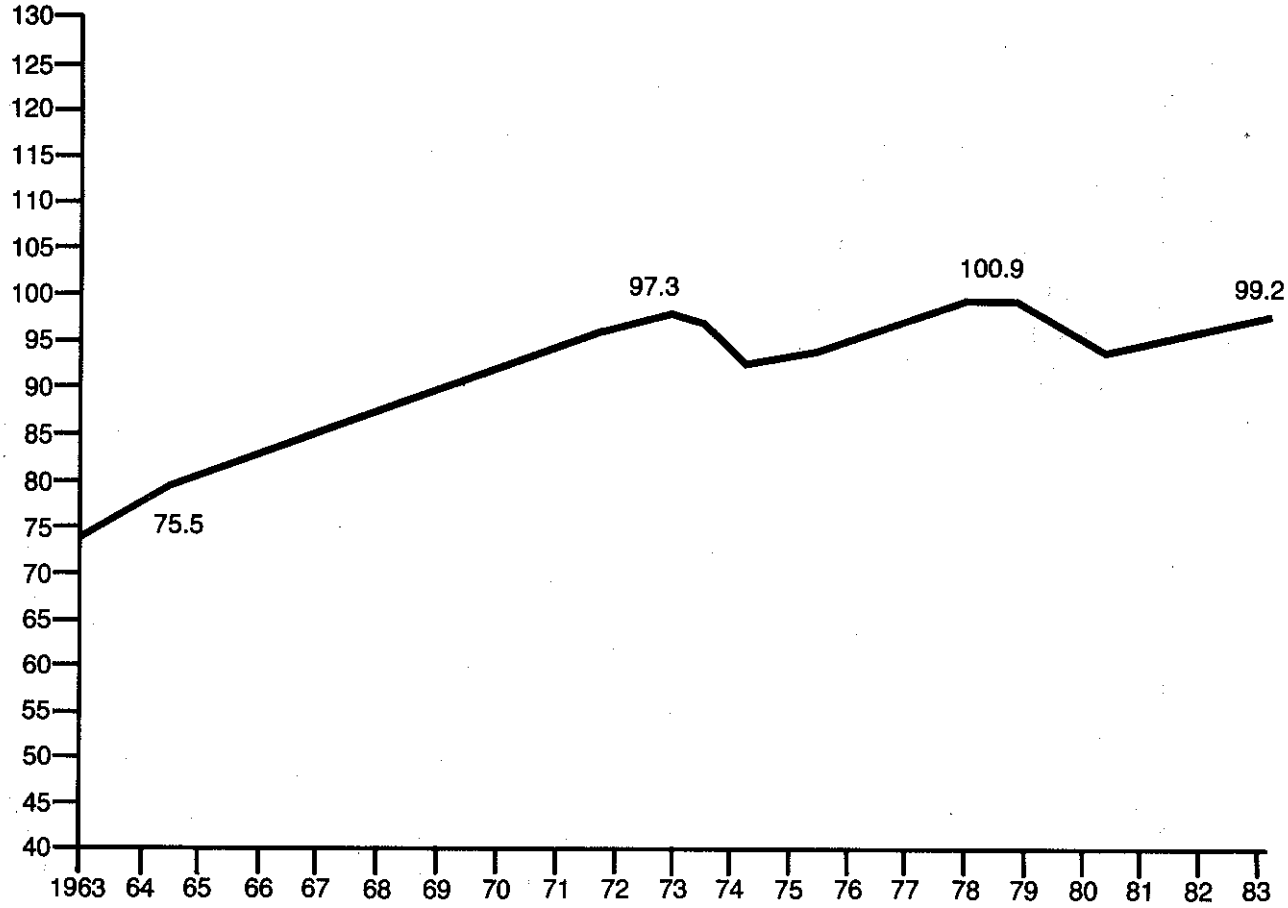
Thus, there is convincing evidence of a declining U.S. ability to compete--warning signals that should compel us to make the concerted response called for in this report. With the recent economic recovery, some indicators show signs of improvement. As a result, some may disagree with the seriousness of the competitive challenge we face. Yet we cannot assume that there has been a permanent reversal of the decades of decline noted above. Our task is not yet completed; indeed, we have barely begun.

Further, adopting the recommendations that follow will strengthen our economy, no matter what our diagnosis of its current health. Because the recent recovery may not have permanently reversed the long-term trends of decline, we must look to the long-term effectiveness--and necessity--of the Commission's plan. If we fail to act, the consequences will be grave. We have everything to lose by our inaction, and everything to gain by acting on the recommendations to follow.

(Further evidence of declining industrial competitiveness is presented in "Some Rationalizations for Our Current Performance," page 15.)

CHART 3

Real Compensation Per Hour in the Business Sector, 1963-83
(Index, 1977 = 100)

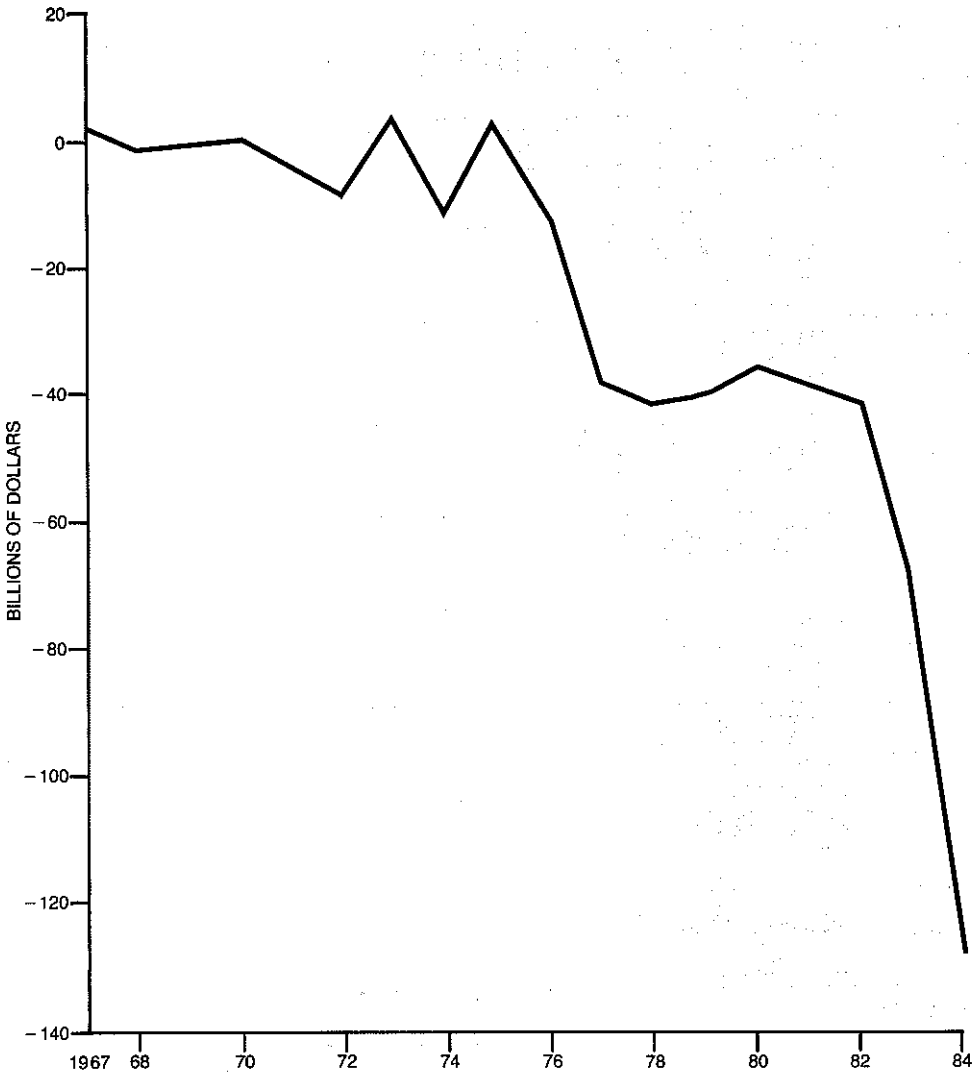


Increasing our standard of living is the goal of competitiveness. Yet today the real compensation (benefits plus wages) of our work force is below its 1977 level, which indicates a declining U.S. ability to compete.

Source: Economic Report of the President, February 1984.

CHART 5

Trade Deficit (Merchandise Trade Balance), 1967-84
(Billions of Dollars)



The strong dollar has greatly increased our merchandise trade deficit by making U.S. goods more expensive both at home and abroad. However, lowering the value of the dollar will not totally solve our trade deficit problem. (See "Some Rationalizations for Our Current Performance," page 15.) If we respond to the deficit with protectionist measures, there is the danger that we will be lulled into inaction and do nothing to improve our underlying ability to compete.

Source: U.S. Department of Commerce.

SOME RATIONALIZATIONS FOR OUR CURRENT PERFORMANCE

A number of arguments have been suggested to explain the disappointing performance of American industry, both at home and abroad. However, these discussions neither explain away our current situation nor provide any insights on how to improve our ability to compete. Yet because these arguments contain some elements of truth--and are most comforting--it is appropriate to discuss why they are inadequate explanations.

Rationalization: The strong U.S. dollar is the main cause of our declining position in world markets. The strong U.S. dollar is the reason U.S. firms are having trouble competing, and if it moves to a lower level, we will regain the position we have lost.

Response: While the strong dollar has contributed greatly to the trade deficit, our competitiveness problem is much broader. Our slow productivity growth, stagnant wages, and high capital costs are not caused by the strong dollar. Thus the fall in the dollar, if it occurs, will not solve the long-term problem. A lower value for the dollar did not cure the trade deficit in the 1970's, when, despite a 15 percent depreciation, our trade deficit actually increased. Moreover, it is far from certain when and by how much the dollar will fall, in view of the robust financial flows into the U.S. economy by foreign investors.

It is also important to note that a large depreciation of the dollar would mean that more U.S. exports are required to buy a given quantity of imports. A depreciation of the dollar means a loss in purchasing power for the American consumer, which means a lower standard of living for us all.

Rationalization: We are becoming a service economy, so deterioration in manufacturing is natural. The U.S. trade deficit in manufactured goods has been partially offset by a trade surplus in services. Thus, our advantage in services can compensate for the declining position in manufacturing.

Response: Though competitiveness does not require that a certain percent of our GNP be devoted to manufacturing (indeed, Japan has seen a decreasing portion of GNP in manufacturing), the bright picture in services in the United States does not compensate for our deteriorating position in manufacturing. After deducting dividends, interest, and other service payments on U.S. investments abroad, the actual volume of service exports remains small compared to the volume of goods exported. Most of the services produced in the United States are not traded. These include medical care, educational, and government, all major U.S. employers today. Thus, despite the growth of employment in service industries, trade in services is unlikely to replace lost trade in manufacturing.

More important, traded services and manufacturing are often closely linked. Services such as financing, insurance, and process engineering, for example, are often performed for manufacturing industries. Our ability to be competitive in such services in part depends on the presence of a strong U.S. manufacturing sector from which U.S. service firms can draw experience. If the United States loses competitiveness in manufactured goods, it risks losing position in supporting services. A healthy manufacturing

IMPROVING AMERICA'S ABILITY TO COMPETE

If we are to compete effectively in the future, we must build on our strengths and minimize our weaknesses. Though an exhaustive list of all the factors affecting our competitiveness would include just about every aspect of our economy, four major areas stand out--technology, capital resources, human resources, and the environment in which we conduct international trade.

The United States may not be able to create a "comparative advantage" in each of the areas to be discussed. For example, our high standard of living means our people earn higher wages than their counterparts abroad. That is a competitive disadvantage that Americans will doubtlessly choose to keep. Similarly, the role of the dollar as international currency adds to its strength--and thus to the price of our products in world markets. These competitive disadvantages may not be entirely overcome, but we can look for ways to neutralize their effects (see chart 7).

In other areas, the United States has advantages that should be strengthened. Technology is the most important of those, and our lead in this area should be increased. Likewise, our skilled and enterprising populace is an advantage we can use much more effectively. In areas where we already have a competitive advantage, we must seek to unleash our full competitive potential.

Providing a trade environment in which U.S. firms can compete successfully is another challenge. Meeting it will require close scrutiny and improvement of the rules of international trade, as well as our own policy-making process and domestic laws covering trade and export controls.

The following four sections discuss our past performance and relative strengths in technology, capital resources, human resources, and trade. As we analyze these four determinants of competitiveness, we have to ask ourselves two basic questions. First, do the trends over time show an increasing or decreasing ability to compete? Second, how are we doing compared to our competitors abroad? While the four determinants of our competitiveness are treated separately, it is important to note that they are all interrelated.

CREATE, APPLY, AND PROTECT NEW TECHNOLOGY

Technology propels our economy forward. Without doubt, it has been our strongest competitive advantage. Innovation has created whole new industries and the renewal of existing ones. State-of-the-art products have commanded premium prices in world markets, and technological advances have spurred productivity gains. Thus, America owes much of its standard of living to U.S. preeminence in technology.

Our Competitive Position Today

In order to make technology a continuing competitive advantage for the United States, we need to do three basic things: (1) create a solid foundation of science and technology that is relevant to commercial uses; (2) apply advances in knowledge to commercial products and processes; and (3) protect intellectual property by strengthening patent, copyright, trademark, and trade secret protections. Attaining these goals will require actions on the part of the Federal Government, industry, and our Nation's universities.

There is not enough research and development with competitiveness as its goal. The United States currently spends more on research and development (R&D) than Japan, France, and Germany combined. As a percentage of gross national product, America spends slightly more on R&D than any of our international competitors do. But these figures have led some to a degree of comfort that is unwarranted.

Roughly half of the total R&D done in the United States is funded by the Federal Government, which spends most of its money (about two-thirds) on defense and space programs. And in those two areas, any commercial spillover is not a prime objective. Thus, when we look at what the United States spends on civilian R&D--areas of innovation from which we can reap the greatest commercial reward--we find ourselves behind both Germany and Japan (see chart 8).

In the years following World War II, federally funded R&D projects were important catalysts to commercial industries such as aircraft and electronics. Today, the roles have been reversed in many technologies. Industry is the principal initiator of technological advances--such as state-of-the-art VLSI (very large-scale integration) electronics--and Government is a net user.

If we are comparing our technological position to that of our trading partners, then, it is misleading to include all Government-funded R&D. Given the limited amount of Federal funds spent on any areas of commercial potential, the question of how Government manages its R&D becomes a critical issue. Finally, since Government is the prime funder for basic research--those areas of risky inquiry that are essential for long-term technological preeminence--the competitive consequences of its critical role cannot be overstated.

For these reasons, we should be concerned by the fact that the Federal Government conducts its R&D--including its basic research--in agencies and

organizations with no common management. Each research entity has a mission largely independent of the others, and none has industrial competitiveness as a goal. Also, some $18 billion worth of Government R&D is conducted in more than 700 Federal laboratories employing one-sixth of the Nation's scientists and engineers. Two recent reports have found them in need of major improvement, with overlapping and sometimes obsolete research charters.[1]

Incentives are needed for private R&D. With more and more of our industrial base dependent on new technology, industry must continue to expand its own investment in innovation. But R&D--particularly basic research--is a very high-risk process. Not only are the outcomes of research hard to predict, but often other people will benefit as much from discoveries as those who fund the research that creates them. Private firms may tend to underinvest in R&D because of their difficulty in reaping the full rewards of innovations, especially those with wide-ranging applications. Industry thus needs special incentives to fund R&D.

Universities are under stress. University revenues do not cover the rising cost of research, and engineering faculty salaries do not compete with those of private industry. As a result, fully one-tenth of the Nation's engineering faculty positions are currently vacant. In critical fields like electrical engineering and computer science, some universities report half of their positions as unfilled. As the American Electronics Association stated so well, we are "eating our own seed corn" by failing to produce the faculty required to teach future scientists and engineers.[2] Our scanty harvest shows the result; Japan produces more engineers than we do (see chart 9).

CHART 9

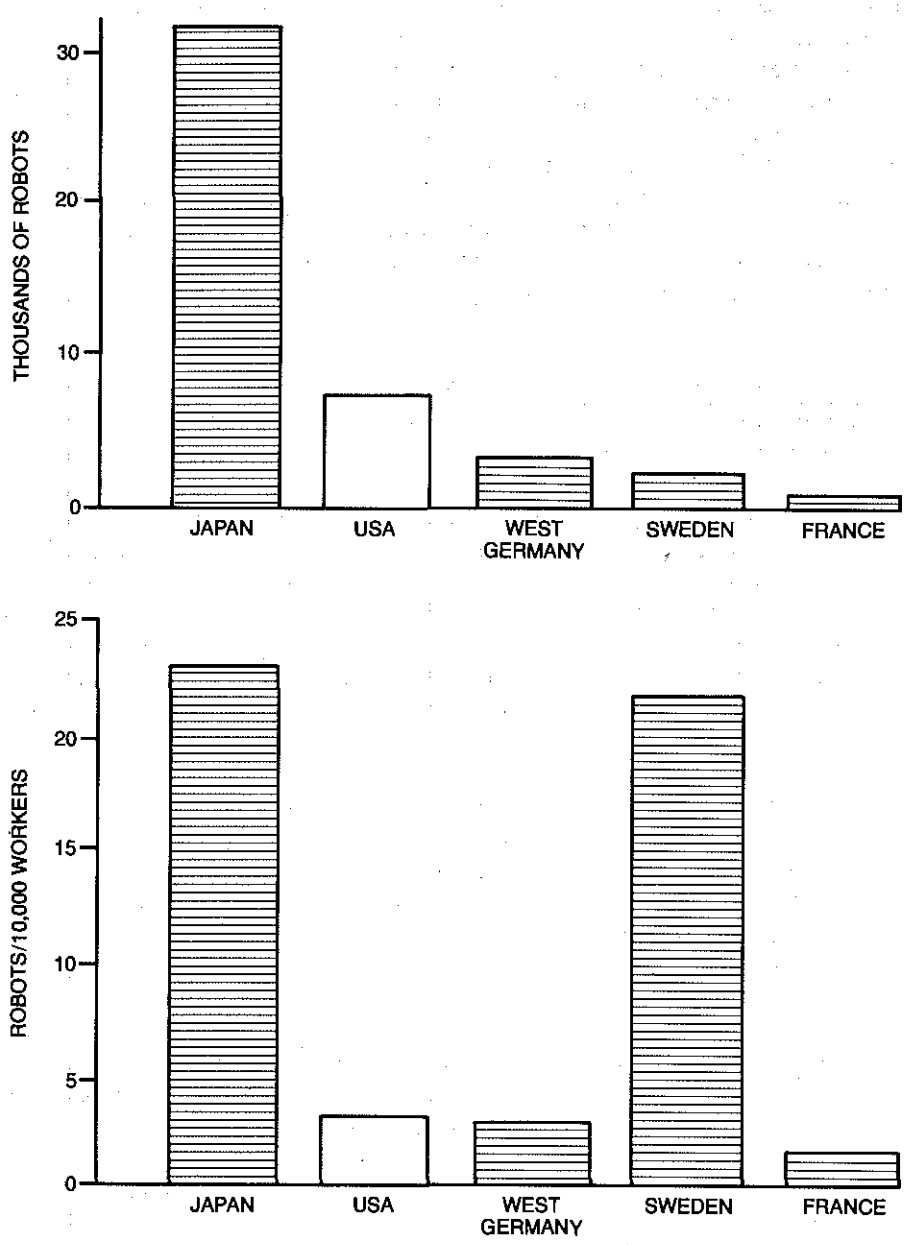
Engineering Graduates for Selected Countries, 1982

Country	First University Degree	
	Total	Per 100,000 Persons
Japan	73,600	62
West Germany	6,800	11
United Kingdom	10,300	18
United States	67,400	29
France	11,900	22

Source: National Science Foundation, International Science and Technology Data Update, unpublished.

CHART 10

International Adoption of Robots, 1982



If we are to be competitive, we must invest in technology to improve the productivity of our work force and the quality of our products. While definitions of robots may differ from country to country, the United States clearly trails some of its trading partners in applying a technology that was first developed in America.

Source: Society of Manufacturing Engineers, prepared for International Trade Commission, 1984.

credit can be helpful if clarified to provide the funds for development of innovative manufacturing processes, machinery, and facilities. Industry should increase support for university and joint private sector research efforts that can lead to new manufacturing technologies.

Universities need to improve the quality and quantity of their manufacturing-related curriculums. We need more technical courses in process-related subjects and more emphasis on courses in manufacturing management. Government funding of university research should include process technologies. Federal agencies that have investigated advanced manufacturing technologies--particularly the Department of Defense and the National Aeronautics and Space Administration--should make special efforts to share what they have learned that can be applied to private sector activities. In turn, industry must also make special efforts to take advantage of technology available from Government sources.

- Strengthen the protection of intellectual property rights. The Federal Government must make the strengthening of intellectual property rights at home and abroad a priority item on its policy agenda. In addition to launching a major policy effort to strengthen protection, Government must be willing to push for even those small changes which, cumulatively, add up to better protection. Detailed policy recommendations have been identified in a comprehensive Commission report contained in volume II, appendix D.

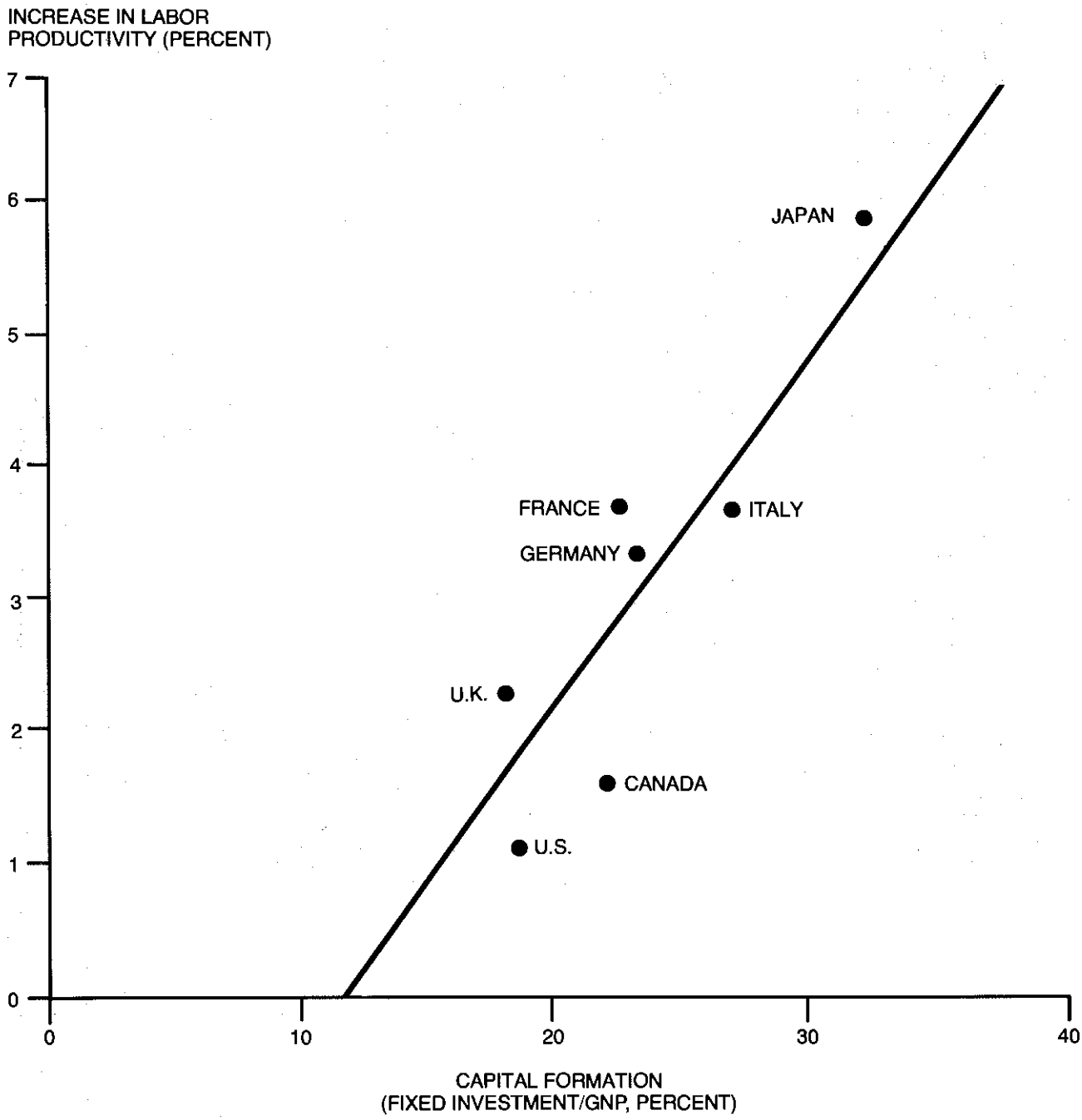
Of special importance are those laws relating to international protection, since many countries provide inadequate measures. The Government, through negotiations on treaties, tariffs, and trade, should not only resist erosion of intellectual property rights, but should strengthen the protection afforded.

A series of technical changes to streamline patent laws and procedures is also needed to strengthen our technological foundation. These are described in detail in volume II, appendix D. Also, because the original intent of the Freedom of Information Act sometimes has been subverted to misappropriate proprietary information, measures are necessary to protect the confidentiality of scientific information American businesses are required to disclose to the Government.

- Balance the legitimate goals of regulation with the need to bring the results of innovation to market. America can accomplish the dual goals of protecting public safety and being first to market with new technologies. The Office of Science and Technology Policy should be given an expanded role to assist with a rigorous scrutiny of how our regulations and our regulatory agencies affect the U.S. ability to innovate and bring new products to market.

CHART 11

Productivity Growth and Capital Formation,
International Comparison, 1960-83



Nations that invest more also have greater productivity growth. The United States ranks poorly in both of these areas when compared to our major trading partners.

Source: U.S. Department of Labor, Bureau of Labor Statistics, 1984; Organization for Economic Cooperation and Development, 1984.

Recent studies find that, compared to the Japanese, U.S. capital costs have been up to twice as high.[4] As a result, our Japanese competitors have been able to invest more heavily in new technologies and thus improve their productivity and the cost-competitiveness of their products. A study by the Semiconductor Industry Association shows that the Japanese success in semiconductors during the 1970's was due, in large part, to the advantage of low capital costs, not superior technology.[5] In short, a lower cost for capital represents a major competitive advantage to our competitors.

Tax and regulatory policies distort capital flows. Where our capital goes is heavily influenced by a myriad of tax and regulatory policies that exacerbate the problems of short supply and high costs. Tax laws discourage savings by taxing the interest they earn but encourage borrowing by exempting interest payments from taxation. Corporate income is taxed twice (both as profits and as dividends and capital gains on stocks), while returns of State and municipal bonds are exempt from taxation. Investors are taxed on their nominal capital gains, not on the real, inflation-adjusted value of those gains. Thus, such investments receive no protection from their dilution by inflation. Startup firms and other high-risk investments are penalized by low limits on the deductibility of capital losses.

The wide variation of effective tax rates from industry to industry also affects the way we invest our capital resources. Indeed, a study recently published by the National Bureau of Economic Research finds that the differences between industry tax rates may have greater competitive consequences than the overall level of taxation. That same study found a bigger gap between industry tax rates in the United States than in the other countries studied. Most ominous, in terms of its competitive consequences, is the fact that investments in America's vital manufacturing industries have the highest effective marginal tax rate--an average of 46 percent, while wholesale/retail trade industries paid an average of 30 percent, and the rest of industry 11 percent in 1982.[6] The sector of our economy most pressured by foreign competition--manufacturing--has the highest tax rate.

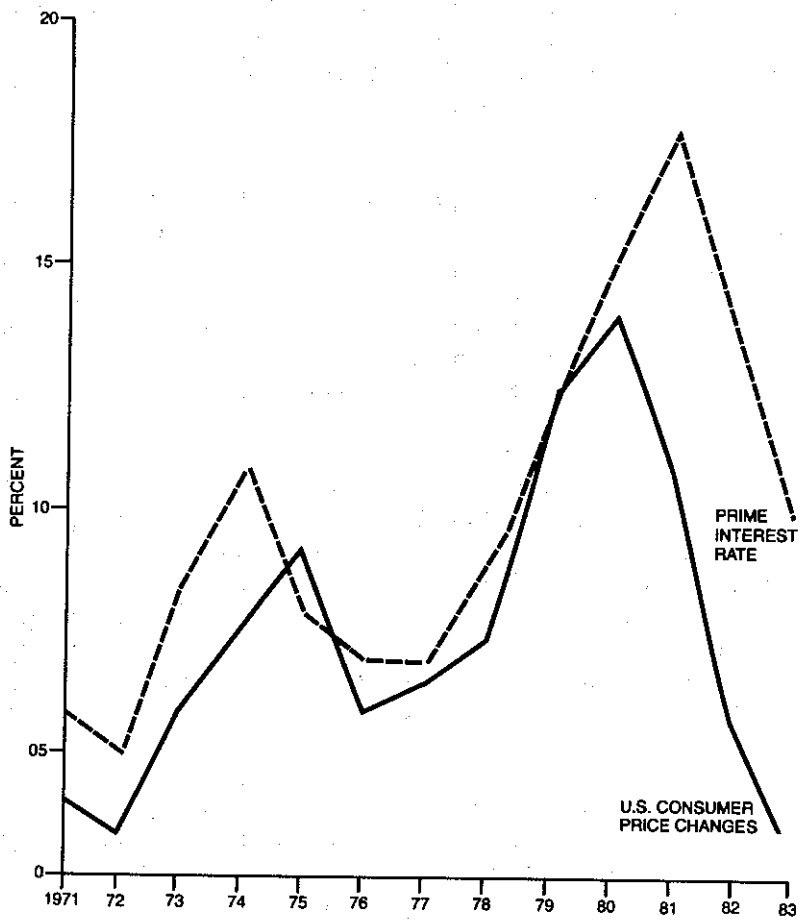
Commission Recommendations

- Reduce the deficit. This goal must be attained by strictly curbing spending growth and emphasizing steady, noninflationary economic growth. No single category of the Federal budget should be considered sacrosanct, but any cuts should be made with a long-term view as to their competitive consequences. A lower deficit will mean that Government is competing less for funds, which will enlarge the supply of capital available for private investment. Reduced competition for capital from the Federal sector will also lessen the pressure on the Federal Reserve System and thus reduce the threat of inflation. The result of these improvements will be lower capital costs for U.S. industry.

- Restructure the tax system. The tax code should be restructured so that capital can be put to work more effectively, its costs reduced, and productive investments stimulated. Such restructuring should include the following:

CHART 13

U.S. Consumer Price Changes and the Prime Interest Rate, 1971-83



Investing and managing for long-term economic growth is a difficult challenge, given the wide fluctuations in interest and inflation rates.

Source: U.S. Department of Labor, Bureau of Labor Statistics; Board of Governors of the Federal Reserve System.

Although great strides have been made over the last decade toward increased cooperation in some industries, teamwork remains the exception rather than the rule. In a discouraging comparison to our strongest competitor, only 9 percent of American workers felt they would benefit directly from the increased productivity of their companies, while a similar survey of Japanese workers showed that 93 percent felt they would benefit from such improvements.[7]

The work force needs help adapting to change. The United States has not fully come to grips with the question of how to help workers in declining industries develop new skills and find reemployment. While analysts estimate that relatively few of the unemployed (5 to 10 percent) can be classified as "displaced," failure to assist them will seriously impede industry's--and their--responsiveness to change. The Job Training Partnership Act currently provides a variety of employment and training services to displaced workers, but some doubts exist as to whether it is adequately funded. Unemployment insurance benefits contain no incentives to seek either reemployment or retraining. Lastly, the U.S. Employment Service, which is well positioned geographically with some 2,000 offices throughout the country, has had its labor-exchange mission seriously diluted by the addition of a plethora of administrative and enforcement duties.

Preparing the American people for changing jobs and employment opportunities is another challenge we must meet if we are to compete effectively. Demographic changes in our work force and the introduction of new technologies in the workplace make it imperative that our people continue to learn all their lives. Word-processing equipment has dramatically changed the jobs of clerical workers. Robots on the factory floor will replace many repetitive, low-skill jobs. Today, the United States has an estimated 9,400 robots in place. By 1992, that number could increase to more than 133,000. Three-fourths of the people who will be in our work force in the year 2000 are already working; our challenge is to maintain their ability to make productive contributions in a rapidly changing economy (see chart 14).

Employers lack incentives to invest in training. Employers are the primary suppliers of formal employee training and retraining. Yet that training is seldom provided systematically or in anticipation of changing needs. With the mobility of our work force and the demands for short-term profitability, training investments can be difficult to justify. Thus, industry lacks incentives for forward-looking investments in developing people.

The ability of our community colleges and vocational schools to assist industry is limited. According to the National Center for Educational Statistics, more than 40 percent of vocational and occupation-specific training is received by postsecondary students. Yet in 1982, on average only 19 percent of Federal vocational funds were spent by States to serve this segment of the population. In addition, vocational and community colleges often lack information about industry's changing skill requirements and thus cannot anticipate and respond to changing needs.

Universities are strapped. Engineering and business education at the university level represents another continuing challenge in developing our human resources. The shortage of engineering faculty (discussed earlier under the heading of Technology) calls into question our ability to train the number of skilled people our industries require. In 1983, the American Electronics Association projected that 200,000 new positions for electrical engineers and computer scientists would be created over the 5-year period ending in 1987--more than twice the number our universities will graduate during that time.[8] U.S. research universities suffer from inadequate funding and obsolete equipment. According to the Association of American Universities, the median age of instrumentation in our Nation's universities is twice that used in industrial laboratories.[9] At the same time, the basic concepts of management are changing, and business schools must reflect the increasing internationalization of our markets and the pervasiveness of technology.

Elementary and secondary education systems still need support. America's elementary and secondary education systems have been the subject of many reports in the recent past, calling into question their ability to produce graduates who are equipped either for work or for further education. The Commission echoes those concerns and notes their competitive consequences, but will not repeat them here. Rather, two additional areas should be addressed in our quest for educational excellence.

First, we must address the Nation's dropout problem. Fully 26 percent of American students fail to complete high school. That means more than 1 million unequipped entrants to the work force each year--a significant disadvantage competitively and a real tragedy personally for those involved.

Second, this Nation has not effectively used technology to enhance its educational offerings. Interactive computers can be powerful learning tools, yet little educational software has been developed that makes full use of their capabilities. "Computer literacy" has become the focus of computer use in schools, yet it is the use of computers as a new and more productive way of learning that offers the greatest potential of educational technology.

Commission Recommendations

- Increase effective dialogue among Government, industry, labor, academia, and other interested parties. One way to strengthen such a dialogue is to improve the consensus-building capabilities of existing Federal advisory committees. The charters and memberships of the committees affiliated with the U.S. Trade Representative and the Departments of Commerce, Labor, and Treasury should be reviewed with the goal of enhancing their ability to address competitiveness issues. Government decisionmaking can be strengthened significantly by providing a forum in which consensus can be reached on the facts of an issue and in which the implicit tradeoffs among policy options can be made explicit. In addition, the President would be well served by the creation of a small staff in the Executive Office of the President to study and advise him on competitiveness issues. This recommendation is reported under the heading of human resources challenges; however, its implementation could have far-reaching impact on America's ability to solve a wide range of competitiveness problems.

• Strengthen the capacity of our universities to train future engineers and business leaders. To help solve the engineering faculty shortage, the Federal Government should make available adequate stipends to encourage our best students to pursue graduate study in engineering, and the Presidential Young Investigator's Award program should emphasize areas of engineering that are experiencing faculty shortages. Funds for engineering research should be augmented; the Administration's 22 percent increase in National Science Foundation (NSF) funding for engineering research in fiscal 1985 is a good beginning. In addition, NSF's new program of cross-disciplinary engineering research centers at universities should be expanded in future years to include up to 25 centers nationwide.

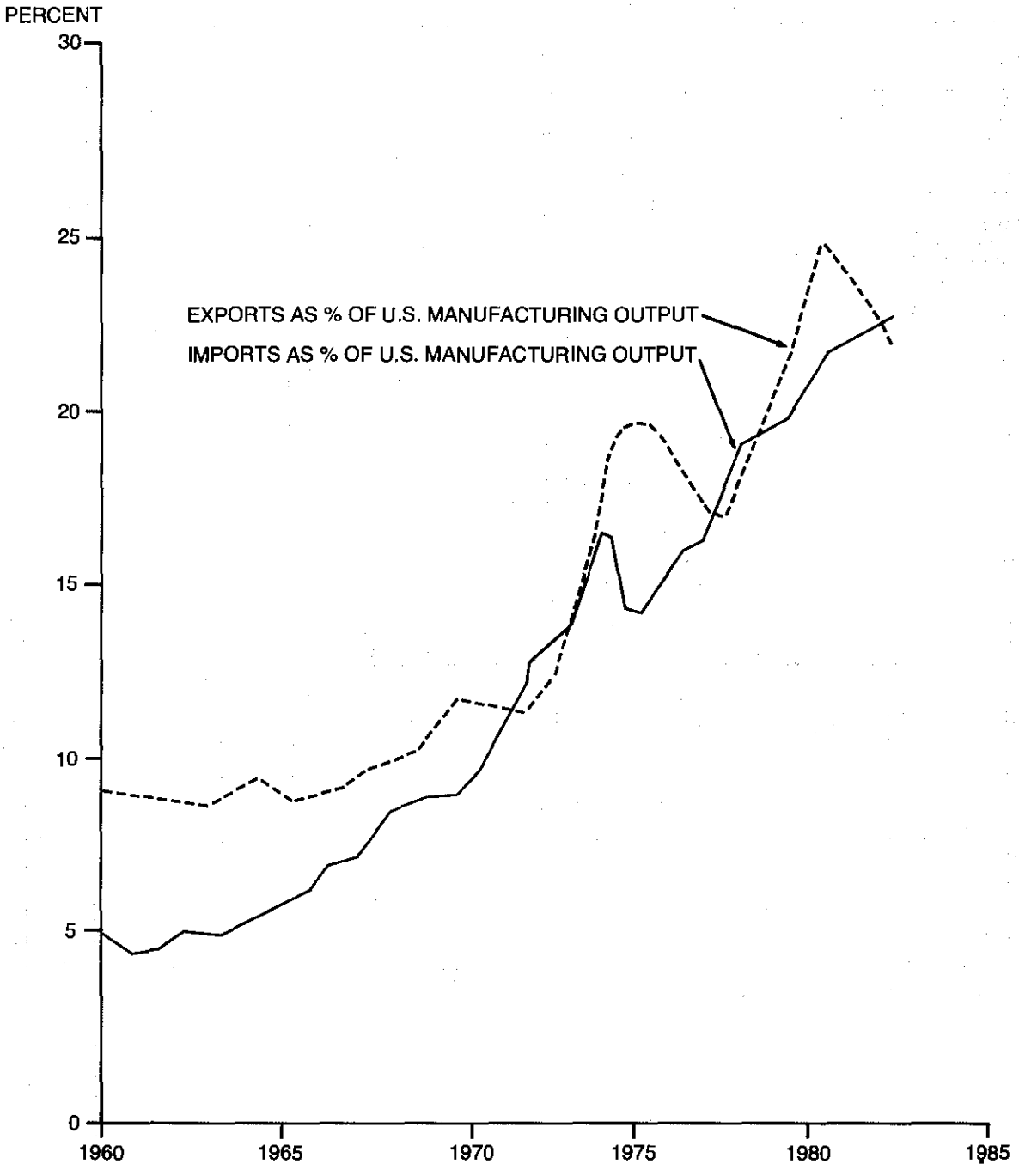
The current emphasis on updating our university equipment and instrumentation should continue, with adequate support for maintenance and operation of modern equipment. In line with the Commission's recommendation under Technology, one way to encourage such updating of equipment would be a tax credit for either industrial funding of university research or equipment donations. University department budgets should provide adequate support for the operation and maintenance of modern instrumentation.

Business schools should undertake a systematic reevaluation of their course offerings to assure that they adequately reflect the changes in our global economy and in technology. The Business-Higher Education Forum is urged to continue its work in addressing the role of business schools in preparing managers for this new era of competition.

• Continue to focus on excellence in elementary and secondary education. The initiatives stirred by recent reports by the National Commission on Excellence in Education, the Education Commission of the States, and others should continue. In addition, effective use of computers in schools and the development of educational software should be supported through federally funded prototype research. Finally, our strivings for more rigorous educational standards should be coupled with strengthened efforts to address the dropout problem. To this end, we should establish public-private partnerships to provide coordinated services in the school setting through programs such as Cities in Schools and Adopt-A-School.

CHART 15

U.S. Trade as a Share of U.S. Manufacturing Output



Both imports and exports represent a significantly greater portion of U.S. industrial production than they did just two decades ago. Yet American attitudes and policies have been slow to reflect this new reality.

Source: U.S. Department of Commerce.

occasions, without a plan--or hope--for recovery or readjustment. At the same time, U.S. trade remedies for "unfair foreign government practices" have been unable to respond to our competitors' new national strategies. These include approaches to trade that encourage specific export industries with a wide range of government policies which, considered separately, may not violate international trade law, but whose aggregate effect is to distort world markets.

Another area in which the United States has yet to respond adequately to changes in global markets can be seen in our own domestic policies. A prime example can be found in U.S. antitrust statutes, which were first enacted when America was isolated from the rigors of international competition. These statutes have often been implemented without giving proper weight to international markets. But U.S. firms no longer operate in a closed economy, and an entirely different picture emerges when a U.S. firm's share of the global market is measured. Yet U.S. antitrust policy has been slow in reflecting this new reality and, as a result, American industries have been either unable to consolidate or uncertain about their ability to do so (see chart 17).

Controls on U.S. exports are plentiful and time-consuming. From 1914 to 1970, the United States imposed controls on U.S. exports for foreign policy or national security reasons only 24 times. In the years since then, controls have been imposed on an average of twice each year.

Today foreign policy controls on exports are estimated to cost the U.S. economy $4.7 billion annually. However, they rarely achieve their desired result when applied unilaterally, since the goods controlled are generally available from our trading partners. By applying such controls to pre-existing contracts and to foreign affiliates of U.S. firms, we have created a reputation for American industry as an unreliable supplier.

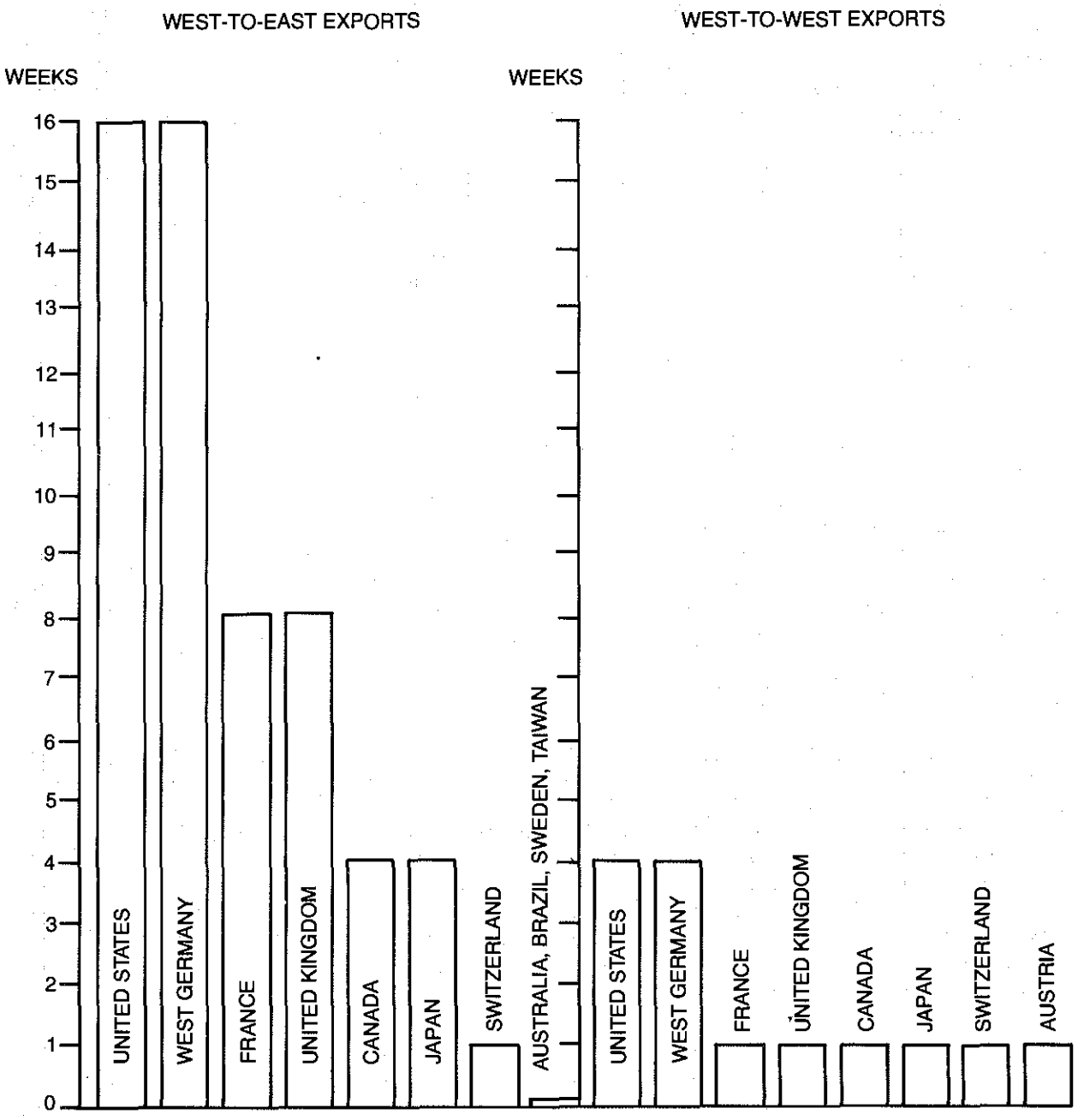
National security controls are estimated to cost us another $7.6 billion in lost sales. The United States and our allies work together to apply such controls, but the United States often imposes controls on products beyond those applied by our allies. We also differ from their practices by requiring licenses for exports to other allies, and our regulations are much more vigorously enforced. Recently, the United States has also begun to restrict technology information flows before obtaining multilateral agreement from our allies on this approach.

Meanwhile, the licensing delays for products permissible for export are much longer for U.S. firms than for our trading partners (see chart 18).

U.S. exporters receive little encouragement. Our international competitors receive much greater support in their efforts to export. Great Britain, Japan, and France all spend three times as much on export promotion. Export financing is also more available in other countries. The U.S. Export-Import Bank, which supports export sales, directly finances only 6 percent of U.S. exports. Fully 35 percent of Japanese and British exports receive similar financing. Given the lower U.S. level of support, it is essential that we use our resources more effectively.

CHART 18

Export Licensing Delays for Generally Allowable Technology



Technology that is permissible to export must be licensed, and U.S. licensing requirements are much more rigorous--and time-consuming--than those of our trading partners. To customers who value reliability and timely delivery, American suppliers do not always look so attractive.

Source: Bain & Company.

industrial sectors severely affected by foreign competition. The uncertainty as to what constitutes antitrust violation has deterred actions that could have desirable competitive effects. For this reason, the award of treble damages should apply only to behavior explicitly prohibited by law. Finally, the Department of Justice should work with other interested Government agencies in setting antitrust policy and ruling on specific mergers.

- Balance the need for competitiveness in world markets with national security and foreign policy considerations when controlling U.S. exports. America's national security controls and their enforcement should be consistent with those agreed upon by all 15 allied members of the Coordinating Committee for Multilateral Export Controls (COCOM). Foreign policy controls should be used only when all diplomatic sanctions have been exhausted. Then they should be applied multilaterally, recognizing the validity of preexisting contracts, and they should not be applied to the foreign affiliates of U.S. firms. The existing licensing process for export controls should be streamlined by one-stop regulatory review, expanded delegation of review authority to the Department of Commerce, electronic license application and common interagency data files, and increased use of multiple-shipment licensing wherever possible.

- Intensify trade promotion efforts. American firms should be encouraged to export in a number of ways. The role of the Export-Import Bank in financing exports should be strengthened by removing its nonfinance-related limitations, authorizing defensive use of export financing assistance (until we succeed in getting our trading partners to eliminate use of mixed credits), and forging working relationships with local commercial banks and state export banks. To enhance the ability of U.S. firms to evaluate market opportunities and be aware of foreign competitive threats, the Department of Commerce should take the lead in an interagency effort to improve the collection and distribution of market information that potential exporters may need. The President should launch a major export promotion campaign in 1985 and require that U.S. ambassadors submit annual reports on how they have assisted U.S. firms to expand exports. Finally, we should consider creating a semiprivate U.S. export promotion organization similar to those used by other major trading nations.

- Strengthen the multilateral trading system. The Government should begin preparatory work, in consultation with industry, labor, and agriculture, for a future round of GATT negotiations. Priorities for discussion should include Government practices affecting industry, import safeguards, countertrade (barter), commercial counterfeiting and intellectual property rights, direct foreign investment, performance requirements, international tax practices, trade in services, trade in agriculture, and the GATT dispute settlement process. When necessary, the United States should pursue agreements with other nations that could both increase developing country commitment to the multilateral trading process and serve as the basis for future GATT negotiations.

- Reform fiscal and monetary policy and tax laws to lower the cost of capital for U.S. firms and encourage investment;

- Enhance the ability of our educational institutions to prepare and train our people thoroughly;

- Change U.S. domestic and trade laws that hinder the ability of U.S. firms to compete;

- Conduct trade negotiations to improve the free flow and fairness of world trade; and

- Ensure that our human and capital resources can respond to changing markets and technologies in ways that are competitive, equitable, and humane.

Beyond recommending an economic agenda for the next decade, the broader intention of this report is to launch a national discussion on the issues raised. Such deliberations should help us forge a national consensus on the imperative of improving our industrial competitiveness. Achieving that goal will take hard work and the will to change. For all the difficulties involved, the Commission remains cautiously optimistic. The time is ripe for the program we urge. Americans recognize a change in their economic environment and are searching for ways to respond.

The goal is clear and within reach: We must perform up to our potential. Americans enjoy tackling a new problem. One lies before us now. To meet the challenge of competitiveness, we require only a new vision and a new resolve. We must acknowledge the reality of a new global economy--an economic era that has come quietly, without fanfare. And just as we explored a vast and unknown American frontier, we must chart a course into this new territory and claim it for the generations to come.

financial measures, utilizing instead measures more consistent with long-range competitiveness and profitability.

- Universities, industry, and Government must work together to improve both the quality and quantity of manufacturing-related education. Educational organizations must initiate (with industry and Government support) research to increase our understanding of the management of technological innovation.

- The Federal Government should expand support for manufacturing-related activities in universities. The R&D tax credit should be strengthened and clarified to include expenses involved in developing and implementing innovative manufacturing processes, machinery, and facilities. Aggressive Federal support should continue for research and assistance with interface and data exchange standards for manufacturing automation. Finally, Federal agencies should undertake special efforts to facilitate U.S. manufacturers to make use of advanced manufacturing technologies they developed.

Strengthen Protection of Intellectual Property Rights

The strengthening of intellectual property rights at home and abroad should be a priority item on the Nation's policy agenda and, together with industry, the Federal Government should commit itself to a detailed strategy of actions to achieve this goal. Among the specific actions suggested are the following:

- Deter product counterfeiting by making the trafficking in counterfeit trademarks with intent to deceive or defraud a criminal offense. Support international efforts to implement an anticounterfeiting code.

- Amend the Freedom of Information Act to protect the rights of private firms to maintain the confidentiality of information of potential commercial applications that they are required to disclose to the Government.

- Support legislation that would restore patent life lost during the Government approval process.

- Streamline patent laws and procedures so that patent laws continue to be a major mechanism to encourage R&D and the commercial development of new technology.

Balance Regulation With Needs of Industrial Competitiveness

Existing regulations should be reexamined and the full consequences of proposed regulations carefully examined to assure that health and safety concerns are balanced with the needs for innovation and industrial competitiveness. This issue should be placed high on the national agenda in 1985. The President should expand the role of the Office of Science and Technology Policy (and transfer this role to the new Department of Science and Technology if created) to require it to take actions in the regulatory process to balance the needs of science and technology with concerns about health, safety, and the environment.

Increase Effective Dialogue Among Government, Industry, and Labor

Mechanisms should be developed for building consensus among key sectors of society to better respond to our competitive challenges. In this regard, the Departments of Commerce, Labor, and Treasury and the Office of the U.S. Trade Representative should undertake a review of existing advisory committee charters and membership to assess their usefulness in providing such mechanisms, and to recommend means of enhancing their effectiveness to address competitiveness issues.

In addition, a position in the Executive Office of the President (possibly in the Council of Economic Advisers) should be created to study the competitive dynamics of our economy and advise the President on these matters.

Labor-Management Cooperation

American labor and management must move boldly to establish new cooperative relationships that will maximize productivity by involving employees and their elected representatives in decisionmaking in the work place, as well as encouraging participative management throughout the organization.

In addition, the President should publicly recognize those cooperative labor-management efforts already under way, which are characterized by trust, open communication, and worker participation.

Strengthen Employee Incentives

American management is urged to make use of the broad array of incentive mechanisms, including compensation plans, Incentive Stock Options (ISO's), and Employee Stock Ownership Plans, to reward the effort of individual employees and to strengthen the linkage between pay and performance.

The Internal Revenue Code should be amended to eliminate as a tax preference item the spread between exercise price and fair market value that exists at the time of exercising ISO's; to remove the ceiling limiting the granting of ISO's; and to delete the rule requiring ISO's to be exercised in sequential order. Current accounting treatment of ISO's should be preserved.

Displaced Workers

Employers should be encouraged to provide early notification of plant closings and to strengthen commitment to employment security. The unemployment insurance system should be revised to allow benefits to be converted into reemployment/retraining vouchers. Federal assistance should be provided for a comprehensive range of services to further the goal of reemployment. Responsibilities of the U.S. Employment Service should be refocused on its labor exchange functions and its use by employers encouraged.

Improve Trade and Investment Policy

The President should pursue initiatives to make trade a permanent national priority; seek Congressional advice and enactment of legislation establishing a Cabinet-level Department of Trade; improve the trade policy-making process through a more effective coordinating mechanism for balancing domestic and international policies; and direct all executive branch and regulatory agencies to analyze the effects of all proposed policies on international trade.

Domestic Trade Law Revisions

A public/private sector task force should be established to examine U.S. trade law remedies that will facilitate industry adjustment to increased global competition, respond to the trade effects of the industrial policies of foreign governments, and strengthen U.S. statutes governing unfair trade practices of foreign governments.

Reform U.S. Antitrust Policy

Section 7 of the Clayton Act and other antitrust statutes should be modified to recognize the potential efficiency gains from business combinations and to reflect the reality of global competition and global market definitions where appropriate. In addition, specific antitrust exemptions should be considered for mergers that promote national objectives. Treble damage liability should be restricted to behavior explicitly prohibited by law.

The Administration should create a procedure under which interested Government agencies have the opportunity to work with the Department of Justice in setting antitrust policy particularly with respect to mergers and other types of business combinations.

Renewal of the Export Administration Act

Renewal of the Export Administration Act should occur with full recognition that national security and successful foreign policy are dependent on maintaining U.S. industrial competitiveness and noting that export restrictions are generally antithetical to competitiveness.

Minimize Impact of Controls on Competitiveness

Where comparable products or technologies are available from other sources, the U.S. Government should seek mutual agreement and consistent application of national security export controls by all allied countries that have joined the Coordinating Committee for Multilateral Export Controls (COCOM). In addition, COCOM should be encouraged to establish a specific goal of upgrading member nation enforcement practices.

Foreign policy controls should be used only after applying all feasible diplomatic remedies. In addition, the U.S. Government should develop the

A new U.S. export promotion campaign should be launched in 1985 that includes a Presidential conference on trade and increased Presidential emphasis on recognition for the Nation's exporters, reinforced by an extensive public service advertising campaign.

A semiprivate, nonprofit U.S. export promotion organization should be established that is managed by representatives from the business community, with the support of State and local governmental trade development organizations, and financed by public and private contributions, subscriptions, and user fees.

Foreign Sales Corporation

Legislation should be enacted to establish foreign sales corporations to replace the existing domestic sales corporations.

Strengthen the Multilateral Trading System

The U.S. Government, with industry, labor, and agricultural participation and consultation, should intensify preparatory work for a future round of General Agreements on Tariffs and Trade (GATT) negotiation aimed at addressing the key trade-distorting issues of the coming decade. Pursuit of plurilateral agreements could serve as a basis for spurring a new round of multilateral GATT negotiations, extending the GATT code coverage, and increasing developing country commitment to the multilateral trading systems.

OTHER COMMISSION ACTION

Entrepreneurship and Innovations at the State Level

State and local governments and entrepreneurs play an important role in improving the competitiveness of industry. States should continue to exercise initiatives in this regard with Federal encouragement.

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The following members of the Commission's senior staff deserve special recognition:

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NOTES

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2. American Electronics Association, "Technical Employment Projections, 1983-1987," July 1983.

3. U.S. International Trade Commission, "The Effects of Foreign Product Counterfeiting on U.S. Industry," ITC Pub. No. 1479, 1984.

4. See, for instance, George N. Hatsopoulos, "High Cost of Capital: Handicap of American Business" (American Business Conference and Thermo Electron Corp., April 26, 1983, updated in Memorandum to the PCIC January 17, 1984); and U.S. Department of Commerce, "A Historical Comparison of the Cost of Financial Capital in France, the Federal Republic of Germany, Japan, and the United States," April 1983.

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6. M.A. King and D. Fullerton, The Taxation of Income from Capital: A Comparative Study of the United States, the United Kingdom, Sweden and West Germany (University of Chicago Press for National Bureau of Economic Research, 1984), updated in testimony to the PCIC by King, February 23, 1984. This volume computes a weighted marginal tax rate, taking into account taxes paid by investors as well as companies they invest in.

7. Daniel Yankelovich and John Immerwahr, Putting the Work Ethic to Work (New York, 1983), p. 27.

8. American Electronics Association, "Technical Employment Projections, 1983-1987," July 1983, p. 10.

9. Cited in "Factbook on High-Technology and Energy-Related Higher Education in the West," Western Interstate Commission for Higher Education.

10. General Accounting Office, "Efforts to Promote Exports by Small, Non-Exporting Manufacturers" (GAO/ID-83-21), January 18, 1983.

capability to identify quickly sources of foreign availability and to seek multilateral consensus among such potential suppliers to restrict exports to achieve foreign policy goals.

Future imposition of foreign policy controls should recognize the principle of contract sanctity and refrain from extraterritorial application except in cases of national emergency. The existing licensing process for all export controls should be streamlined and automated to provide timely responses competitive with other nations such as Japan, France, and the United Kingdom.

Export Expansion

The Secretary of Commerce should lead an effort to unify the export support functions of appropriate executive branch departments--State, Defense, Export-Import Bank, and the Small Business Administration--by coordinating their local export assistance systems.

Legislation should be enacted to clarify the Foreign Corrupt Practices Act (such as liabilities created by foreign agent actions, conflicting foreign legislative and accounting provisions) and to eliminate conflicting aspects of the two antiboycott statutes by statutory establishment of a national policy of noncooperation by U.S. firms with foreign boycotts.

U.S. ambassadors should submit annual reports to the President on their embassies' accomplishment in helping U.S. industry improve its market position relative to overseas competitors. Appointment of a review team of leading business executives is encouraged to visit U.S. embassies in our principal trading partners' countries and to evaluate export promotion activities.

The Secretaries of Commerce and State should strengthen the personnel programs and lengthen tenures of the Foreign Commercial Service to increase their ability to support U.S. exports.

Trade Information Dissemination

The Department of Commerce should take the lead in an interagency effort to improve the capacity of the Federal Government to collect and distribute relevant market information. Such initiatives should include consultation with private sector users and vendors of information.

Export Financing

The Office of Management and Budget should reduce nonfinance-related limitations of the operating authority of the Export-Import Bank (Eximbank). Eximbank itself should devise a competitive approach to the mixed credit financing offered by other nations until negotiations result in a satisfactory reduction of this practice. Creation of a new congressional authorization for Eximbank for mixed credit funding on a contingency basis should be considered. Eximbank should stimulate greater private sector lending for exports by expanding its working relationship nationwide with commercial banks and State export banks.

Improve Work Force Skills

Employer investment in employee training should be encouraged through macroeconomic strategies designed to maintain economic expansion and reduce unemployment; balanced tax treatment of employer investments in human and physical capital; strengthened capacity of vocational education institutions and community colleges to provide customized training programs; and removal of tax disincentives for individuals being trained through employer-financed education programs. Employers should also be encouraged to take a more systematic approach in their training activities.

Engineering Education

A program of stipends should be provided for engineering graduate students and the Presidential Investigators Award program should emphasize areas of engineering that face faculty shortages. In addition, States should be encouraged to provide adequate support for faculty salaries; emphasis should continue on engineering research, equipment, and instrumentation; and support should be increased for maintenance of that equipment. The new National Science Foundation program of on-campus, cross-disciplinary engineering research centers should be expanded to include up to 25 centers.

Business School Education

Business schools are challenged to undertake a systematic and comprehensive academic response to the changing competitive environment. In support of their efforts, the Business-Higher Education Forum should continue its work in articulating the role of American business schools in responding to America's competitive challenge.

Partnerships in Education

To counter the high dropout rate in schools, a national partnership between the Federal Government and the private sector should be established. The purpose of this partnership would be to replicate the approach of integrated services delivery in schools, utilized by cities in schools. To implement the partnership, the President should establish a task force consisting of representatives of relevant Federal agencies, interested corporations, and private sector organizations to implement the partnership.

Education Technology

Sustained Federal support for a program of basic and prototype research in educational software should be funded through the National Science Foundation and the U.S. Department of Education.

Teachers should be trained in the use of computers and the capabilities of quality software. States should be encouraged to provide such training, while the Federal Government should aid in these efforts by disseminating information on the capabilities of available software.

Reduce the Deficit

The supply of capital should be increased by reduction of the Federal deficit, particularly through actions that emphasize steady, noninflationary economic growth and that strictly curb spending growth. Immediate legislative action should be taken to implement policies that would substantially cut the Federal deficit over the next 3 or 4 years.

Restructure the Tax System

Productive investment should be stimulated by restructuring the tax code so that the efficiency with which resources are allocated is improved and the cost of capital is lowered (whether or not the overall level of revenues is changed). Restructuring should include

- Reduction in the bias against savings and investment, in particular through greater reliance on taxation of consumption (but without abandoning progressivity) and ending double taxation of corporate profits when received as either dividends or capital gains;
- Reduced variation in effective tax rates on different industries' corporate income, which results from their receiving varying credits and depreciation schedules on different kinds of assets;
- Extension of indexing to capital income and expense or loss items;
- Reduction in the disincentives to venture and other risk capital investment, for instance by allowing individuals to claim fuller deductions for capital losses; and
- Selective base broadening to reduce distortions and preferences in the personal income tax, provided this does not increase current disincentives for savings and investment.

Pursue a Stable Monetary Policy

The Federal Reserve should foster stable, moderate growth of the money supply. In conjunction with spending restraint and a tax system that is less biased against productive investment, a steady monetary policy should lower the cost of capital by lowering inflation premiums caused by excessive money growth and risk premiums caused by sudden policy swings.

Remove Barriers to the Efficient Flow of Capital

Regulatory policies should be designed and administered to accomplish their legitimate goals in ways that do not excessively interfere with the free market flow of capital. For example, growth of small companies has been aided by relaxation of the rules governing private placements and public issuance of new securities.

PRESIDENT'S COMMISSION ON INDUSTRIAL COMPETITIVENESS
SUMMARY OF RECOMMENDATIONS

RESEARCH AND DEVELOPMENT AND MANUFACTURING

Create a Federal Department of Science and Technology

A Cabinet-level Department of Science and Technology should be created to promote national interest in and policies for research and technological innovation. Comprising major civilian research and development (R&D) agencies, the Department would increase the effectiveness of R&D in meeting long-term national goals by making clear the national importance of science and technology in enhancing industrial competitiveness; establishing an authoritative voice within Government to deal with science and technology issues; improving the management of Federal R&D in included laboratories and agencies; and coordinating the management of Federal science and technology policy with other organizations.

Increase Tax Incentives for Research and Development

R&D conducted by industry is critical to competitiveness and should be encouraged through enhanced incentives: making permanent the R&D tax credit of the current tax law; broadening the definition of R&D qualifying for the tax credit; implementing a tax credit based on total R&D as a substitute for the incremental R&D tax credit; permanently repealing the research allocation rules to remove the incentives in the present law to shift R&D overseas (Treasury Regulation section 1.861-8); and creating a preferential tax credit to encourage further industry investment in university research.

Remove Antitrust Barriers to Joint Research

Existing disincentives to joint research arrangements should be removed. Legislative action is needed to require that the legality of joint R&D ventures be judged by a "rule of reason," which assesses whether any possible anticompetitive effects outweigh any potential procompetitive effects. Action is also needed to limit damages that a private litigant can recover in an antitrust suit to actual damages.

Commercialize New Technologies Through Improved Manufacturing

Private sector, educational, and Government organizations should initiate actions to improve the development and use of manufacturing technologies to transform R&D results into competitive products and services for U.S. firms.

- Within industry, firms must give increased management attention to the need to improve their manufacturing capabilities and should increase support for university-related and joint industry cooperative research activities.

- Money managers, bankers, accountants, stockholders, and business leaders should be challenged to deemphasize simple short-term

RESPONDING TO THE AGENDA OF COMPETITIVENESS

Honing America's competitive edge is a formidable task. The calls to action are many, yet each is aimed at one overriding objective--increased competitiveness both at home and abroad. Only through a competitive America can we sustain economic growth, assure our national security, maintain our leadership position in world affairs and our technological preeminence, and provide greater opportunities for the generations to follow.

America's private sector is at the forefront of meeting the competitive challenges we face, for Government cannot legislate success in world markets. To unleash its full competitive potential, leaders in industry must

- Take a new look at the opportunities of world trade and the new competitors we face;
- Establish world leadership in the commercialization of both product and manufacturing technology;
- Raise our level of investment in productive assets and in the development of our work force; and
- Seek new ways of creating a sense of shared purpose within their organizations.

The millions of individuals in the private sector must recognize their own stakes in competitive renewal and

- Equip themselves with the skills required in the workplace of the future;
- Adopt a more flexible attitude toward changing markets and technologies; and
- Work together--both labor and management--to strengthen the competitive performance of their own firms.

Government must take the lead in those areas where its resources and responsibilities can be best applied. Our public leaders and policy must

- Make competitiveness a national priority and communicate the urgency of improving our ability to compete;
- Encourage dialogue and consensus-building among leaders in industry, labor, Government, and academia whose expertise and cooperation are needed to improve our competitive performance;
- Provide a stable macroeconomic environment that nurtures economic growth;
- Provide an environment conducive to prompt commercialization and strong protection of technology;

Because U.S. trade laws provide so many hurdles to exporters--and such little assistance--relatively few American firms export. The Nation's top 250 export firms account for 85 percent of our exports, and the General Accounting Office (GAO) estimates that 11,000 additional U.S. firms could export, but do not. One reason few U.S. firms export is that they lack critical information about foreign markets. Such information currently exists within Government, but is not easily available. If those American businesses that could export did so, the GAO estimates, the American economy would create an additional 125,000 jobs and $4 billion in sales.[10]

The world trading system needs strengthening. If American trade law has failed to reflect the realities of global competition, international trade law has been equally unresponsive to changes in world markets. While the volume of world trade has increased dramatically, the proportion of it covered by agreed-upon rules of international trade remains seriously inadequate.

The General Agreement on Tariffs and Trade (GATT) provides the only comprehensive set of rules agreed to by our major trading partners, yet it does not cover trade in services or investments. GATT rules for agricultural trade are inadequate, and so are its provisions for state-owned enterprises. In addition, GATT does not adequately deal with a growing set of foreign government industrial policies and the increasing use of nontariff measures such as antitrust exemptions, R&D subsidies, and restrictions on foreign investment. Compounding GATT's inadequate coverage of both traded products and nontariff measures is the fact that the newly industrializing countries are not subject to the same stringent standards of trade conduct as the United States and other developed countries.

Commission Recommendations

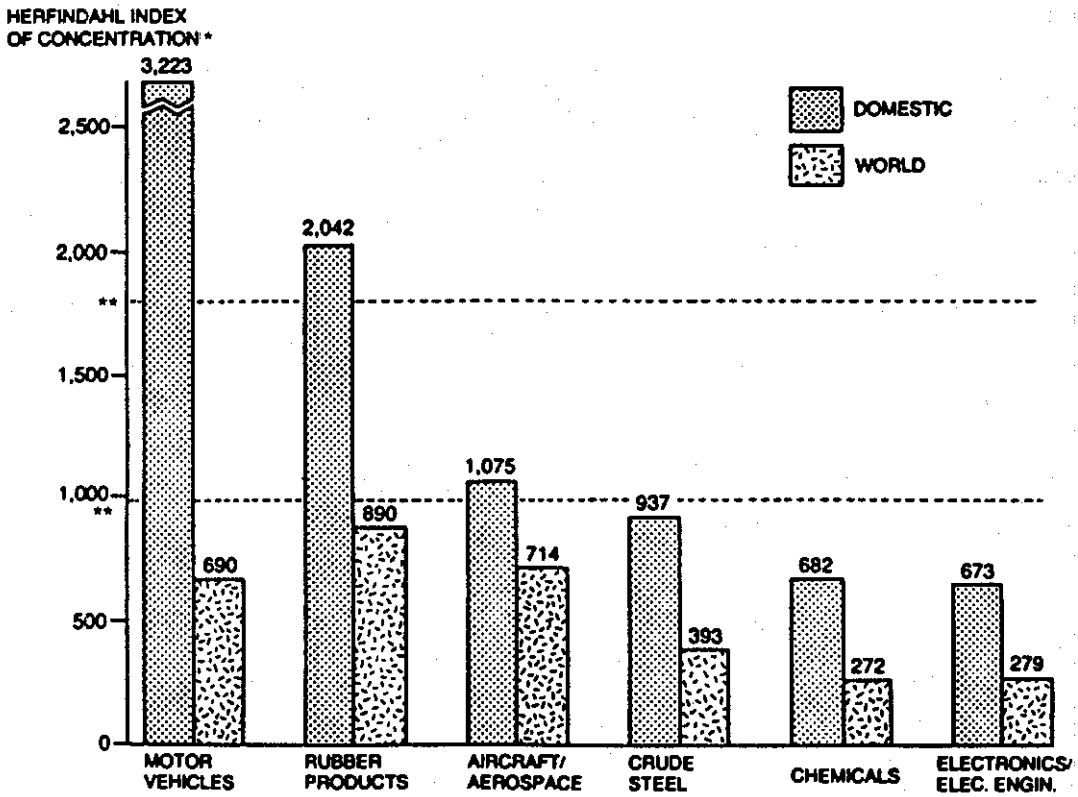
- Create a Department of Trade and make trade a national priority. International competitiveness requires a well-integrated policymaking process that places trade considerations on a par with domestic and foreign policy issues. The President should pursue initiatives to improve the trade policymaking process and seek congressional advice and enactment of legislation establishing a Cabinet-level Department of Trade. The goals of establishing a single department are to enunciate trade policy with a single strong voice, to eliminate duplication and overlap, and to establish a more effective coordinating mechanism for balancing the needs of trade with other domestic and international policies.

- Improve domestic trade law. The President should establish a task force of appropriate Government agencies and representatives from industry, labor, and agriculture to examine U.S. trade law remedies and to develop recommendations for an omnibus trade bill. That bill should provide mechanisms to facilitate industry adjustment to increased global competition, respond to foreign government policies aimed at fostering specific industries, and strengthen the statutes governing our response to unfair trade practices.

- Change U.S. antitrust law to reflect the new global markets within which American firms operate. U.S. antitrust law must recognize the potential efficiency of mergers and other business combinations, especially in

CHART 17

Concentration of Selected U.S. Industries
Based on U.S. and World Market Share



*THE HERFINDAHL INDEX IS A MEASURE OF CONCENTRATION BASED ON THE SUM OF THE SQUARED MARKET SHARES OF FIRMS IN THE INDUSTRY

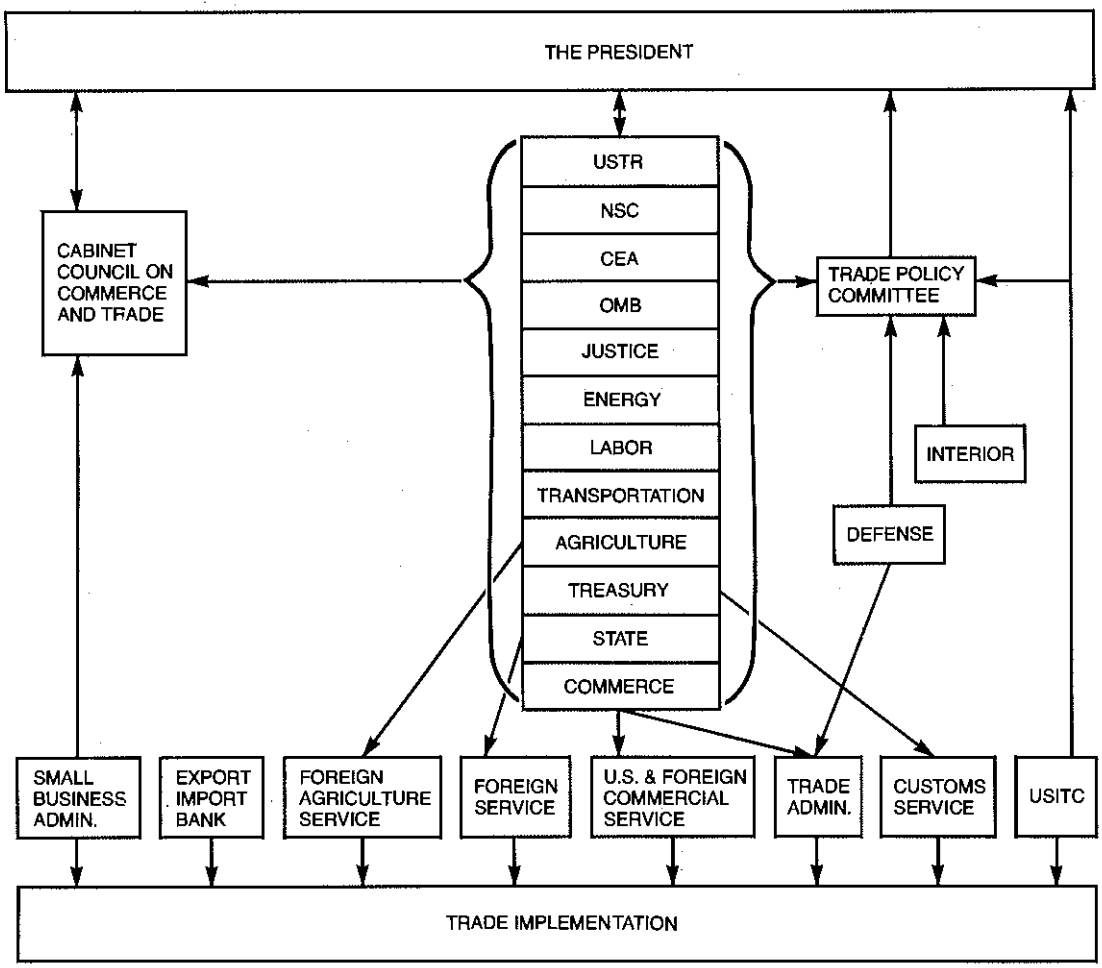
** DEPARTMENT OF JUSTICE THRESHOLDS FOR ACCEPTABLE CONCENTRATION LEVELS (INDEX IS BELOW 1000) AND EXCESSIVE CONCENTRATION LEVELS (ABOVE 1800).

When viewed as operating in an international market, American industries are much less concentrated than when viewed from the narrow context of a domestic market. U.S. antitrust law has not yet been interpreted to reflect the new global economy.

Source: Bain & Company.

CHART 16

Trade Relationships



This chart depicts the confusion and duplication in U.S. trade policy mechanisms. Split responsibility makes effective management difficult, and many national policy decisions are made without considering their impact on U.S. trade competitiveness.

MAKE TRADE A NATIONAL PRIORITY

An open and fair trading environment is vital to the future success of American industry. World trade now represents a $2 trillion arena of opportunity, and it is growing faster than our own economy. Between 1970 and 1984, U.S. exports quintupled. They now exceed $220 billion annually, providing jobs for 5 million American workers. At the same time, the U.S. domestic market has grown increasingly international in character, and the value of our merchandise imports now represents almost one-fourth of our own industrial production, providing American consumers with a diverse array of products and services (see chart 15).

Our Competitive Position Today

In order for U.S. firms to compete effectively in world markets, we must (1) articulate and enforce trade policy in a coordinated way, (2) reduce domestic obstacles to U.S. trade competitiveness, (3) balance foreign policy and national security export controls with the need to compete in world markets, (4) expand our exports, and (5) strengthen the international trading system.

Trade policy and the policymaking process need greater emphasis. U.S. trade and international economic policies have not yet assumed an equal stature with other U.S. policies. In part, this is symptomatic of fragmented and duplicative U.S. trade and investment policy mechanisms. Decisions are split between at least 25 executive branch agencies and 19 congressional subcommittees. Many governmental agencies--the Departments of State, Justice, Treasury, and Defense among them--make policies that strongly influence our international trade position. Often they fail to consider the ramifications of their decisions on our ability to compete in world markets.

Two Cabinet-level committees currently consider trade policy--the Trade Policy Committee, chaired by the U.S. Trade Representative (USTR), and the Cabinet Council on Commerce and Trade, led by the Secretary of Commerce. The membership of these committees is essentially the same. Yet the USTR is responsible for formulating trade policy and Commerce is responsible for implementing it. Neither committee is authorized to consider a number of international economic issues of fundamental importance to trade policy effectiveness, including exchange rates, credit, debt, and taxation.

This fragmented approach to U.S. trade policymaking causes trade policy officials to spend much time coordinating trade policy, rather than designing and implementing it. Fragmented trade policy responsibility in the United States seriously limits our ability to respond to the growing volume and complexity of international trade (see chart 16).

Domestic trade policies are not responsive to the new global environment. While U.S. trade policy has been fragmented, our domestic trade laws have not been responsive to the new realities of global competition. For those industries threatened by severe import penetration, U.S. trade law has often granted relief only after their injuries have become irreparable. That assistance has been granted, often on repeated occasions, without a

• Forge new understandings between labor and management. This urgent call to action in the area of human resources is one that cannot be legislated. Labor and management are in the same boat--one that is being rocked by a storm of new competitive challenges. American working people must embark on a new era of trust and cooperation.

For management, that means disclosure of relevant information and a willingness to share prosperity as well as austerity. For labor, that means responsiveness to a firm's basic goals and flexibility in taking on new challenges. For both labor and management, trust can only be built by a commitment to equity, consistency, candor, and problemsolving.

• Strengthen incentive programs that increase employee motivation. Compensation plans such as gain-sharing link employee compensation to performance and allow employees to share in the success that their efforts make possible. Employee stock purchase programs help create a sense of "ownership" that is both literal and figurative. To make the use of incentive stock options a better motivational tool, the tax code should be amended to avoid the immediate taxation of options and thus encourage long-term ownership. Changes are also needed to allow employees to exercise their options in any order they choose.

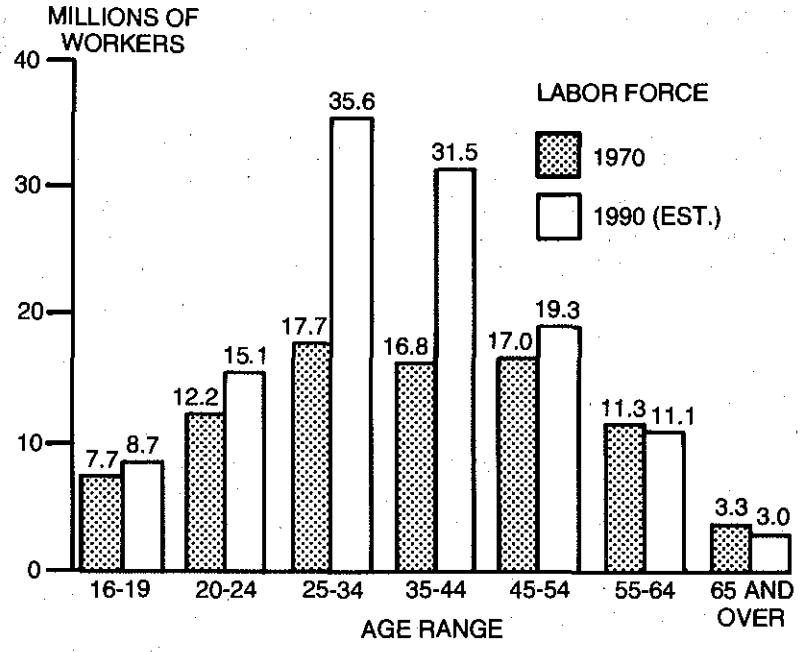
• Improve our national ability to redeploy labor affected by changing markets and technologies. Comprehensive services such as job search, counseling, training, and limited relocation assistance should be provided to displaced workers. The labor exchange functions of the U.S. Employment Service should be strengthened. The current unemployment insurance system should be revised to enable displaced workers to convert benefits to a voucher, which can be used as a wage subsidy to encourage employers to hire and train them. Employers should be encouraged to view job security for employees as a desirable goal.

• Encourage employers to invest in worker training. Because the mobility of the work force represents a disincentive to such investments, it is important that our tax code not further bias employers against funding employee training. Thus, future tax restructuring proposals should seek a balanced treatment of physical and human capital investments. Employer-financed tuition should be permanently exempted from personal income taxation.

We should strengthen the ability of our vocational and community colleges to deliver industrially relevant training. To ensure that such institutions obtain the information they need to plan curriculum, the Commission endorses the establishment of technical committees, as provided in the recently re-enacted Vocational Education Act. The Federal Government currently gives States funds for vocational education, but an insufficient portion of those funds is earmarked for postsecondary students. That portion of the total dollars allocated should be increased. Lastly, to alleviate the shortage of equipment available for vocational education, States should be encouraged to establish equipment pools to facilitate sharing of scarce resources.

CHART 14

Demographic Changes in the Work Force, 1970-90



By the end of the decade, the number of people between the ages of 25 and 44 is expected to have grown considerably, as the "baby boom" generation matures. That means we must find ways of retraining an older work force to meet the challenges of new technologies and new jobs. Lifelong learning will be essential in the future.

Source: "The Work Revolution," 8th Annual Report of the National Commission for Employment Policy, 1982.

DEVELOP A MORE SKILLED, FLEXIBLE, AND MOTIVATED WORK FORCE

America's people--our most vital resource--are the drivers of our economy. Their vision, skill, and motivation are essential elements of our competitive potential. The greatest competitive strategy in the world is doomed to failure if it lacks a dedicated team of players to carry it out.

Our Competitive Position Today

To be successful in an increasingly competitive world environment, America must take on four tasks related to its human resource base: (1) reach a common understanding of the challenges we face in world markets and the possible responses; (2) improve cooperation between management and labor and offer better incentives to our employees; (3) encourage the rapid deployment of our work force in response to changing technologies and markets; and (4) strengthen the quality of our human resources through education and training.

Consensus is vital. The need for finding consensus on a national level is acute. The competitiveness issues facing America today are not new, yet they remain unresolved. The ability of the political decisionmaking process to deal with them is impeded by conflict among the very sectors needed to solve the problems we face. Policymakers must deal with widely disparate points of view presented by a diversity of interested parties. Often there is not even agreement as to the facts of the issue, much less a shared understanding of the tradeoffs involved in the policy options under discussion.

During fiscal 1983, some 60 advisory committees--affiliated with the U.S. Trade Representative and the Departments of Commerce, Labor, and Treasury--operated with the purpose of sustaining a dialogue on the issues affecting our ability to compete in world markets. Yet a study of those committees found general agreement among their members and the agencies they serve that they had little effect on their sponsoring agencies, Congress, or anyone else. (See the report by William G. Ouchi in volume II, appendix E.) They are ineffective because both their membership and their charters are too narrow. As currently constituted, these advisory committees are ill suited to the task of bringing together the disparate segments of business, labor, academia, and the public sector to discuss and resolve their policy differ- ences. Furthermore, the President is hindered in the consensus-building process by a lack of independent data on competitiveness. Instead, he must rely for information upon agencies whose advice may be influenced by their special interest constituencies.

Labor and management must recognize common interests. If American business is to increase productivity and improve the quality of its products--both key to greater competitiveness--labor and management must cooperate more effectively. The traditional adversarial relationship may no longer serve the best interests of both parties and the public. Increasing competitive pressures from abroad--coupled with slow growth and new technology at home--now create a new impetus to work more cooperatively.

(a) Reducing the bias against savings and investment, through greater reliance on taxation of consumption (but keeping progressivity to ensure fairness) and through elimination of the double taxation on corporate profits when received as either dividends or capital gains;

(b) Reducing the variation in effective tax rates on different industries that results from their receiving varying credits and depreciation allowances on different kinds of assets;

(c) Providing inflation adjustments for capital income and capital expense or loss items, similar to existing income tax indexing;

(d) Reducing disincentives to venture and other risk capital investments, for example, by allowing individuals to claim fuller deductions for capital losses; and

(e) Broadening the tax base by including more income items and reducing the number of tax deductions and exclusions, provided this does not increase current disincentives for savings and investment.

• Pursue stable monetary policy. Since 1970 American business has been forced to contend with widely fluctuating interest rates and rates of inflation (see chart 13). American management is often criticized for its short-term orientation, yet a review of the rapidly changing macroeconomic environment in which American managers operate makes that short-term perspective quite understandable.

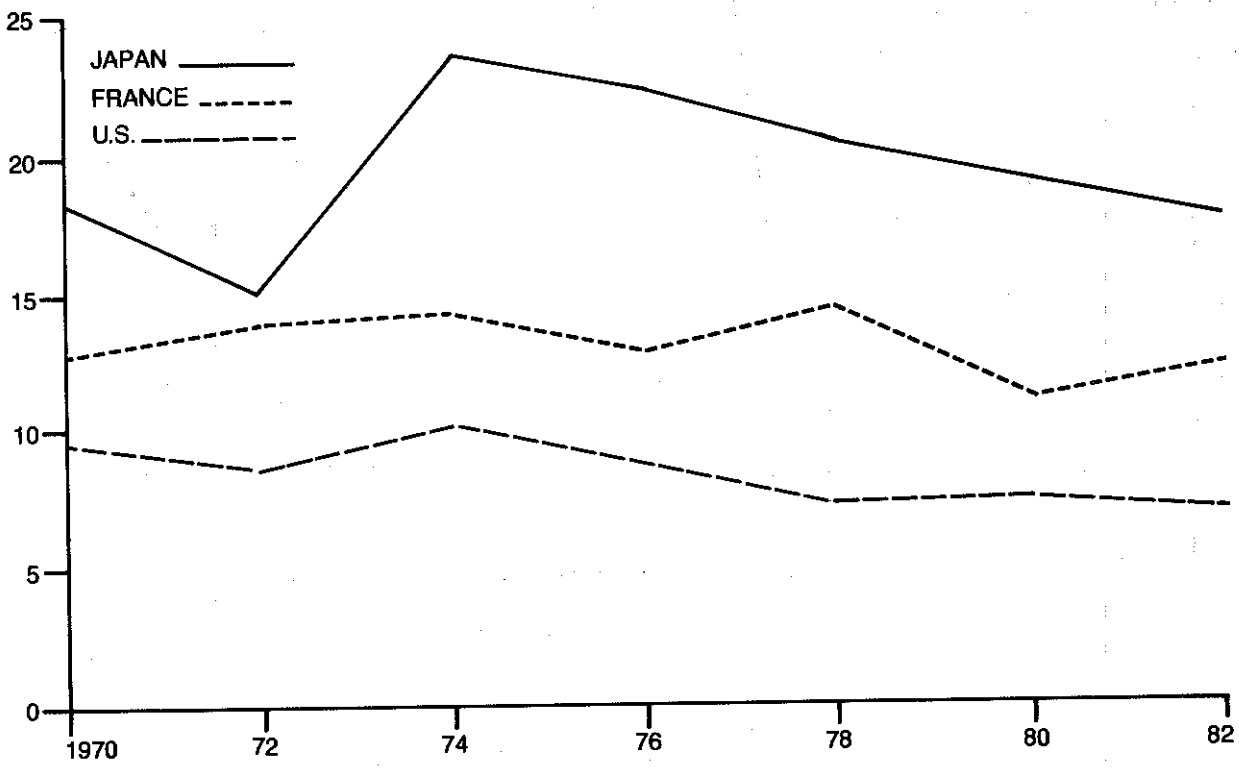
Stable monetary policy will lower the cost of capital by reducing the inflation premiums lenders charge during times of excessive money growth, as well as lowering risk premiums charged during times of sudden policy swings.

• Rely on the free market to determine where capital will flow. Regulation and resource allocation policies should minimize the types of Government intervention that hamper the free flow of capital and other resources to their most productive uses. For example, recently reduced antitrust requirements for joint R&D ventures and eased rules for small business finance have contributed to gains in those areas.

The steps outlined above are hard policies to carry out all at once. Fortunately, even small steps in the right direction can be helpful. A dollar cut from any category of spending reduces the deficit and leaves more resources in the private sector. These budget savings also would make one aspect of monetary policy easier. There are several specific tax changes that should be undertaken even if Congress does not tackle wholesale tax restructuring. Less Government intervention is likely to have direct favorable effects on capital flows. These changes will result in more efficient uses of resources, which will raise productivity and provide more real income and more revenues to the Federal Government.

CHART 12

Net Savings as a Percent of Gross Domestic Product, 1970-82



The American tax system discourages savings and encourages borrowing, resulting in a low overall national savings rate. When large Federal deficits absorb much of the capital available for investment, the resultant shortage of funds pushes up capital costs for U.S. firms.

Source: Organization for Economic Cooperation and Development, 1984.

INCREASE THE SUPPLY OF PRODUCTIVE CAPITAL

Capital--we tend to think of it as money in the bank, but it is really money put to work for us. Capital is the fuel for our economic machine. Invested in productive assets like buildings and machines, capital provides the tools we need to compete. Invested in research and development, it provides the technological advances that are key to competitiveness. Invested in entrepreneurial endeavors, it provides the resources required to bring new ideas to market. The productive and creative use of capital is a strong factor in any nation's competitive position.

Our Competitive Position Today

Countries that invest more tend to be those with the highest rates of growth in productivity. As chart 11 demonstrates, the United States trails its major competitors in both of these areas. We must more aggressively update our capital stock and provide all members of our work force with the plants and equipment they need to match the productivity improvements of their competitors abroad.

The United States must make better use of its capital resources by improving three different things: (1) the supply of capital, (2) its cost to American industry, and (3) our ability to let capital flow to its most productive uses.

Supply of capital is inadequate. It is ironic that the world's richest nation does not produce an adequate supply of funds for productive investment, but such is the case. Americans tend to be borrowers, not savers. As a percent of gross product, U.S. savings lag far behind that of our foreign competitors (see chart 12).

Given our low national savings rate, the Federal budget deficit poses a major competitive disadvantage. Large, sustained deficits, like those commonly projected today, bid capital away from the private sector, since by definition, Government has first call for funds without regard for their cost. Thus far, this danger has been averted by an influx of capital from abroad, but this contributes to another disadvantage in itself--a strong dollar that has hurt the ability of U.S. firms to export. Moreover, we cannot count on the inflow of foreign capital to continue, since it could reverse without warning. Finally, Federal deficits create two additional pressures that can hurt our ability to compete. First, they encourage Congress to increase taxes, usually without regard to the competitive effects. Second, they place pressure on the Federal Reserve Board to create more money by buying up some of the debt, which in turn pushes up inflation.

Capital costs more for U.S. firms. American firms face much higher costs for the capital they need to invest. These higher costs are the result of the Federal Government's competition with the private sector for funds, a tax system biased against investment, premiums charged by lenders expecting inflationary monetary policy, and the relatively greater reliance by American firms on equity (stock) financing.

Commission Recommendations

- Create a Cabinet-level Department of Science and Technology. Such a department would make clear the importance of science and technology at a time when technological innovation is key to enhanced competitiveness. It would transform the current fragmented formulation of policies for science and technology into one that would be far more effective in meeting long-term national goals. The elements and funding that would make up this Department already exist within Government; they should be integrated and focused more effectively. This Department would also improve the effectiveness with which Government, industry, and academia interact in the process of building our Nation's science and technology base. Equally important, it would provide a high-level adviser to the President on a variety of Government policies that affect science, technology, and the use of innovative products.

- Enhance incentives for private sector R&D. Industrial research and development should be encouraged by strengthened and clarified tax credits. The R&D tax credits of existing law should be made permanent, since their current temporary nature makes it difficult to plan long-range projects. Consideration should be given to a tax credit based on total R&D spending, as a substitute for the current credit for only incremental spending. Eligibility should be expanded to include the broad range of accounting expenses commonly defined as R&D. Finally, the development of equipment and processes required to make the difficult leap from prototype development to full-scale production should be eligible. Such tax credits are far preferable to direct Government funding because they let the marketplace determine where the money goes.

Cooperative vehicles for research and development have been used most effectively by other countries and are particularly useful as the cost of conducting R&D gets even higher. Some clarification of the antitrust implications of joint R&D efforts has been attained with President Reagan's signing of the National Cooperative Research Act of 1984, and the Commission is encouraged to see positive action.

- Provide support to America's universities for basic research and the training of future scientists and engineers. As centers of basic research, universities play a critical role in creating the technological foundation for our economy. The current level of university research support by Government should not only be continued but, if possible, increased. Improved management of Federal laboratories could free up considerable funds. These could be better spent in universities, which provide the dual benefits of scientific advances and the training of future scientists and engineers. For the same reasons, industry support of universities should be encouraged. Since university activities also greatly affect the quality and quantity of our human resources, further discussion is contained in that section of this report.

- Make excellence in manufacturing technology an American advantage. In the private sector, manufacturing must receive more focused attention and support. In past years, manufacturing engineering has suffered from lower status and compensation levels than other areas. American business needs to invest more in new manufacturing technologies. Here again, the R&D tax

Manufacturing technology needs more emphasis. Perhaps the most glaring deficiency in America's technological capabilities has been our failure to devote enough attention to manufacturing or "process" technology. It does us little good to design state-of-the-art products, if within a short time our foreign competitors can manufacture them more cheaply. The United States has failed to apply its own technologies to manufacturing. Robotics, automation, and statistical quality control were all first developed in the United States, but in recent years they have been more effectively applied elsewhere (see chart 10). The Japanese have been the most aggressive in applying process technology, and the results have often been lower cost and superior quality products--attributes well accepted by both American and foreign consumers.

The use of technology cannot be limited to "high-tech" industries. Mature industries can and should make better use of advanced technologies as part of their own renewal processes. There need be no distinction between high-technology and mature industries--only between industries that have taken advantage of technological advances and those that have not.

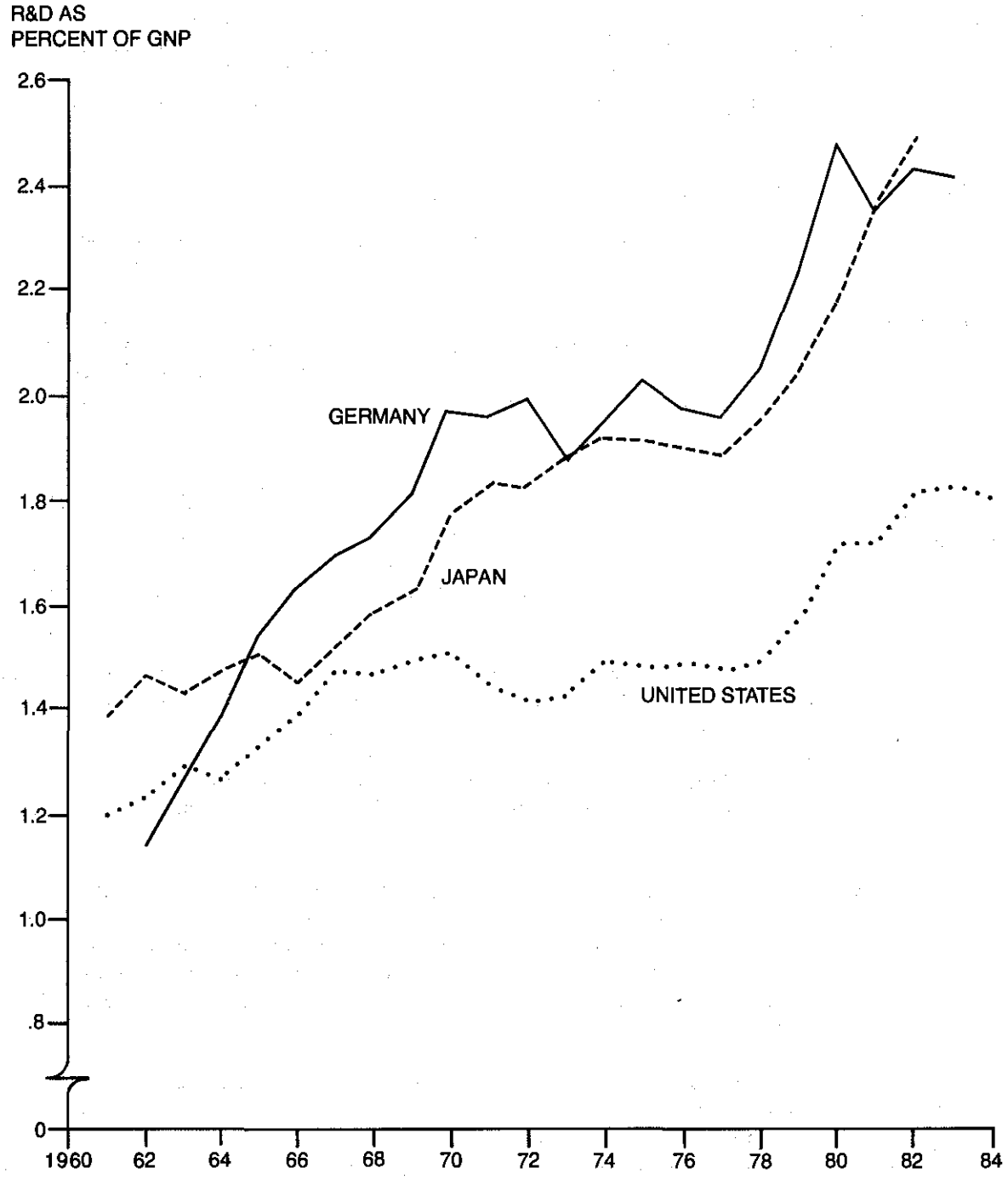
Protection is needed for intellectual property. Since technological innovation requires large investments of both time and money, the protection of our intellectual property is another task we should place on our competitive agenda. Research and development are always risky. If the developers of a new technology cannot be assured of gaining adequate financial benefits from its commercialization, they have few incentives to make the huge investments required.

Today, the need to protect intellectual property is greater than ever. A wave of commercial counterfeiting, copyright and design infringement, technology pirating, and other erosions of intellectual property rights is seriously weakening America's comparative advantage in innovation. A recent study by the International Trade Commission estimates that American business loses almost $8 billion and 131,000 jobs annually though counterfeiting alone.[3] In the arena of international trade, we must create safeguards against the misappropriation of intellectual property for commercial purposes, especially by the newly industrializing countries.

Regulatory restraints inhibit innovation and commercialization. The net result of our cumbersome and complex regulatory environment has been that innovative products are often more easily and quickly introduced abroad. The issue is not whether regulations should exist; their benefits are clear. But improper or ineffective regulation can inhibit innovation. Overlapping regulatory charters and jurisdictional disputes, combined with painstaking procedural requirements, have made innovation, research, development, and new product approval very costly and time-consuming activities. For example, the Pharmaceutical Manufacturers Association reports that the average length of time required to take a drug to market is 10 years--at an average cost of $84 million per product.

CHART 8

Civilian Research and Development Expenditures as a Percent of GNP

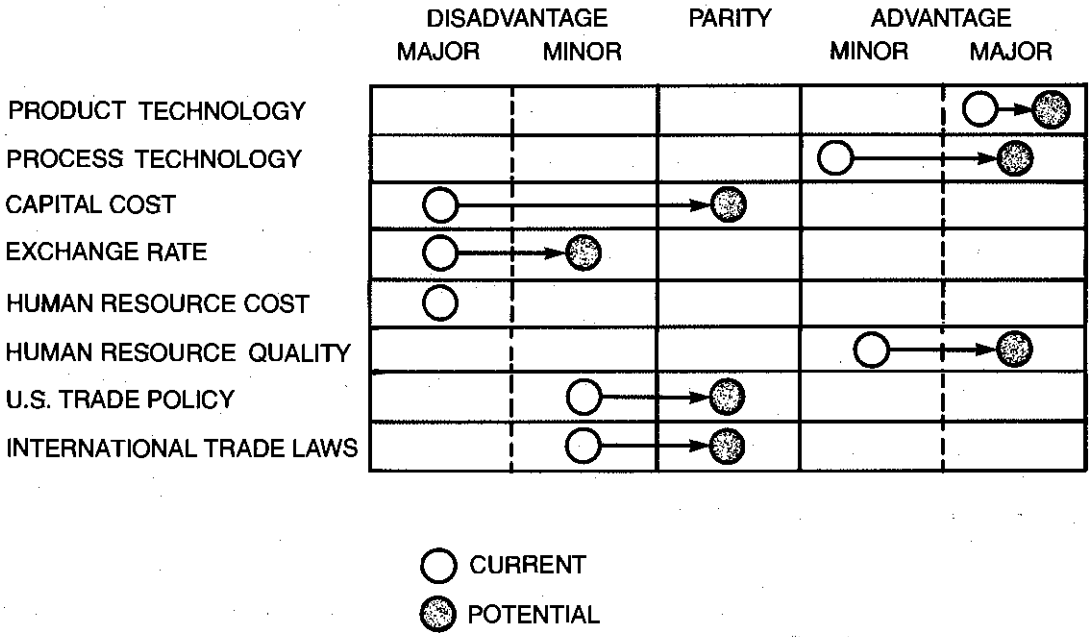


We lag behind our major trading partners in the proportion of GNP spent to fund the commercially relevant research and development that leads to competitiveness.

Source: National Science Foundation, Division of Science Resources Studies, unpublished, November 1984.

CHART 7

Competitive Profile, U.S. Leverage Points



This chart reflects the current U.S. competitive position in the key factors that determine our ability to compete. We may not be able to create a comparative advantage in every area. Some disadvantages, such as high costs for human resources, we may choose to keep. Other disadvantages, such as capital costs or trade policy, can at least be improved to create parity with our competitors abroad. Current minor advantages can be strengthened, especially process technology and the quality of our human resources.

Source: President's Commission on Industrial Competitiveness.

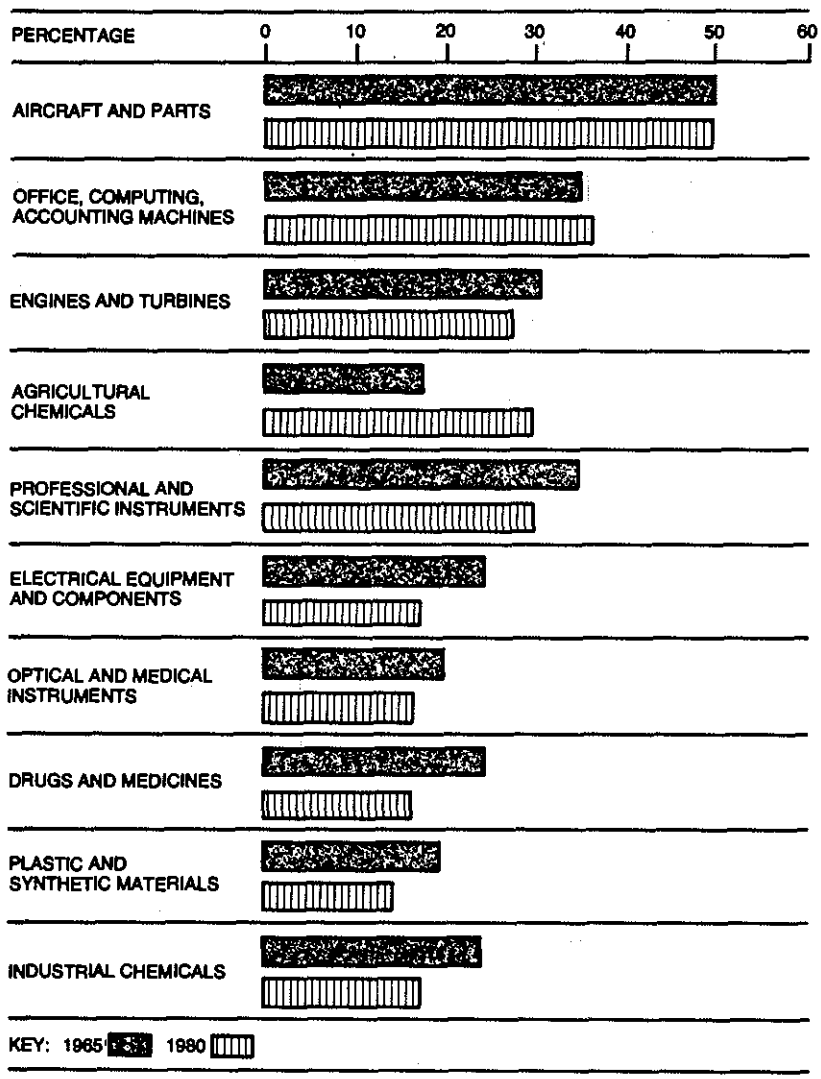
sector can invigorate our overall GNP growth, and a competitive challenge to this critical part of our economy cannot be taken lightly.

Rationalization: It does not matter what industries the U.S. competes in, so long as the overall performance of our economy looks positive. Our competitiveness problems are isolated in a few sectors of our economy. But the Nation is still competitive overall. Neither the composition of our industrial economy nor the makeup of our export trade really matters. A dollar's worth of wheat exports has the same value as a dollar's worth of sophisticated electronics exports.

Response: Unfortunately, our competitiveness problems are not isolated ones. Virtually all sectors of our industrial economy are being challenged. And while our competitiveness does not depend on maintaining a leadership position in any particular industry, we should not be indifferent to the strategic and economic benefits of a diversified industrial base. We reap benefits from the breadth and diversity of the American economy. Our position in manufacturing helps our position in associated services. Our position in high-technology industries spurs new markets and whole new industries. A strong industrial base is also vital to our national security.

CHART 6

United States Shares of World High-Technology Exports, 1965 and 1980

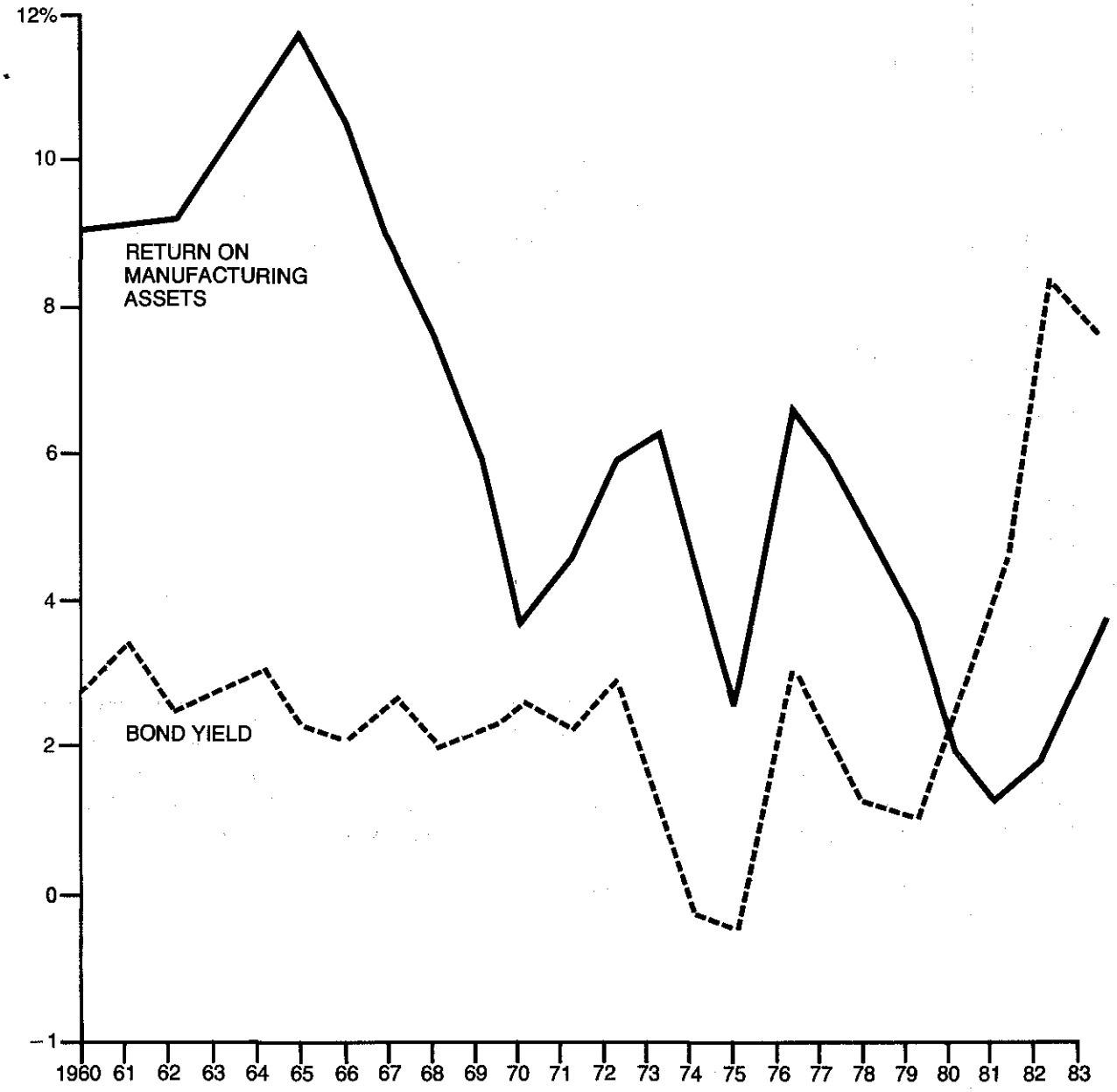


The declining U.S. share of world technology markets is particularly troubling. First, the demand for these products has been growing very rapidly, and they represent a major growth opportunity. Second, technology's value is far greater than the dollars it represents in our trade ledger. Innovation leads to productivity gains that allow us to earn more than our counterparts abroad, and technologically unique products have been able to command premium prices in world markets. Finally, technology changes fast, with one round of advances building on those that precede it. Loss in one round of innovation makes it much harder to enter the competition later on.

Source: U.S. Department of Commerce.

CHART 4

Real Return on Capital (Rate of Return on Total Assets) in Manufacturing and Bond Rate (1960-83)

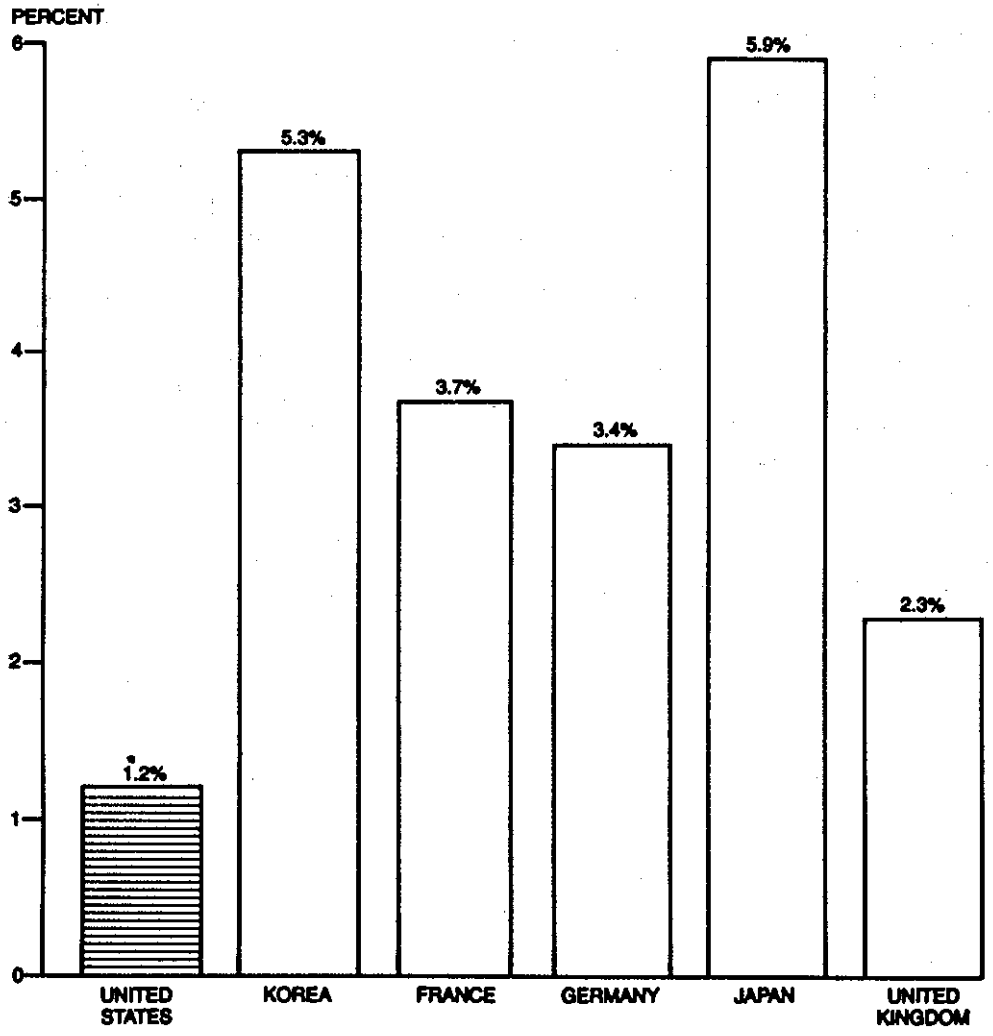


Although currently buoyed by the economic expansion, pretax returns on manufacturing assets are still well below alternative investments. A strong manufacturing sector is vital to future U.S. competitiveness, and these declining returns should be cause for concern. (For more on the importance of manufacturing, see "Some Rationalizations for Our Current Performance," page 15.)

Source: U.S. Department of Commerce, Federal Trade Commission.

CHART 2

Productivity (Real Gross Domestic Product per Employed Person), Average Annual Percent Change, 1960-83



America's low rate of productivity growth during the past two decades means that our future ability to compete is questionable. The improved performance of the past 2 years is not enough to reverse decades of deterioration or even to match the current growth rates of major trading partners. Superior productivity has been a U.S. comparative advantage. It has also been one of the prime causes for the standard of living we enjoy. Americans have been able to earn more than their counterparts abroad because their output has been higher.

Source: U.S. Department of Labor, Bureau of Labor Statistics, unpublished, December 1984.

WARNING SIGNALS WE SHOULD HEED

The United States is losing its ability to compete in world markets. We are still the world's strongest economy. However, the question we must answer is where we will be tomorrow, not just where we stand today. A close look at U.S. performance during the past two decades reveals a declining ability to compete--a trend that, if not reversed, will lead to a lower standard of living and fewer opportunities for all Americans. There are many indications of a weakening U.S. competitiveness.

- Since 1970, our productivity growth has been dismal--outstripped by almost all our trading partners (see chart 2). Japanese productivity growth has been five times greater than our own. That country's productivity now exceeds that of the United States in steel; transportation equipment; and electrical, general, and precision machinery. American employees in those industries have experienced the competitive consequences of our lagging performance.

- It is worth noting that the American economy has been able to create some 33 million jobs over the last two decades. In contrast, Europe has experienced a net loss of jobs. However, the United States has created new jobs without providing the requisite investments in the tools and incentives to make the productivity of our work force a competitive advantage.

- Reflecting that dismal record in productivity, Americans' standard of living has grown more slowly than that of our trading partners. Our 2 percent annual growth rate since 1960 is exceeded by Canada, Germany, France, Italy, and Japan. We lead only the British in growth of standard of living--and that just barely. Real hourly compensation in the United States has remained virtually stagnant since 1973. Since 1979, it has actually declined (see chart 3).

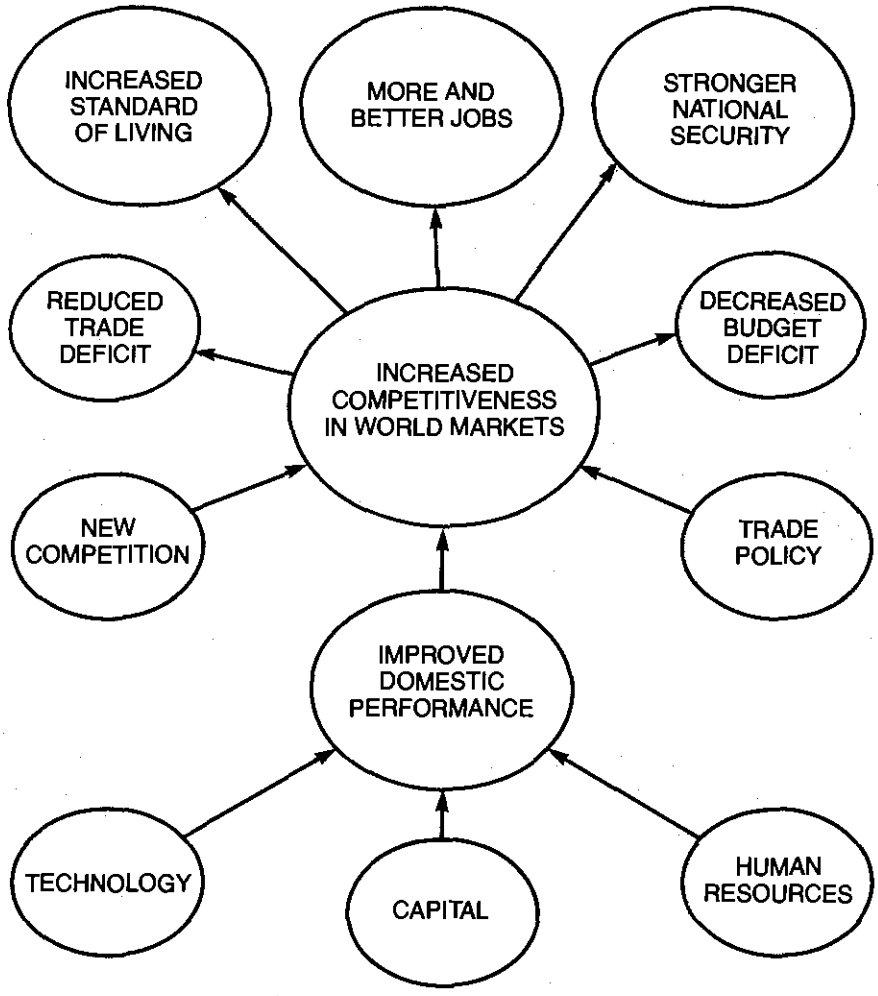
- America's industrial base has been unable to produce the kinds of financial returns that attract productive investments. Over the past 20 years, real rates of return on manufacturing assets have declined (see chart 4). Pretax returns on such assets are well below alternative financial investments and make many investors question the wisdom of putting funds into America's vital manufacturing sector. (For more on the importance of manufacturing, see "Some Rationalizations for Our Current Performance," page 15.)

- Most dramatic, perhaps, is our declining position in the world trading arena. For this entire century--until 1971--this Nation ran a positive balance of trade. Today, our merchandise trade deficit is at record levels (see chart 5). It is currently greatly affected by a strong U.S. dollar, which makes American products more expensive abroad. Yet the deterioration of our trade balance began more than a decade ago, when the dollar was widely thought to be weak.

- In industry after industry, U.S. firms are losing world market share. Even in high technology--often referred to as the "sunrise" industries--the United States has lost world market share in 7 out of

CHART 1

Competitiveness: A Link to National Goals



Competitiveness is vital in attaining many of our national goals, including an improved standard of living and strong national security. Our ability to compete is determined by how effectively we use our technology and capital and human resources, as well as by a free and fair world trading environment.

COMPETITIVENESS: THE QUIET CHALLENGE

More than a quarter of a century ago, the Russians launched Sputnik. Its blasting rockets and steep ascent into space presented a very visible challenge to America's world leadership and technological preeminence.

We responded to that event--quickly, wholeheartedly, and effectively. Americans were the first and only people to ever walk on the moon. An entire nation watched with pride. The entire world watched with awe.

Today, a similar challenge faces America. No roaring engines have announced its arrival. Instead, it has come upon us quietly, almost imperceptibly. Our Nation's economic leadership--both at home and abroad--faces strong challenges from international competitors.

We have failed to respond adequately. Our ability to compete in world markets has been gradually eroding. Even our lead in high technology is slipping.

Is America prepared to compete in an increasingly interdependent and competitive world environment? This is the question that was closely scrutinized by a group of 30 leaders from industry, labor, Government, and academia during the past 15 months.

During the course of its deliberations, the group achieved a remarkable consensus: We must strengthen our ability to compete if we are to provide for the continued well-being of our people.

This report contains compelling evidence of a relative decline in our competitive performance. The underlying causes of this decline are analyzed and recommendations are made to both public policymakers and private citizens on actions that must be taken to reverse the deterioration in our competitive position. In short, the report recommends an economic agenda for America in the 1980's and beyond.

Because U.S. competitiveness is so vital to all Americans, the Commission has chosen to present its final report in the most concise and nontechnical manner possible. Those interested in more detailed coverage of the Commission's analysis and recommendations are encouraged to read volume II of the final report, from which this summary is drawn.

Finally, while this report represents a consensus of the Commission's very diverse membership, every member does not necessarily support all elements of every recommendation. There is, however, unanimous support for the Commission's basic findings and the thrust of its recommendations.

- **Reduce the cost of capital to American industry**--Increase the supply of capital available for investment, reduce its cost to American businesses, and improve its ability to flow freely to its most productive uses.

- **Develop a more skilled, flexible, and motivated work force**--Our people need a strong educational foundation, reduced barriers to labor mobility, and incentives to work cooperatively toward increased competitiveness.

- **Make trade a national priority**--The United States must articulate trade policy with a single strong voice. The Administration's domestic and export policies should encourage U.S. trade and industry adjustment to global competition. The world trading system must also be strengthened.

What Is the Private Sector's Role?

Government cannot legislate success. America's ability to compete lies primarily within the private sector. Thus, business should establish world leadership in the commercialization of product and process technology, raise investment levels in productive assets and the development of employees, seek new ways to create a consensus on goals within our business organizations, and broaden its perspective to include the possibilities of world markets and the certainty of global competition.

What Is Government's Role?

Government should take the lead in highlighting the importance of competitiveness and should nurture an effective consensus-building dialogue among leaders in industry, labor, Government, and academia. Government should provide a stable fiscal and monetary policy that ensures steady, noninflationary growth, an environment that nurtures and protects technological innovation, an educational system that prepares our people for the future, a free and fair world trading environment, changes in antitrust and export administration policies to reflect the new global environment, and policies to help American firms and workers respond to changing technologies and markets.

What Must We All Do?

We must recognize the challenge and its significance. We must equip ourselves with the skills required in the workplace of the future, adopt a flexible attitude toward changing markets and technology, and work together to strengthen the competitive performance of American industry.

There Is No Simple Solution

There is no single action--no simple solution--that can reverse the competitive erosion we report. Competitiveness is a broad issue, affected by and in turn affecting a broad spectrum of our activities.

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CEQ Chief Hits Industry For Energy Scare Ads

Russell Peterson, the new chairman of the Council on Environmental Quality, has got himself into a public scrap with executives of the American Electric Power Company, the largest investor-owned utility in the country, with Peterson accusing AEP of irresponsible and nonsensical advertising, and AEP's chairman firing off a letter to President Nixon suggesting that he should investigate Peterson's "conduct of his office."

The conflict started when Peterson, incensed by a series of full-page ads taken out by AEP in national news publications which suggested that energy conservation will "generate galloping unemployment," wrote to AEP president George Patterson, calling such a suggestion "the least comprehending of our energy problem and the most subversive of the public interest." Peterson also made his letter public.

Donald C. Cook, AEP's chairman, replied to Peterson with a vituperative attack in which he failed to defend the advertising campaign but suggested that Peterson was trying to take away AEP's "right of free speech and thereby preventing the dissemination of the truth about the inevitable consequences of your extremism." Peterson's crime is that he has publicly advocated that the United States should cut its growth in energy consumption by half.

Cook was particularly concerned that Peterson had made his original letter public, but CEQ officials point out that it was the only way to make their case known. Since AEP's advertising campaign probably cost more than CEQ's entire budget, CEQ could hardly respond in kind to the advertisements' self-interested rubbish.

Technology Transfer Hearings

The well-worn theme of the transfer of technology from the United States to developing countries is about to get another airing on Capitol Hill through a bill introduced in the House by Richard T. Hanna, a lame-duck (through voluntary retirement) Congressman from California.

Since Congress is likely to be hung up on impeachment in the next few months, the bill isn't going to get anywhere, but Hanna, who happens to be chairman of a subcommittee on international scientific affairs, is planning some hearings on the matter next month.

The nub of his proposal is the establishment of an International Institute for Technology Transfer, a kind of international data bank staffed by scientists, which will supply information to underdeveloped countries on request. Hanna has the novel idea that the Institute would use leased satellite telecommunication lines, though he is not too specific about why such speed would be required to get information across.

Hanna claims that he's getting a favorable reception for the idea from the Administration, but since Nixon and his associates are not currently disposed to avoidable squabbles with Congress, the good reception, such as it may be, can probably be written off as a tactical courtesy.

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Letter to the Editor

Forest Service Denies Lag on DDT Replacement

Dear Sir:

In discussing the recent decision by the Environmental Protection Agency (EPA) to allow emergency use of DDT, if needed, to control the tussock moth in forests of the Pacific Northwest, SGR (Vol. IV, No. 6) concludes that alternative means of control had been ignored until last year.

Both the writer of the article and EPA Administrator Russell Train are wrong in this conclusion. A major effort to find alternatives to DDT for controlling the tussock moth has been underway since 1964—8 years before the ban on DDT by the Environmental Protection Agency.

Research goals in finding these alternate controls have not yet succeeded, partly because of the long time period between outbreaks (when it was difficult to find even low-level populations for study and testing) and partly because research funding has been limited.

But significant progress has been made and I cite the following facts to rebut the article's contention that it wasn't until last summer "that the Forest Service did any serious research and testing of alternatives to DDT to control the pest."

1. In 1964 we began to investigate the use of natural biological agents to control the moth. Through this investigation, many of the natural parasites, predators and diseases which attack the moth have been identified. One of these—a nucleopolyhedrosis virus—shows exceptional promise. The virus achieved population reductions as high as 99 percent when sprayed on small plots last year. A commercially available bacterium (Bacillus thuringiensis) was also tested in 1973. It achieved population reductions as high as 98 percent. But some research problems still remain. . .

2. In 1966, the Forest Service began initial screening of insecticides against the tussock moth at its Insecticide Evaluation Laboratory in Berkeley, Calif. Of the 80 compounds tested so far, half show significant toxicity to the moth larvae. But until the 1972 outbreak in eastern Oregon and Washington in 1972, there had not been a significant outbreak on which these insecticides could be tested. In 1972, Zectran was tested against the tussock moth in Washington and Oregon. In 1973, it and three others of the most promising insecticides—carbaryl, Dylox and bioethanomethrin (a synthetic pyrethrin) were tested in the Wallowa and Blue mountains in Oregon. The field test for Zectran covered more than 70,000 acres, but it proved only moderately encouraging. Consequently, this year more extensive tests will be conducted with carbaryl and Dylox. As you know, it is impossible to complete a field testing program in one or two years.

3. Because of the need to know about the biology of the moth, we have been devoting much of our research effort over the years to studies of insect population trends and ecology, population genetics and behavior, relationship of weather to outbreaks, and tree physiology.

4. These tangible research activities, plus the fact the Forest Service spent $370,000 last year and is spending over $600,000 this year on research for safer controls, I think, belies Mr. Train's statement that efforts to date have been "almost totally inadequate—to the point of dereliction."

It is disappointing that a scientific publication such as yours failed to obtain the facts relating to Forest Service research for alternatives to DDT before erroneously reporting that no serious efforts were undertaken until last summer.

JOHN R. McGUIRE
Chief, Forest Service,
US Department of Agriculture

PSYCHOSURGERY *(Continued from page 5.)*

garded as strictly experimental, to be used only in rare circumstances, when all else has failed.

The effect of such a classification would be to slap a number of restrictions on when and how psychosurgery should be performed. For a start, the proposed guidelines suggest that such operations should be carried out only in hospitals which have "strong and intimate affiliation with, and attachment to, academic sciences," and comprehensive research protocols would have to be drawn up for each operation. Strict controls would have to be applied to make sure that informed consent is freely given, and "every effort must be made to ensure that all reasonable alternative therapies are attempted before resorting to psychosurgery."

When they finally emerge, the new regulations will legally apply only to the use of federal funds for psychosurgery, but they are likely to have an impact on non-federal programs as well because they are expected to be copied at the state level, which means that they will apply to a wide range of medical and research institutions.

Gifts to Education Hit Record

The widely held notion that the public is turning its back on the financial needs of higher education finds no support in figures recently released by the Council for Financial Aid to Education.

For the year ended last June 30, according to the CFAE, contributions from individuals, corporations, and foundations reached a record high — $2.24 billion, an increase of 11 percent over the previous year.

The top recipients were: Harvard, $57.1 million; Stanford, $46.5 million; University of California System, $44.3 million; Yale, $32.1 million; Cornell, $30.6 million; Northwestern, $30.3 million; University of Pennsylvania, $28.9 million; University of Chicago, $28.7 million; Emory University, $27.4 million, and Columbia, $27.1 million.

Details are contained in *Voluntary Support of Education*, 1972-73, $6, to be published at the end of May, (CFAE, 680 Fifth Ave., New York, N.Y. 10019.)

Medical School Rejects Flocking Abroad

Faced with diminishing prospects for enrolling in medical schools in the United States, prospective physicians are turning in droves to schools and colleges abroad. According to a survey carried out by the Department of Health, Education and Welfare, 2,045 US citizens were studying medicine in Latin America and Canada in the 1971-72 academic year, and there are indications that the number has grown since then.

By far the largest home for expatriate US medical students is Mexico, where 1,744 are enrolled in the Autonomous University of Guadalajara alone, each of them paying $4,000 a year for tuition. A new medical school has also recently opened at the University of Monterrey, and the HEW survey reckons that it could soon attract as many US medical students as Guadalajara.

The chief incentive for foreign study is the fact that in 1972, US medical schools rejected 16,800 applicants, and the less restrictive admission policies in some foreign countries help create "a haven for would-be physicians who are not able to compete with other applicants meeting medical school admissions criteria more exactly."

Copies of the report, *Foreign Medical Students in the Americas*, can be obtained from the US government Printing Office, Washington, D.C. 20402. Price, 55 cents. Number 1741-00069.

BLAST *(Continued from page 3.)*

yield, and Rio Blanco was designed to do just that. In short, the test involved stringing three 30-kiloton explosives together in a vertical line, about 450 feet apart, in the hope that the caverns blasted out by each one would join together to form a huge underground chimney.

But when the AEC drilled into the cavern, it found that it was getting gas only from the area around the topmost explosive—the caverns either failed to join together, or they had become blocked off from each other.

IMPACT STATEMENT

This rather embarrassing discovery is going to present a huge obstacle to the nuclear gas stimulation plans because the AEC itself pointed out in an environmental impact statement two years ago that "the use of multiple explosives is required to improve both the economics and the total recoverable fraction of the gas."

But the whole notion of exploding thousands of nuclear devices under the Rockies had already run into some pretty devastating opposition long before Rio Blanco shattered the peace last year, and the handwriting was probably already on the wall.

For a start, people living in the area are not very happy about the prospect of having their homes shaken by shockwaves. But more important, the gas fields happen to lie directly beneath the highly prized oil shale fields which have been proclaimed as offering a potentially huge source of domestic petroleum. The oil companies which have been bidding for a piece of the shale lands are unlikely to sit back and allow the AEC's nuclear fantasies to jeopardize their operations. They will be only too happy to use Rio Blanco's technical problems as a club with which to beat the program into an early grave.

"NO KNOWN ALTERNATIVE"

In view of the fact that about 300 trillion cubic feet of natural gas are reckoned to be recoverable from the Rocky Mountain oil shale area, enough to satisfy the entire US demand for 10 years, neither the federal government nor the energy industry is likely to give up trying to get it out. Unfortunately, though, the AEC said in its environmental impact statement on Rio Blanco that "there is no known alternative to nuclear gas stimulation for recovering the gas from tight formations."

Be that as it may, the AEC announced last month that it is putting up $1 million to test a technique known as massive hydraulic fracturing—essentially pumping high pressure fluids down a borehole to fracture the gas bearing rock—at a site a mile away from Rio Blanco.

OTA Gets Moving with Drug Study for Kennedy

The Congressional Office of Technology Assessment (OTA), which has drawn some sniping for its leisurely startup pace (SGR Vol. IV, No. 5), has decided to move along swiftly on at least one assessment and report to Congress by July 1.

The subject selected for fast treatment is "bioequivalency" of pharmaceutical drugs, which became a hot item last December when HEW Secretary Caspar W. Weinberger recommended that in purchasing drugs, the government opt for the least expensive version "in (the) absence of demonstrated differences in uniform quality and therapeutic equivalence. . ." Weinberger's recommendation was included in testimony presented to the Senate Labor and Public Welfare subcommitttee on health, whose chairman, Edward M. Kennedy, shares the Secretary's concern about high profit margins in the pharmaceutical industry.

Weinberger said that the system of buying at lowest cost, with specified exceptions, could safely be adopted because "all the evidence to date indicates that clinically significant differences in bioavailability are not frequent."

His position, however, was challenged by representatives of the pharmaceutical industry who contended that the absence of demonstrable differences could not be taken as evidence that they did not exist. Kennedy, who is chairman of OTA's board, subsequently recommended that OTA carry out a study on the subject and report back to his subcommittee.

Since this is the first OTA study to get underway, the organizational arrangements are of some interest. OTA's first step was to start putting together an advisory panel to supervise the study. Selected to chair the panel was Robert W. Berliner, newly appointed dean of Yale Medical School, and former director for science of the National Institutes of Health. While other members are being selected, a contract for $149,000 was awarded to a Washington-based organization, Family Health Care, Inc., headed by Stanley C. Scheyer, former medical director of the Peace Corps, to carry out the study.

As stated in an OTA announcement, "The key issue to be assessed is whether present day technology can determine that two drugs with the same chemical composition but produced under different manufacturing processes will produce the same therapeutic results."

Since the value of OTA in the hurly-burly of Congressional affairs is yet to be proven, there is a good deal more riding on this study than mere determination of the particular issue at hand. If the OTA study decisively settles the matter one way or the other for Kennedy's subcommittee, due note of this will pass along the Congressional grapevine and members confronted by scientific and technical problems will be more inclined to turn to OTA for assistance.

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federal laboratories out into the marketplace.

But about the only federal project to emerge from the gusher of talk was the Experimental Technology Incentives Program (ETIP), jointly funded and administered by the National Science Foundation and the National Bureau of Standards. NBS is only now getting round to announcing its first contracts, and NSF's part of the operation has been reduced from an $11 million a year enterprise to a miniscule $1 million. According to NSF Director Guyford Stever, the program is now in an "evaluation mode."

The accomplishments have therefore so far failed to live up to the rhetoric of Nixon's message, and the NAE committee—which was in fact convened through a grant from the NSF ETIP program—has suggested that so far the Administration has been taking too timid an approach.

For a start, the committee believes that the federal government has been spending a paltry sum of money encouraging technology utilization—in 1973, it spent $43 million, or 0.25 per cent of the total research budget on such activities. The NAE committee reckons that the figure should be pumped up to $1 billion.

The money would be used to fund a search of projects supported by federal agencies, to determine which have developed products likely to be useful to society, and then to fund a variety of incentives to industry to exploit them. Such incentives as exclusive licenses, and "imaginatively bold financing to users in the private and public sectors in order to accelerate the direct implementation or to stimulate financial institutions to provide greater investment in new technology enterprises" should be tried, the committee suggested.

Most of the committee's suggestions and recommendations are familiar stuff, and reflect the industrial bent of the majority of its members. Like similar recommendations made last year by representatives from state and local governments for harnessing federal R&D for the common good, they will probably be quietly forgotten.

The committee was chaired by Joseph H. Newman, senior vice president, Tishman Research Corp., New York City. The report, titled, *Technology Transfer and Utilization*, is available without charge from the Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Ave. Nw., Washington, D.C. 20418.