

A Policy For Export Of Products & Technology

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Third in a series of
perspectives on employing
technology to solve the
pressing problems of society.

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In order to formulate an appropriate policy for the export of products and technology, one should look at the major needs of our society. These are the reference points against which benefits and risks of exports should be measured.

The number one need is more jobs and almost as important, more skilled jobs. Then other pressing needs include those for the achievement of more abundant and less costly sources of energy, improved energy conservation, greater environmental protection, new materials, less costly food production, more efficient water conservation, revitalization of inner cities, better health care and improved productivity. Solutions to these problems would provide the new jobs needed in the years ahead not only for the young people entering our labor force each year, but also new jobs to replace those that are lost because of changing conditions; for example, economists estimate the petroleum imports in 1977 will cost the U.S. three million jobs.

How does the export of products and technology relate to our major needs? First to be considered is products.

PRODUCTS

Obviously the export of products creates jobs. Since World War II, producing for export has become increasingly important. Over the last twenty years, exports grew from 4.5% of our gross national product to 7.6%, despite a world-wide recession. Altogether our export business directly employs about four million persons in this country. I am not suggesting that a policy of pushing product exports to higher levels will cure unemployment. But I do contend that we should have a policy to encourage the exports of high technology products, as well as many agricultural products, to all countries. It is precisely those products that account for the bulk of U.S. export today. Without continued strong performance in these areas, the U.S. balance of payments will deteriorate and U.S. jobs will be lost.

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TECHNOLOGY

On balance, the export of technology also creates jobs, but as will be explained later, the benefits that can be derived in helping to solve our other major problems by exchanging technology with other countries are significantly more important.

To avoid misunderstanding, I should mention the definition of technology I use is “a way of doing things.” I also use the words “technology” and “knowhow” interchangeably. Obviously there is a broad span of technology. How to grow two stalks of rice in place of one is knowhow or technology. How to design a nuclear power plant is another example. Clearly technology is central to the economic process.

One other needed clarification is that I am talking about industrial products and technology and not military products or technology. Further, since it is not possible in many cases to determine whether or not a particular technology has military application, I am talking about all technology developed by U.S. industry for peaceful purposes.

Turning back then to the effects of the export of technology on jobs, studies show that where technology is transferred from U.S. parents to overseas subsidiaries, over the long run there is a net gain in U.S. jobs, although not nearly as great as for the export of products that embody that technology. Of particular note is that the export of technology in exchange for cash does not directly create jobs, except for those relatively few personnel who are required to effect the transfer—in fact, the number of jobs may eventually decrease depending upon the extent that products derived from the exported technology are imported and displace U.S.-made products.

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The export of technology for cash, except when it has already become obsolete, is not normally of itself in the best interests of either a company or the nation. The purchase of technology is essentially risk-free to the buyer. It represents prior investment, by others, of both money and time—the latter is particularly important because the acquisition of technology saves years in getting a product to market.

In our open society the cost and time to develop technology by a private company are often reduced by the infusion of technology from other companies, government laboratories and both directly and indirectly from our educational system. Thus, our whole society has an investment in technology and this fact must be reckoned with.

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Therefore, a very economically desirable method for the transfer of technology is to exchange it... that is, to import technology of a value equivalent to that exported. Societal inputs balance and the time advantage and other benefits accrue to each side. In other words, we should strive for technological cooperation. It is the only way that timely solutions can be achieved for our major problems because the solutions require massive technological resources—far more than any single country can marshal—and even then, the cooperation must be arranged so as to minimize needless duplication.

There is a growing—but still limited—recognition of the need for increased cooperation. NASA, of course, has many cooperative activities. The joint research projects now under way between the U.S. and Soviet Union are other examples. One is the nuclear fusion project, started in 1974 and based on a breakthrough by Soviet scientists. Another is the magneto-hydrodynamics research and development program based on the complementary nature of developments in the two countries. One immediate result was the saving of more than \$150 million to the U.S. through the joint use of a Soviet test facility. In addition, the development of MHD is progressing faster and with less risk of technical failure than if the two countries had worked independently. The pending United States/Israeli binational foundation for industrial research and development is another example. Most of the work will be done through cooperation of U.S. and Israeli industrial companies and universities. There are other examples, but they are few and the recognition of the need is still limited.

DETERIORATING U.S. WORLD COMPETITIVE POSITION

Another fact which must be understood in formulating export policies is that of our deteriorating competitive position. The United States is no longer dominant in world technology. Many people are reluctant to accept that reality...but there is an abundance of substantiating facts. Here are some.

“The United States is no longer dominant in world technology. Many people are reluctant to accept that reality...”

There is virtually no technology exclusive to the United States. Department of Commerce statistics show that the rate of generation of industrial technology in Europe and Japan has begun to exceed that of the United States in many areas. Today they have essentially the same technology as we have. One reason is that research and development expenditure in the U.S. is declining as a percentage of our gross national product, whereas other countries are providing financial incentives and allocating a higher percentage of resources to industrial research and development.

Of the top ten research organizations in the chemical industry, rated by size of R&D budgets, only three are U.S. companies. Important areas of nuclear power plant technology are moving faster in Europe. Russia has taken a lead in welding technology and titanium fabrication.

There are numerous areas where the U.S. is leading, but by a time margin that is only a few years. For example, we have a lead in computers, but that lead is not overwhelming. European and Japanese computers are in many respects equivalent to U.S. products and competition from them is stiffening.

Experience with Control Data's worldwide computer-based technology transfer service shows that far more American companies are seeking foreign technology than vice versa.

Again the main point is that the United States does not have the technological resources to provide the whole new round of technological innovation required to solve our major societal problems.

What we *do* have are the best management and marketing resources in the world. So, we are ideally positioned to promote and benefit from technological cooperation with other countries.

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RISKS

So much for the benefits from exports. What about risks? There are two categories, commercial and military.

Commercial: Export of technology is really the only area where there are significant commercial risk issues. Clearly there is risk that the sale abroad of current technology could create competition back here at home if the resultant products are imported into the U.S. An example is Japanese products sold in the U.S. that were originally based on U.S. knowhow. But with technology exchange, that is a two-edged sword.

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Other countries with serious unemployment problems are striving to maximize local manufacture. Couple that with the fact noted earlier, that there is virtually no technology today that is exclusive to the U.S., and we readily conclude that... If we don't help those countries meet their knowhow needs, other countries will. Then we lose three ways. We lose the value of the knowhow, we suffer product competition in world markets, and we don't get knowhow in return that could be the basis for greater competitive thrust for U.S. industry in those same world markets.

So again, the best answer for the United States is cooperation, either through direct exchange of technology, or indirectly through joint projects, jointly-owned companies, or through the establishment of wholly-owned product subsidiaries. It is clear, though, that the last approach is becoming less acceptable to many countries.

Through joint activities it is possible to share permanently in local markets and have an adequate degree of control. Frequently in

joint projects or jointly-owned companies, it is practicable—even desirable—to retain some of the product component production in the United States. The joint activity can carry on related research and development and this technology can flow back to the United States.

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Military: Military risks are more difficult to assess. One reason is that almost any commercial product, service or technology, ranging from food and clothing to jet engines and electronic computers, can contribute directly to a country's military capability, or indirectly by strengthening its economy. Another reason is that most military developments are covert, so that evidence of the direct utilization of industrial technology for military purposes is much less visible.

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The risk assessment for any item, then, has to boil down to whether or not it is of *significant* potential military benefit. And the only practical answer is to make a determination based primarily on what the U.S. gets in return. If we get a significant technology in return, then we have profited more than the other country, because we are much more effective in transforming knowhow into products.

It should also be noted again that joint activities have the advantage that the U.S. partner has a considerable degree of control and, of course, knowledge of what is going on.

There is also risk in not furnishing the desired products, services and knowhow. I will cover that later.

EXPORT CONTROLS

To complete the perspective, export controls must be considered. The U.S. has had many years of experience with them—what is the result?

Positive results are not obvious. For example, the Soviet Union has not been prevented from carrying out its military weapon objectives in recent years. We are told that its military power has increased dramatically and that it has the capability to destroy the world.

On the other hand, the Department of Defense reports that Soviet progress in some important areas, such as electronics, has been slowed, thus making it possible for the United States to maintain weapons superiority longer in a number of key areas. The results, at best, seem inconsistent, because we are really talking about trade-offs—benefits and risks—not embargoes.

For some years now, we should have been asking whether the lower military risks that are claimed and the corresponding money saved in reduced defense spending in the United States as a result of export control were commensurate with the economic and social detriments of fewer jobs, lost business opportunity, and the gain by foreign competitors who did sell the equivalent or acceptable alternative products to the Soviet Union. We should also have been assessing the implications of the Soviet's deciding to develop their own products or even leapfrog the state of the art to a more advanced technology, which could pose greater military threat to us.

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The gaps created by limitation of U.S. trade with the Soviet Union can be filled by high technology products from others, particularly from West Europe and Japan. Although COCOM* was designed to limit export of western technology of military significance, over time and under competitive stress that control mechanism has weakened. Moreover, it has not prevented the Soviet Union from developing its own advanced technology or achieving its military objectives.

There are numerous cases where export licenses to foreign manufacturers have been approved by COCOM even though the office of export control had previously advised U.S. companies that licenses would not be approved.

Over the past nine years my own company alone has lost equipment business in this manner valued at \$235 million. This represents an average of 1,100 U.S. jobs per year lost to foreign firms.

Export controls have certainly stimulated the communist countries to develop their own computer industry. Today, virtually all of their needs for small- and medium-sized computers are being met with their own production. The main computer markets left for American companies in communist countries are larger computers and peripheral equipments. But these opportunities will eventually shrink, unless export restrictions are lessened.

*The Coordinating Committee on East-West Trade, established in Paris and consisting of all NATO countries except Iceland, plus Japan.

With moderate relaxation, it is estimated that sales of larger computers and peripherals for U.S. companies could in ten years build to an annual level representing 150,000 high-technology jobs.

This is not a pie-in-the-sky estimate. Indeed, similar increases have occurred in the past when export controls were relaxed. Let me cite just one of many examples. From the end of World War II through most of the 1960s, the U.S. government prohibited the export of Caterpillar earth-moving equipment to the USSR and Eastern Europe. In the latter part of the 1960s, export controls over tractors to these countries were relaxed. Immediately thereafter, sales of Caterpillar tractors and other earth-moving equipments to those countries skyrocketed, thereby creating thousands of jobs for Americans.

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The urgency of the message to relax export controls is made even clearer by taking into account that job increases in the future will occur in smaller increments... because of progress in automation. For example, employment today in our total semiconductor industry is only 100,000 and for the coal mining industry about 200,000. Coal mining employment twenty-five years ago was 400,000. New automated production facilities require ever-decreasing numbers of employees. The point is that each export case merits a thorough assessment of risks and benefits, but the present methods of export control do not provide for it.

NEEDED: U.S. POLICY ON TECHNOLOGY

The major stumbling block in formulating an appropriate policy on the export of products and technology is the lack of a comprehensive and coordinated U.S. policy on the development and application of technology. There are many different policies with respect to technology followed by different government departments and they often appear unrelated. Many elements are required to make up a comprehensive policy, but a brief review of four will suffice for illustration.

National Priorities:

An essential element that is currently missing is the provision for establishment of national priorities and guidelines for the development and application of technology. Priorities should be described in terms of our most important societal needs and opportunities, along with an analysis of the benefits, including the number and

type of jobs to be created or eliminated. Guidelines would help with policy implementation.

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Inventory of Technology: A second element for a comprehensive policy is a requirement for a national inventory of technology. Nations keep track of goods and services and the balance of foreign trade with respect to goods and services, but most do not make a sufficient accounting of the value of technology transfers.

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Technology is a national resource which is ultimately more valuable than supplies of energy and food . . . items for which we go to great lengths and expense to have an accurate accounting.

The need to value technology and maintain an accounting of technology trade balances is growing ever more urgent, both because of its increasing volume, and the need to better inform the public about what is going on, so that there will be a much greater understanding of cost and benefits of technology to society.

Worldwide Cooperation: Earlier the importance of worldwide technological cooperation was stressed. Aggressive promotion of it should be a part of policy. Even tax or other financial incentives should be used to encourage widebased cooperation which has a benefit, on balance, to society.

Public Understanding: The policy should also provide for an expanded and continuing education of the American public, including our politicians, on what technology is all about, particularly how it meets basic needs and its effects on employment.

Technology is not widely understood. Even use of the word often causes people to turn off with the attitude that technology is for the long-hairs—don't bother me, or worse, and more recently, technology has become for many, a synonym for environmental pollution.

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OUTLINE FOR AN EXPORT POLICY

Now to get back to what should or should not be exported. First, I believe that we need a policy that fosters the export of virtually any industrial product or technology under appropriate conditions. The thrust must be to expand and not restrict exports. The burden of administration is primarily the determination of minimum appropriate conditions.

For products, appropriate conditions are that they will be used for industrial purposes with reasonable visibility on usage during the life of the product. Only those products or services embodying the most highly advanced technology would be scrutinized.

For technology, the major criterion is an appropriate balance between each country and the U.S. Certainly between the U.S. and the Soviet Union it should be equal. Most technology transfers would occur under a blanket agreement negotiated between governments. Once the blanket agreement is in place, then U.S. companies proceed to establish projects in the traditional manner.

The normal approach for the export of current industrial technologies would be that of receiving technology of equivalent value in return for that exported, or the establishment of joint projects or joint companies where a substantial amount of commercial control and visibility is maintained.

It should also be noted that there are countries that may not be concerned about technology trade balances but prefer to make cash sales of technology to us. This would be very advantageous to the U.S. and should be encouraged. For technology, as with products, only the most highly advanced knowhow would be subject to government control.

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A guiding principle in assessing military risk would be that a strong industrial base is the greatest asset of U.S. defense. By keeping the number of cases coming under government control to a minimum, the necessary review of risks and benefits to the nation can be made by a high level commission whose members have unbiased interests and broad perspectives so that all factors are properly

weighed in considering technology policies. This is not achievable in a review involving only representatives of the departments of the executive branch of the government.

Finally, I should note that the complex issues in an export policy are not easily or quickly resolvable. Simplistic approaches do all of us a great disservice.

This outline for a policy for exports is presented in the hope that it will add to the public understanding of a very serious and complex problem and lead to continued study resulting in a comprehensive solution.