

Testimony before the

Senate Subcommittee on Science, Technology and Space

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Re

S.1250 National Technology Innovation Act of 1979

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My name is Lewis Branscomb. I am vice president and chief scientist of the IBM Corporation and president of The American Physical Society. I welcome this opportunity to speak with the Committee about the encouragement of technological innovation in the United States and the contributions that could be made by the National Technology Innovation Act of 1979.

A lot of people think American industry has lost its technical capability and has abandoned research and development. Let me put the facts as they are:

It is the government, not industry, which has exhibited the most uncertainty about its science and technology investments in recent years.

In 1980 private industry will fund approximately half of all the R&D in this country and will perform 72 percent of a total 57.3 billion dollar national effort. The trends are positive and 1979 funds for industrial R&D will increase by about 15 percent above '78 levels. They are predicted by the McGraw-Hill survey to rise another 37 percent in the next three years to 54.7 billion.

In 1962 industrial R&D investments were only half those of the federal government; in 1980 they are almost equal. In constant dollars, industry investments in R&D have moved steadily upward

throughout that period, while federal activities have only recently reversed a declining trend. This is hardly a picture of American industry going down the tubes. Furthermore, while industrial R&D is heavily concentrated in high technology industries, such as electronics, computers, and communications as one might expect, some of the most dramatic increases in R&D funding are emerging in industries such as iron and steel, stone, clay and glass, and machinery. Thus, the conventional wisdom that older industries have lost their confidence in R&D is not a valid generalization. What we need are the facts, sector by sector. S1250 would permit that work to be done.

The widespread concern about the state of American industrial innovation that one finds in the press and in industrial and scientific circles deserves examination. The concern arises from three sources:

First, technologically advanced competitors from Europe and Japan are successfully challenging American business on many fronts where American business has been accustomed to an unchallenged lead.

Secondly, the chronic appearance of inflation, combined with low economic growth, cries out for a rapid increase in the rate of productivity growth and the creation of new jobs and new solutions to our national problems through innovation.

Third, both business and scientific communities share a sense of frustration that the scientific and business skills on which we pride ourselves as a nation are not being mobilized as well as they might be to address our problems. Indeed, the national debate about technology has concentrated too heavily on the problems that progress brings. The institutional mistrust that results undermines the opportunity to mobilize our native ingenuity to get the job done.

The role of government is, of course, a central question. Many of the foreign companies challenging American industrial leadership have benefited from direct government protection and support. Yet the United States government action seems to have focussed more on the redistribution of wealth than on its creation. It is time to start building on our strengths, and review the balance between incentive and restraint on innovative private action.

The government's experience with the encouragement of scientific excellence in this country and its success in working with the aerospace industry to develop technology for the government's own operational activities has been outstanding. On the other hand, the government's involvement in commercial industrial innovation has been a mixed bag at best. Thus, it is not surprising that after a good many years of study of the government's role with respect to commercial innovation, little coherent policy has emerged and a great deal of skepticism surrounds each

new proposal for specific government action.

Nevertheless, I believe Congressional consideration of this aspect of government policy is quite timely. The Technology Innovation Act is an interesting basis for this discussion.

There is a healthy skepticism about the efficacy of government intervention into commercial activities today. Fiscal prudence is becoming a political asset. The economic cost of regulation to achieve social goals is beginning to be reckoned and the virtues of competition in a fair marketplace are gaining new respect. There is, as a result, a good opportunity to consider ways that government can improve the environment within which the private sector innovates.

There is increasing understanding that research and development activities do not by themselves cause innovation. They permit it if the economic and business climate is conducive. President Carter, in his Science and Technology message to the Congress last March, emphasized the government's role in basic research support and accepted the view that the federal government should provide "a climate that fosters innovation rather than . . . direct support of research and development with commercial potential".

The dominant factors governing industrial technology investments are those mentioned in section 2 (6) which describe the business climate. Erratic interventions or changes in the course of government policy, however well intended, are the greatest deterrent to industrial innovation because they escalate an already high risk associated with innovative activities for new business development. In other words, confidence in the long term future is the most essential single requirement for private investment in innovative development.

The President's Domestic Policy Review of Innovation, now complete and under review in the White House, should be expected to make a major contribution to the public discussion about the role of government in this regard. I hope the President will make this entire study available for public discussion and for review by this Committee so there can be full debate and clear understanding about the two aspects of the government's role:

- (a) improvement in the business climate for innovation, and
- (b) support and encouragement of the kinds of scientific and technological activities upon which innovating enterprises can draw.

This bill, focussed on the authorities of the Department of Commerce, deals largely with the second role. Thus,

the name of the bill is somewhat misleading; it deals with only half the problem.

The philosophy embodied in S1250, in section 6a (2), correctly focuses on "the development of a generic research base important for technological advance and innovative activity . . ." as the right way for government expenditures to help business. For 10 years, since I first served as Director of the National Bureau of Standards, I have urged that the best way for government R&D investments to help industry is by investing in high quality scientific research of generic importance to industry, but not focussed on narrow proprietary objectives. I am delighted to see this view reflected in this bill, and supported in the President's proposals for improving the scientific base for advances in automotive technology, announced May 18th last. But there are two elements missing in S1250: a scientifically competent government laboratory to set up and manage the Centers, and active participation by industrial scientists in the setting-up of goals and priorities. The National Bureau of Standards should be given the first of these assignments and mixed industrial/university panels should be specified to set priorities and evaluate effectiveness of the Centers.

Fortunately, the attitudes of faculty and students in our universities toward research cooperation with industry, have become much more positive in the last five years. This augurs well for the kinds of proposals envisioned in the statute.

It should be possible to choose specific projects that are both basic enough to interest the universities and pertinent to industrial needs to attract industrial participation. But if the effort focuses on generic, non-proprietary applied research, as I believe it should, one must recognize that it is illusory to expect major, continuing funding from industry.

Nevertheless, the program should not be attempted without overt industry involvement, especially in selection of research areas, review of work quality and accomplishment, and loans of technical personnel. Perhaps specific project support could also be expected, building on a stable base of institutional support.

But other patterns of university industry support are worth trying too. For example, matching grants might be made available to universities for specific projects partially funded by a single company. Such direct partnership projects may be more attractive to both sides than the multilateral institutional proposal of \$1250. But both patterns should be tried.

Let me now return to the environment for innovation. S1250 usefully calls for microeconomic fact gathering and policy analysis. It falls short of focussing on the responsibilities of the Secretary of Commerce to accept the responsibility for economic development based on industrial and technological strength in America.

This does not imply new programs of expenditure; I have already agreed that support of generic research, aimed at technologies important throughout industry, is the correct role for government. But it does mean that somewhere in government there should be a focus of attention at cabinet level on all the factors, which taken together, determine the innovative and productive vitality of our nation's industry. Why not take a more ambitious step with this legislation, and assign this responsibility to the Secretary of Commerce so all the capabilities of the Department will be focussed on it.

In these brief comments, I do not have time to comment on the details of S1250. I am concerned that the patent provisions of 6(e) should permit negotiated terms for preferential rights by a participating company to patents arising from projects in which that company invested. The absence of such rights may be a disincentive to industry participation in the program and thereby defeat the objective of the legislation. I am submitting for your consideration and the record a correction to section 6(e).

I don't understand why 7c(2) disallows payments for rental of space occupied by a Center. And the provisions of 7c(3) are insufficiently safeguarded against governmental intrusion into commercial proprietary information not strictly relevant to the auditing responsibility of the government for its funds.

Let me conclude by commending the Committee for taking this initiative. I hope the Administration soon comes forth with its own proposals, out of the domestic policy review on innovation. It is time we Americans began the construction of harmonious, constructive relationships between government, the private sector, and our universities. In the field of innovation promotion we may want to start modestly and carefully, but we should start.

Thank you.