

The seminal report, *Science, the Endless Frontier*, produced by a post-war study group chaired by Vannevar Bush, stressed the importance of this partnership: “Since health, well-being, and security are proper concerns of government, scientific progress is, and must be, of vital interest to government.” The resulting partnership between the federal government and the nation’s universities has had an extraordinary impact. It has made America the world's leading source of fundamental scientific knowledge. It has also produced the well-trained scientists and engineers capable of applying this new knowledge.

Yet as important as research universities are today in our everyday lives, it seems increasingly clear that in the future they will play an even more critical role as they become the key players in providing the knowledge resources--knowledge itself and the educated citizens capable of applying it wisely--necessary for our prosperity, security, and social well-being. As Erich Bloch, former Director of the National Science Foundation stated it in Congressional testimony:

“The solution of virtually all the problems with which government is concerned: health, education, environment, energy, urban development, international relationships, space, economic competitiveness, and defense and national security, all depend on creating new knowledge--and hence upon the health of America’s research universities.”

But here we have both some good news and some bad news. First, the good news:

## The Good News

The good news is that America's system of higher education is still widely acknowledged to be the strongest and most productive in the world. A couple of years ago a *New York Times* editorial referred to our nation's research universities as the "jewel in the crown" of our national economy. It went on to assert that university research "is the best investment taxpayers can ever make in America's future".

In fact, at a recent session of the National Science Board led by Nobel Laureate Economist Bob Solow, and involving Laura Tyson's economic team, it was noted that in our increasingly knowledge-intensive society, the rate of return of research is rising. More specifically, while the average rate of return on capital investment in the United States today ranges from 10% to 14%, the private rate of return of R&D investment is estimated to be 25% to 30%, and the social rate of return--that is the rate that accrues to society more generally, is estimated to be as high as 50% to 60%--roughly four times the rate for other types of investment.

As a group of 15 leading corporate CEOs led by next year's Woodruff Lecturer, Norm Augustine or Martin Marietta, put it well in a recent letter to Congress:

"America's leadership position in an ever-increasing globally competitive economy has been fueled by our technological prowess.

our universities, and the research programs pursued therein, have played a pivotal role in continually advancing our technical knowledge and know-how”

## The Bad News

If the good news is that our research universities are the strongest in the world--at a time when the benefits from R&D investment have never been higher--the bad news is that the 1990s stand a good chance of being the worst for higher education since the 1930s. There is a frightening sense of crisis at many of our nation's most distinguished campuses.

Our universities are at serious risk on a number of fronts. The signs of stress are everywhere:

1. The breakdown of mutual trust has led to increasingly adversarial relationships between universities and government.
2. The skepticism--indeed, hostility--exhibited by the media and government has badly eroded public trust and confidence in the university, as revealed by the recent deluge of attacks on the academy, e.g., those who suggest that “most scholarly activity is either the sterile product of requirements imposed by Philistine administrators or a form of private pleasure that selfish professors enjoy at the expense of their students.”

3. Forces upon and within the universities, such as the rapidly escalating costs of research, are pushing toward a rebalancing of missions, away from research and more toward teaching and public service.

4. The morale of academic researchers has deteriorated significantly over the past decade, in part due to the pressures and time-consuming nature of the need to obtain and manage sponsored research funding and the disintegration of a "scholarly community" within the university. In a recent series of campus workshops sponsored jointly by the Government-University-Industry Research Roundtable and the National Science Foundation, a young faculty member described the modern university as "a holding company for research entrepreneurs

5. Universities are suffering the consequences of the structural flaws of national and state economies, the growing imbalance between revenues and expenditures, that are undermining support for essential institutions as governments struggle to meet short-term demands at the expense of long-term needs.

Actually, the writing has been on the wall for almost a decade, since federal outlays for R&D have been falling in real terms since 1987. Today, in Washington, we hear a new mantra, "Balance the Budget in seven years", that is being chanted over and over again as the way to deliverance. While the particular Tao, the path to deliverance, is still uncertain...whether via the Contract with America or Reinventing Government...the endpoint is clear. Discretionary domestic spending, research and education programs, and

federal support of the research university, all are at great risk. (For example, basic research is proposed to decline by 30%, with even the National Science Foundation being cut up to 13% (\$440 M).) Indeed, leaders both in the federal government as well as in higher education have suggested that the next several months could well determine whether the research university will survive into the next century as a viable paradigm in American higher education.

### Concluding Remarks

The world and the structure of academic research have changed greatly since Vannevar Bush wrote his report. However the major principles he advanced merit reaffirmation. Now more than ever before the national interest calls for an investment in human and intellectual capital. As Bush so clearly stated it, the government-university partnership is not simply about the procurement of research results. It is also about nurturing and maintaining the human strengths of a great technological nation and sowing the seeds of innovation that will ultimately bear fruit in new products and processes to fuel our economy and improve our quality of life.

The American public, its government, and its universities should not surrender the long-term advantage of this research partnership because of a short-term loss of direction or confidence. At a time when many of society's other institutions do not seem to be working well, the research university is a true success story. We simply must get that message across to the American public. We must re-articulate and revitalize the remarkably successful

partnership that has existed between our government, our society, and our research universities over the past four decades.

With us today is Ernest Moniz, associate director for science in the Office of Science and Technology Policy, who has a letter from the President to read to us: