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Publication Date

1996-04-28

HIGH STAKES FOR KNOWLEDGE

by Richard C. Atkinson
Los Angeles Times, April 28, 1996

In 1945, Vannevar Bush, a pragmatic engineer who had been Franklin Roosevelt's science advisor during World War II, submitted a report to President Truman that was destined to serve as the cornerstone of postwar science policy.

In "Science, the Endless Frontier," Bush argued that the national interest demanded federal investment in research performed in universities-- basic research that would ultimately lay the groundwork for new products and new processes for industry. This partnership among government, universities and industry, he asserted, would guarantee the scientific progress that "is one essential key to our better health, to more jobs, to a higher standard of living and to our cultural progress."

Events have proved him right. And Bush's confidence in the utility of basic research is receiving new validation in the work of a small but increasingly influential group of economists. These economists have been actively promoting what they sometimes refer to as "new growth theory." Simply stated, they assign central importance to science- and technology-based innovation as factors accounting for 50 percent of this nation's economic growth and its international competitive position.

Perhaps the most exciting implication of their work is that the successful economies of the 21st century will be knowledge-based. Those nations that invest in the discovery and application of knowledge will find that it translates into increased productivity, higher living standards and faster economic growth.

Nevertheless, two trends threaten to shrink the nation's lucrative investment in basic research. Federal funding for R&D has declined and is set to decline further as Congress and the president struggle to balance the national budget--perhaps by as much as 30 percent over the next seven years.

And industry financed R&D has slowed. Both ATT and IBM, for example, did spectacular work in basic research for years. But these two giants, along with many other American companies, have sharply curtailed their investment in basic research in the wake of the restructuring forced on them by intensifying global competition. Not surprisingly, industry has turned to the nation's research universities to take up the slack. Industry-

financed research in universities has grown dramatically since the mid 1980s.

The combination of these two trends means that research universities are becoming more dependent on private industry for funding their research. Some regard this as a dangerous development, raising the specter that universities will abandon their pursuit of fundamental knowledge in favor of short-term research with a quick payoff. In my judgment, industry's growing interest in university research is more an opportunity than a threat. Vannevar Bush, who thought universities and industry had much to learn from each other, probably would agree.

Of course, universities should argue, and argue vigorously, for sustaining the federal investment in basic research. But that is not enough. The harsh reality is that, however much we may believe in it and want it, federal funding for university research is going to be less than it has been in the past. Another harsh reality is that despite the success of university-based research, in these tough economic times both the public and its representatives in Congress are increasingly less willing to support the work.

No one would argue that the best university research ought to be held hostage to the shifting fashions of the marketplace. But universities also must recognize that they cannot simply be passive recipients of federal research dollars or passive producers of knowledge for industry. Rather, they need to be involved with all aspects of our knowledge-based economy.

One important way that universities can further this involvement is by increasing their research partnerships with industry. Our experience over the last 15 years or so has taught us a great deal about safeguarding the freedom to publish research findings, avoiding possible conflicts of interest and in general protecting the university's academic atmosphere and the free rein that faculty and students have to pursue what is of interest to them. Many universities have learned to live comfortably with new organizational forms as members of consortia or as hosts of industry-sponsored centers.

As university-industry collaborations mature, newer forms of relationships are bound to emerge. There is no reason to believe that they cannot be designed to be beneficial to industry and at the same time consistent with the university's fundamental principles. We are learning to draw on each other's strengths in ways that respond to the economy's need for a constant supply of innovative ideas while also protecting the academic integrity of our universities.

Bush's great vision assumed a continuum of knowledge, from the most fundamental to the most applied, in which basic research served as the

engine driving the entire enterprise. It is up to universities, as the principal performers of basic research, to take the initiative in finding new ways to keep the partnership among government, universities, and industry productive and vigorous. We cannot by ourselves solve the enormous problem of sustaining support for basic research--only a renewed commitment to science in the national interest can do that. But we can get started. The work of the new growth economists is only the most recent reminder of how high the stakes are.