

Beyond the Endless Frontier: The Future of America's Academic Research Enterprise

The basic structure of today's academic research enterprise set out fifty years ago in the seminal report, *Science, the Endless Frontier*, produced by a post-war study group chaired by Vannevar Bush. The central theme of the document was that the nation's health, economy, and military security required continual deployment of new scientific knowledge and that the federal government was obligated to ensure basic scientific progress and the production of trained personnel in the national interest. It insisted that federal patronage was essential for the advancement of knowledge. It stressed a corollary principle--that the government had to preserve "freedom of inquiry," to recognize that scientific progress results from the "free play of free intellects, working on subjects of their own choice, in the manner dictated by their curiosity for explanation of the unknown."

The resulting partnership between the federal government and the nation's universities has had 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. This academic research enterprise has played a critical role in the conduct of more applied, mission-focused research in a host of areas including health care, agriculture, national defense, and economic development.

Unfortunately, in recent years the basic principles of this extraordinarily productive research partnership have begun to unravel, so much so that today this relationship is rapidly changing from a partnership to a procurement process. The government is increasingly shifting from being a partner with the university--a patron of basic research--to becoming a procurer of research, just like other goods and services. In a similar fashion, the university is shifting to the status of a contractor, regarded no differently from other government contractors in the private sector.

Surely the most ominous warning signs for academic research are the erosion, even breakdown, in the extraordinarily productive fifty-year partnership uniting government and universities. Scientists and universities are questioning whether they can depend on the stable and solid relationship they had come to trust and that has paid such enormous dividends in initiative, innovation, and creativity. It is truly perverse that the partnership that has been in large measure

responsible for our long undisputed national prosperity and security should be threatened at very moment when it has become most critical for our future.

There is a second transformation occurring driving changes in the government-university research partnership : that involving the paradigm of the research university itself. As one of civilization's most enduring institutions, the university has been extraordinary in its capacity to change and adapt to serve society. Far from being immutable, the university has changed over time and continues to do so today. A simple glance at the remarkable diversity of institutions comprising higher education in America demonstrates this evolution of the species.

There is an increasing sense among leaders of American higher education and on the part of our various constituencies that the 1990s will represent a period of significant change on the part of our universities if we are to respond to the challenges, opportunities, and responsibilities before us. A key element will be efforts to provide universities with the capacity to transform themselves into entirely new paradigms that are better able to serve a rapidly changing society and a profoundly changed world. Today, many are concerned about the rapidly increasing costs of quality education and research during a period of limited resources, the erosion of public trust and confidence in higher education, and the deterioration in the partnership between the research university and the federal government. However, our institutions will be affected even more profoundly by the powerful changes driving transformations in our society, including the increasing ethnic and cultural diversity of our people; the growing interdependence of nations; and the degree to which knowledge itself has become the key driving force in determining economic prosperity, national security, and social well-being.

The world and the structure of the academic research enterprise 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.