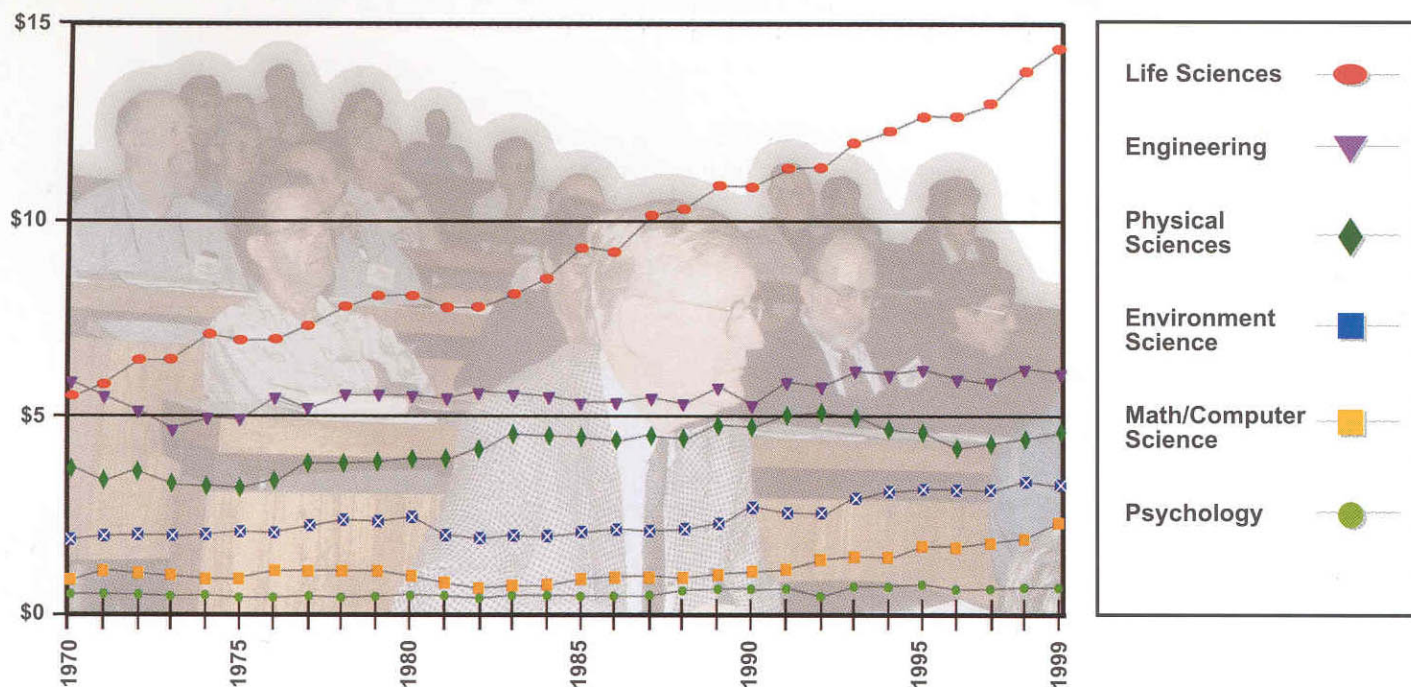


The United States: Learning in and from the Giant

Trends in Federal Research by Discipline, FY 1970-1999
Obligations in billions of constant FY 1999 dollars



The United States' scientific enterprise is remarkable in both size and quality. Its total R&D investment of over \$170 billion in 1995 represented almost one-half (about 44%) of the entire industrialized world's total. Its scientists produce about one-third of all the world's scientific journal articles, about the same as all of Western Europe combined. Despite all this, Prof. Robert Rosenzweig, former President of the Association of American Universities, pointed out that, unlike the U.K. or Israel, the U.S. has no deliberate national policy for education or academic science. Of the \$23.8 billion of U.S. academic research done in 1997, 60% was funded by the federal government; but the government's share was not allocated in any centralized, organized way. For example, the U.S. National Science Foundation has to directly compete, within its own Congressional appropriations bill, with veterans' benefits and housing programs (in contrast, Israel's Knesset routinely gives an annual block grant directly to the PBC).

One largely unintended result of America's fragmented funding process is that U.S. researchers have had to learn how to approach Congress and the public on their own terms, e.g., by explaining the benefits of their research and by substituting "merit review" for "peer review." This is more than semantics; it reflects the mutual acceptance of academic research funding as a calculated national investment in America's future. Conservative opposition to U.S. government funding for commercializable research guarantees that 30-40% of all government-funded civilian R&D is basic in character. In contrast, Prof. Thorsten Nybom, former Secretary of the Swedish Funding Council for Higher Education, reported that almost 75% of all Swedish federal R&D funding is for applied research, most related to the activities of five major Swedish companies. The Congress' continuing exceptional generosity to the NIH has shifted U.S. academic research funding heavily towards the Life Sciences (see figure).

The U.S. has over 3,000 highly diverse institutions of higher education, including about 100 research-intensive universities, but more than half of all federal academic research funds go to just 50 top institutions. In contrast, the Netherlands has a far flatter distribution. The recent spurt in U.S. prosperity has boosted federal academic research spending, but Rosenzweig noted that such peaks and valleys are typical, and that U.S. research universities are largely unprepared for the next downturn. Contrary to popular belief, internal funds (tuition, endowments, etc.) at U.S. universities have actually grown more (up from 10% to 20% of all R&D funding) than industrial funding (up from 3% to 7%) over the last two decades, so it is not clear what could take up the slack.

As for growing industrial support, Prof. David Litster, MIT's Vice President for R&D, believes that such relationships can be structured to prevent obvious abuses. At MIT such partnerships are long-term (5-10 years), moderate in size (about \$3 million per year), allow only short (30-60 day) publication delays, and follow normal MIT policies. Still, Rosenzweig is uneasy when individual companies can buy up the research output of entire university departments (as at Berkeley), limit their funding only to department staff, and choose (naturally) only those fields which already seem demonstrably "useful." As he put it, "U.S. research universities must now make some hard choices about what's up for sale, and what is not."