Federal Research Grants

Maintaining public accountability without inhibiting creative research

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Finding an appropriate working definition of accountability for public funds used to support basic research at universities is a matter of great importance. This topic currently is eliciting wide interest and kindling very strong reactions in concerned parties. In this article I will describe the necessity for both accountability and the freedom essential to creative research. Although I will focus on university research, many of the same issues arise in relation to other institutions performing research, development, demonstrations, training, or other services under federal grants.

Introduction

Few people, I believe, would question that science and technology have made basic contributions toward meeting societal needs. In almost every sector of our economy, almost every aspect of our modern lives, science and technology have major impacts. This was appropriately stated by President Carter in his Science and Technology Message to Congress on 27 March:

> We look to the fruits of science and technology to improve our health by curing illness and preventing disease and disability. We expect science and technology to find new sources of energy, to feed the world's growing population, to provide new tools for our national security, and to prevent unwise applications of science and technology. The health of our economy has been especially tied to science and technology; they have been key factors in generating growth, jobs, and productivity through innovation. Indeed, most of the great undertakings we face today as a nation have a scientific or technological component.

Whether short- or long-term in its effects, basic research is the fundamental seed for scientific and technological advancement. The importance of basic research has been recognized by the federal government, as shown by the following three trends:

1) From 1960 to 1978, federal spending for basic research has almost tripled (in constant 1972 dollars) from around $1 billion to approximately $2.8 billion.

2) During this time, the importance of the universities as performers of basic research has increased greatly. In 1958, universities performed 32 percent of all U.S. basic research. This figure rose to 52 percent by 1978.

3) Finally, in 1978 the universities depended on the government for 72 percent of total university support for basic research and, on the other hand, 54 percent of total federal funds spent on basic research was used to support basic research at universities.

It is thus apparent that the federal government and the universities have become very dependent on one another for the performance and support for our nation's basic research. However, there are signs of strain in this partnership. A report entitled *The State of Academic Science* (*1*) has recently found substantial anxiety in the research community over the future of this relationship. The National Science Board's *Science at the Bicentennial* (*2*) also revealed the growing tensions. Last November, Jerome Wiesner, president of the Massachusetts Institute of Technology, gave an address in which he expressed "grave concern that the basic federal-academic relationship . . . is floundering. . . . [I]t has begun to deteriorate and come apart so badly that we have reached a point of crisis that could see the effectiveness of this nation's major research universities seriously curtailed at a time when it sorely needs to be enhanced."

In recognition of the importance of these tensions, an independent National Commission on Research created in October 1978 is taking an in-depth look at the issues involved. A major point of contention and area of study of the commission is the determination of an appropriate operating definition of accountability. The fundamental dilemma here is how to achieve adequate accountability for public funds without imposing excessive controls, direction, and administrative burden on research grantees, which would inhibit freedom of intellectual inquiry and efficient performance of research. Although much concern has been expressed about this issue, at this time there is insufficient evidence to determine the magnitude of the problem.

As a first step toward improving the relationship between the federal government and the universities, there must be discussion and understanding between sponsors and performers. Each must recognize how the other operates, the degree of flexibility, the pressures and constraints, and so on. With this in mind, I will now briefly describe important attributes of the research process and then of the need for federal accountability, with particular emphasis on what accountability means in various contexts.

The Nature of Academic Research

There are several characteristics of university basic research which are relevant to a discussion of accountability and which I believe need to be understood. I would like to summarize some of those characteristics now to provide context for my remarks.

The pluralism so endemic to the way this country supports and performs science and technology is especially characteristic of research universities. Not only is each university an independent entity, but its research is performed in independent departments, which, in turn, are composed of individual, autonomous researchers. The structure and organization of this environment are generally nonhierarchical and tend to be loose and flexible with much autonomy of the individual parts.

The keystone of the research process, however, is the individual researcher or the generally small group of researchers who perform the work. The process of investigation itself, like the overall "climate," is characterized by a lack of hierarchy. The researcher conceives, di-

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rects, performs, and publishes his work, often in conjunction with graduate students, who are essentially practicing apprentices. He is his own director, his own boss. He has a heightened sense of self-reliance and autonomy, and this serves as crucial motivation for his work. As a consequence, a researcher will be particularly sensitive to any externally imposed constraints on his time and investigative effort.

In fact, such automony has come to be viewed by many scientists, as well as nonscientists, as necessary to scientific excellence. It has, however, served us well: our science and technology effort has been a prodigious success by any standards.

This situation has been strongly encouraged by the type of financial support the government has provided for basic research. Project grant funding began its development in various private foundations before World War II. After the war, it was adopted as a special type of government contract which recognized the need to avoid detailed and short-term political control of research. I will return to the unique status of grants in a moment. Peer review remains the primary system for selecting proposals to be funded. This system is an outgrowth of a fundamental type of accountability to which all scientific research is subjected: there is an intensive scrutiny that scientists aim at each other's work, a continual testing and retesting of experiments, ideas, and theories that is the rite of passage for all research. This type of scrutiny is the way scientists establish the reliability and supportability of their working methods and results. Peer review represents an institutionalized form of this and is essentially a *scientific* method of accounting for research, reviewing science on its own terms.

Despite recent criticism, it appears, in principle, to be the best way we know to determine which research most merits support. In general terms, peer review is the method by which the government is accountable to the public for its selection of science to support. However, there are other types of accountability which are integral to federal sponsorship of research.

The Government's Role in Accountability

This brings me to discussing the general characteristics of the government's position with regard to accountability. As we are all aware, the government, as the steward of public monies entrusted to it, acts as sponsor for activities which will enhance our quality of life. It is in the broadest terms accountable to the public for engaging high-quality services. Such accountability is very complex and involves several separate facets: the need to be responsible for selection of the performer, and to ensure that the appropriate procedures or methods are used by the performer, that the resulting service is of acceptable quality and meets a recognized need, and that the public funds are spent in accord with the terms of the contract.

I would like to emphasize that the basic intention of a research grant is to support, not to procure in the sense that one procures hardware. It inherently involves a long-term view, in that it supports and encourages effort which is characterized by its perennial and unspecific potential for social benefits, not by its ability to generate specific products or services. In the context of government support, scientific research is a particularly unique and esoteric endeavor. Its primary form of accountability—peer review—reflects this uniqueness. Peer review still appears to be the best method of accounting for the substance of scientific research, as opposed to other aspects, such as the finances.

Most of the controversy focuses primarily on financial accountability. Financial accountability is concerned with monitoring whether funds are spent for their intended, agreed upon purpose. The government carries a strong mandate from the public to ensure that public funds are spent as intended without diversion, waste, or fraud.

Recently, public pressure for accountability in government has increased significantly. This pressure can be attributed to several factors.

1) As continuing inflation makes people more aware of their personal budget limitations, more public attention is given to how tax dollars are spent. This is best reflected in initiatives to limit taxing authority and public expenditures.

2) There appears to be increasing public mistrust of large institutions. This is due in major part to exposures of carelessness and instances of outright fraud. This mistrust is not diminished by arguments that these instances may represent only a minor percentage of public expenditures.

3) There also has been increasing tightening of federal spending, which includes certain cuts in the budget. Consequently, there is greater competition for increasingly scarce funds.

4) Related to this budget tightening and competition over funds is an increasing degree of congressional oversight of federal programs.

This pressure for financial accountability applies to all programs of the government, in all instances where the government has stewardship for public funds. Universities are not different from other institutions that receive public funds—public money must be accounted for. Public pressure for fiscal accountability for university research is especially called for since the public understands little of what the research actually entails. Fiscal controls at least offer some degree of assurance that funds are being used as authorized on research.

In addition, as I previously mentioned in describing the research process, the other major form of accountability, that for the substance of the expenditure, is already taken out of the public domain by the peer review system, which is internal to the research process. It therefore stands to reason that the public requires increased fiscal accountability for university research in order to retain some check on public research expenditures.

This very real, and frankly legitimate, demand for strong accountability presents a major challenge to the university community, as well as to the federal government. Precise, uniformly categorized accounting systems may not be appropriate for university research, with its emphasis on individual autonomy. The key issue is how to ensure appropriate stewardship for funds spent in support of research, without imposing excessive controls, direction, and administrative burden on research grantees. It is in the best interests of both the government and the universities to guard against the imposition of excessive controls, which would restrict the research freedom and autonomy and thus affect the performance of research.

What the Federal Government and Universities Must Do

The federal government must continue to provide major support for basic research in both natural and social sciences and the engineering disciplines. Sponsors must recognize that the very nature of basic research is long-term and exploratory, with little or no assurance of predetermined positive results. While it is necessary to assure wise and accountable expenditure of public funds, we in the government should seek ways to fulfill this need without inhibiting free-

dom of intellectual inquiry and risk-taking.

I believe that the government should establish a long-term plan for investment in basic research. In addition, I believe that it is important to provide a stable base for funding from year to year. As longer-range plans are developed, Congress should also consider greater use of multiyear and advanced funding methods for basic research and other selected R & D efforts which require more than 1 year to complete. I stated these views in my testimony in April before the House Committee on Science and Technology.

I am pleased by the Carter Administration's support of basic research. James McIntyre, director of the Office of Management and Budget, and Frank Press, director of the Office of Science and Technology Policy, wrote a memorandum to the heads of departments and agencies last summer to advise them of the "need for providing an adequate level of basic research support" despite the constraints of budget ceilings. The letter stated, "It is the policy of this Administration to assure effective support of basic or long-term research, particularly to provide a better basis for decision-making or for dealing with long-term national problems."

We in the federal government, in regard to basic research, must understand that fiscal accountability is only a means of insuring that research is carried out. Such accountability is not an end in itself. With this in mind, the government needs to review how standards for accountability are affecting university research. We need to recognize the unique needs of the universities—that accounting standards developed by the government for nonacademic institutions may not be appropriate for uniform application to universities. Thus, accountability must be achieved in such a way as to minimize controls and time-consuming administrative procedures, which can detract from research. I might add that it may be constructive for the government to treat general health, safety, and equal employment opportunity regulations pertaining to universities in the same perspective—these regulations should be examined in light of their impacts on research and applied so that their adverse effects are minimized, while they meet the needs for which they are intended.

In administering grants for basic research, individual federal agencies must exercise sufficient oversight to ensure that the peer-review system is consistent, well managed, and fair, and that adequate records are kept of the review process. The agencies must also fulfill their responsibility for financial accountability and monitor grant expenditures to ensure that the funds are expended for the purposes intended.

On the university side, it seems that several things are needed. First, although I have to some degree emphasized the unique position of university research and the importance of government officials recognizing this, there is an equal need for university understanding of the government's role with respect to accountability. There must be cognizance of the general need for public accountability in our democracy, as well as the growing pressures for this and how such pressures affect governmental relations. In general, there is a need for adaptability to a changing context: simple advocacy or looking back on former times as a "paradise lost" will not serve this need.

Second, there is a need to sit down with federal officials in the attempt to forge greater mutual understanding. University officials and researchers should explain their own special requirements in light of the fact that they, like other performers under government sponsorship, are not unique to the point of requiring exemption from fiscal accountability. The intention must be mutual cooperation so that acceptable solutions to problems of accountability can be found. An important step in this direction has been taken by the National Commission on Research in its creation of a subcommittee concerned with this subject. This subcommittee is doing an extensive review of both government and university views on accountability, and I, along with members of my staff, have met with them and discussed some of the issues involved.

More specifically, university officials need to thoroughly appraise their present financial procedures to ensure compliance with existing federal requirements, as well as to present university views concerning proposed changes to these requirements.

Also, it might be helpful for university associations and professional societies to promote greater public understanding of the nature and importance of scientific research, and of the central role of autonomy in its continued excellence. Again, rather than stressing the uniqueness of university research, focusing on what it needs to operate optimally is needed.

What the General Accounting Office Is Doing in this Area

The General Accounting Office has a great interest in the issues related to basic research. Related work currently in progress, or being planned includes the following:

1) A review, in draft, of the adequacy of Health, Education, and Welfare audits of the 20 academic institutions that received the most federal support during fiscal year 1975, and for which HEW was assigned auditing responsibility. This federal support included funds for R & D as well as for facilities and equipment, fellowships and traineeships, and other general funding. A tentative conclusion is that some of the audits are not as effective and timely as they could be.

2) A review, in draft, of indirect costs of health research, how they are computed, and why they are increasing so rapidly. Data were obtained from the analysis of questionnaire responses from 444 federal grantees and from interviews at 14 grantee institutions. This review explains why indirect cost rates cannot be meaningfully compared among grantees and demonstrates inconsistencies in the principles and practices used to make indirect cost determinations.

3) A study, in progress, of research proposal review and monitoring of grants to universities by the National Science Foundation and the National Institutes of Health to determine how well the peer review system assesses scientific accountability and whether grant monitoring by NSF and NIH is effective. For this study, we will examine 75 grants.

4) A study, being planned, which will examine federal policies and institutional relationships affecting government-industry-university cooperation in the area of basic research. This study will include an examination of foreign experiences in this area.

In conclusion, there is a great challenge to all of us to find a means of ensuring accountability for money spent on research without choking off creativity. This challenge must be met by a collaborative effort between universities and the government to make certain that the U.S. capability for basic research is maintained.

References and Notes

1. B. L. R. Smith and J. J. Karlesky, *The State of Academic Science*, vol. 1, *Summary of Major Findings* (Change Magazine Press, New Rochelle, N.Y., 1977).
2. National Science Board, *Science at the Bicentennial: A Report from the Research Community* (NSB 76-1, Government Printing Office, Washington, D.C., 1976).