

INTRODUCTION

Some Skeptical  
Reflections on  
Research and  
Development

*Tibor R. Machan*

SHOULD GOVERNMENT be funding much of the science in a free society?

In the years since the Second World War, it has become commonplace to expect that most advanced scientific research will be funded by the federal government. Following that conflict's intensive scientific and technological demands and the federal government's efforts to meet them, most scholars concerned with research and development have approached their subject with the idea that government funding is and ought to be the norm.

Yet the U.S. government has not always funded research and development as it does now, and before the war there was little such funding. The exception was agricultural research, which—as the denizens of land-grant universities are wont to remind us—the federal government began subsidizing with the first Morrill Act in 1862.

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After the Second World War the defense establishment realized what a huge competitive advantage it had obtained by the advanced scientific work (code-breaking, computers for weapons targeting, bombs, planes) done at their behest before and during the war, and hoped to stimulate further innovation. This hope led to the Department of Defense's massive spending on research and development.

Early in the Truman administration, there was an argument that not all federal funding of research and development should be driven by the needs of the Department of Defense, and so the National Science Foundation was born. A similar argument, in the wake of the Soviet Union's launch of Sputnik, led to the establishment of the National Aeronautics and Space Administration and, later, the National Institutes of Health. Together, these organizations now plow billions into research and development each year, adding up to about one-third of all expenditure. Despite the large raw numbers, over the years the percentage of total research and development funding has actually been dropping, down from about two-thirds of the total in the 1960s. The trend will likely continue as the economy grows faster than government-funded research. Some government-sponsored research and development has doubtless been scientifically and technologically fruitful, producing a higher standard of living and a better-informed citizenry. The example most often cited is the work on data communications leading up to the Internet, originally developed by the Department of Defense and the National Science Foundation. The World Wide Web was born of research sponsored by European governments at CERN, the European Laboratory for Particle Physics. The first easily available web browser, Mosaic, was developed by the National Center for Supercomputing Applications, a spin-off of the National Science Foundation.

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Despite the undoubted usefulness of some of these expenditures, there remains the question of whether the funds were necessarily deployed in *the* best way. We know how the money has been spent by the government, but we don't know how it would have been spent had it remained in private hands. Might some other projects have served more valuable purposes? And could these alternative projects have been pursued by government, or is the private sector better equipped to discern and to pursue such purposes?

When it is noted, for example, that the Internet was made possible by government support, that sheer historical fact does not settle the debate by a long shot. Consider the following: The Defense Department's role in developing ARPANET, the forerunner to the Internet, was more as a customer than as an engineer creating something by design. It provided money for researchers doing early work on a decentralized computer network, but it didn't anticipate anything like the Internet we use today. Indeed, the essentially unplanned way in which the Internet developed is an example of the biologically informed models of growth and self-regulation that libertarians celebrate. It's also worth pointing out that the Internet's huge growth, both in terms of infrastructure and customers, came about due to commercial investment, not government financing.<sup>1</sup>

Without a market in which allocations can be made in obedience to the law of supply and demand, it is difficult or impossible to funnel resources efficiently with respect to actual human preferences and goals.<sup>2</sup> One of the insights of the late

1. Brian Doherty, "Cybersilly," review of *Cyberselfish*, by Paulina Borsook, *Reason* (August/September 2000): 68.

2. See, however, Terrence Kealey and Aram Rudenski, "Endogenous Growth Theory for Natural Scientists," *Nature Medicine* 4, no. 6 (September 1998): 995–99, and Terrence Kealey, *The Economic Laws of Scientific*

Nobel Laureate economist F. A. Hayek, and of his teacher, Ludwig von Mises, is that central planning is not so much undesirable as impossible. The signals that communicate what needs to be done (i.e., prices) are necessarily absent: for it is precisely the free play of supply and demand in the market which generates those signals. Central planners thus lack the feedback mechanism of the price system that enables market agents to figure out what needs to be produced, how much, and of how high a quality.

Market economies have problems enough when price mechanisms are merely hampered (through price controls mandating maximum or minimum prices). When market processes are eliminated altogether, central planners do not have even mangled price information to consult. The issue isn't whether what such planners dictate is important or worthwhile, but whether, absent the data about priorities conveyed through price signals created by freely acting individuals, determinations about what is socially important can even be made at all.

Consider the immense funds used to build massive accelerators to support experiments in the field of particle physics alone. No one can dispute that there is a value—to someone—in knowing what such research produces for any of the sciences receiving it, including particle physics. No one disputes the derivative values that may emerge from such expenditures, sometimes for decades, fueling the economy and satisfying many wants and needs. But if Hayek and Mises are right, it's far from certain that those monies could not have been spent better. As central planners make decisions about how the col-

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*Research* (London: Macmillan, 1996). These works argue that reasons exist to believe that the good works engendered by government funding of research and development could and would have been attained via the funding a laissez-faire approach would have produced.

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lective wealth—consisting mostly of taxes—should be spent, they need a set of priorities. But how to determine them?

In a socialist conception of social life the solution is simple: a theory of society's needs guides the allocation of resources. But since the needs of society are many, highly varied, and disparate—those of the individuals of whom the society is comprised—the supposed solution is just that, merely supposed. To solve the calculation problem, central planners require much more than their theory of collective need and must also determine individual needs, wants, wishes, and preferences. This determination cannot be made without knowing what members of society would have done had they been allowed to allocate their resources in terms suited to them. (In which case, why not just let them do that?) A price system is necessary, one that helps all the members of society communicate the degree of importance resources have. As Hayek put it, “It is more than a metaphor to describe the price system as telecommunications which enables individual producers to watch merely the movements of a few pointers, as an engineer might watch the hands of a few dials, in order to adjust their activities to changes of which they may never know more than is reflected in the price movement.”<sup>3</sup> It is the price system which makes possible the most accurate and extensive learning of what is needed in society.<sup>4</sup>

As with other arenas taken over by government, federally funded research and development is burdened by all the earmarks of lumbering nonprofit bureaucracies: repeated cost overruns, fuzziness about goals, inability to ensure that the purposes of the vested interests lobbying for funds are congru-

3. F. A. Hayek, *Individualism and Economic Order* (London: Routledge, 1949), 86–87.

4. I discuss the topic, from a normative perspective, in Tibor R. Machan, *Capitalism and Individualism* (New York: St. Martin's Press, 1990).

ent with valid public purposes, and so forth. All of these problems spawn massive misallocation of resources and lack of public confidence.

We can go further and point out that the monies are almost certainly misspent from the perspective of the individual taxpayer—who would choose to spend his money in any other way than on the specified public project if allowed to make the decision himself. Maybe he regards paying the rent or funding his children’s college education to be more important than the long-run benefits of particle accelerators, or is the director of a research and development department in a private company, able to invest more funds in his firm’s own research and development projects if the government did not take so much of the firm’s income for its own research and development.

Consider the nature of expropriation as such. Consider all the criminals who have stolen, burglarized, and embezzled from others. They have spent what they looted on various goods and services, to fulfill purposes which they themselves undoubtedly regard as important. The expenditures of these thugs and thieves clearly contribute to the economic well-being of those who produce goods and services that they purchase as well as others down the line who receive payments from these producers. That is what we see. What we don’t see is how those who rightfully owned the funds would have expended them had they not been stolen. The victims are not able to pay for their own projects. They are as deprived as are, indirectly, those from whom they would have purchased goods and services. The decisions made by the criminals, however much they may foster economic well-being for some, cannot rectify or compensate for the disruption of the life of the victim.

For those who prize the free society and are concerned about its vulnerability—with so many citizens losing sight of its importance and willing to sacrifice their liberty for illusory se-

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curity, order, progress, safety, and so forth—the government’s encroachment on any sphere of peaceful social life is ominous. A precedent is thereby established for even more extensive involvement in human affairs whenever an urgent need might be felt. The logical end of the road is the socialist disaster with wholesale central planning of the economy and banning of individual choices.

We know that, when free, most individuals are trustworthy enough to expend their own honestly earned funds with reasonable wisdom and prudence, to yield worthwhile results. Under freedom, the human capacity to reason is abetted by the discipline of the market, but we cannot know the specifics: how many corporations would be able to invest in research and development or even build research and development facilities of their own, nor the outcome of these efforts. In markets, the shape of things to come depends on the combined voluntary choices and serendipitous discoveries of millions of individuals. The results are unpredictable. But we can at least predict that what happens under freedom will more closely reflect what the members of society want than what happens under top-down central planning. After all, free people make their own spending decisions directly. Not all of their decisions will be for the best, but we’d be far better off under a regime of laissez-faire than under a regime of centrally planned research-by-expropriation.

Setting aside the moral issues, is there any other method of determining social needs than the free play of the market? Can ballots pinch-hit for prices? Another Nobel Laureate, Kenneth J. Arrow, has identified the paradox of democratic social choice,<sup>5</sup> arguing that democracy cannot yield a reliable and

5. Kenneth J. Arrow, *Social Choice and Individual Values*, 2d ed. (New Haven: Yale University Press, 1963).

consistent ranking of what is important in society. The continuous spectacle of group-eat-group political warfare in the welfare-state democracies would seem to support the observation.

What do all these considerations tell us about the success of public policy decisions, especially at the federal level, with respect to allocation of valued resources to research and development? What sort of research and development ought to be undertaken? How much of it? Where? When? To get a glimpse of the difficulties associated with this task, one could do worse than read James D. Savage, *Funding Science in America*.<sup>6</sup> Savage shows how unbelievably arbitrary and confused is the American federal government's allocation of tax funds to university research.

Consider the consequences of outright government control of most American universities and heavy government subsidies to most others. Would the effects of government research grants be the same if all universities were private, for-profit corporations? In other words, are management incentives in a university affected by grants in the same way that management incentives in corporations are affected by jockeying for government protections and subsidies? It would seem that the inability to rationally allocate government research funds could only compound the difficulty of choosing which kinds of teaching, research, and administration to fund that already afflicts most universities. The proliferation of barely accountable administrative positions is one symptom of the general bureaucratic malaise. Free-market economists have written remarkably little about the economics of universities, even though many of these economists themselves work for universities, and enjoy the protection of tenure. Yet it is obviously

6. James D. Savage, *Funding Science in America* (London: Cambridge University Press, 1999).

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not in the interests of those who want to promote a free society to treat academia as an unanalyzable exception—a social force inherently and irreducibly alien to the market.

Can public funding ever be rational? Clearly, the police and military arms of governments require their own share of research and development. Forensic and military science alone require a great deal of investment in order to meet the threats of crime and foreign aggression. In a society in which almost every realm of life is subject to democratic gerrymandering, Arrow's paradox and the calculation problem of Mises and Hayek must remain intrinsic to public processes. I have argued in previous work that if we clearly conceive the nature and boundaries of the public realm as it must be constituted in a free society, allocations of public support could be achieved rationally, free of Arrow's paradox. If the public domain is adequately circumscribed, there is no need to fight the same battles repeatedly about which projects genuinely count as public ones.<sup>7</sup> These purposes would be stable, resting on a definite goal that has legal standing, rather than on the shifting sands of democratic maneuvering. (Such legitimate state-funded research and development has implications for peaceful technology as well. Sharing these results would be natural in a free society, although exactly how they would be shared is another issue. For example, should government sell the findings or just give them away?

The contributors to this volume explore the implications of such problems and alternatives to the current heavy reliance on government support that research and development enjoys. Not all of the writers reach the same conclusions, but they all

7. Tibor R. Machan, "Rational Choice and Public Affairs," chap. 1 in *Private Rights and Public Illusions* (New Brunswick, N.J.: Transaction Books; Oakland, Calif.: Independent Institute, 1995).

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squarely confront the problems. And they all keep in mind that the answers we seek cannot be arrived at dogmatically, nor even, in many cases, be anticipated at all. The free society is not a closed system, and its various emerging elements may surprise us.

Just how research and development ought to be approached in a manner consistent with the principles of human liberty is a challenging question. This volume does not directly address whether research and development ought to be approached with such principles in mind except by reference to previous entries in this series that explicitly treat arguments for individual rights. It may be useful to note that although many people speculate on what the priorities of the society in which they live should be, a community that recognizes the significance of human individuality constitutionally affirms that no ranking of priorities for society can be achieved apart from the rankings possible to specific individuals.

Regardless of how enthusiastic some people may be about research and development, or the wilderness, or physical fitness or education, these are matters for people to pursue individually and of their own free will.