

Is it Time for Basic Research to Adopt a Profit Model?

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Addressing an “Innovation Deficit”

Basic research, also known as [pure or foundational research](#), is losing ground against the deeper pockets of the corporations and institutions that are directing their attention towards applied research. No mention is made of the basic research that provided the foundation upon which all of this applied research is being conducted. Instead, we continue to commercialize the process with research proposals that now include terms such as the following: opportunity costs, burn rates, return on investment (ROI), and even more important, return on shareholder value.

At the American Association for Advancement of Science conference in May 2014, discussions over a growing “innovation deficit” dominated many breakout sessions. With an across-the-board reduction in [federal R&D spending](#) of \$24 billion from 2010 to 2014, the only scientific agency not to lose funding was the National Institute of Science and Technology—presumably since science must hold on to the agency that determines how things should be measured. With Representative Lamar Smith’s *FIRST* (Frontiers in Innovation, Research, Science and Technology) bill on the horizon, threatening to cut an additional 40% from the National Science Foundation’s (NSF) budget without “written justification” presented to Congress for all grants, the future for basic research funding does indeed look bleak.

Setting More Practical Expectations

The attraction of [applied research](#) is easy to see. Proposing research built on prior data with anticipated results in 2–3 years is very easy to package for funding applications. The upfront investment is less, the availability of data reduces the risk of going too far out on a limb, and strict operational metrics can be applied to keep the budgets in line.

Basic research loses on several counts. Project timelines can extend to a decade or more, and working with a deliverable of increased knowledge is not as easy to package. If there aren’t guarantees of lucrative patents at the end of the road, the checkbooks don’t open quite so quickly. Billionaires such as Paul Allen and Larry Ellison have taken

steps to underwrite research institutes to embrace such projects, but even with investments in the hundreds of millions of dollars, the overall effect is only a drop in the bucket of a much larger funding need.

The Obama Administration's public commitment to the [BRAIN initiative](#) might be taken as evidence of a turning tide of favor towards basic research but the project is still in the early stages and is still at risk of de-funding for several years yet. Perhaps, if the coffers are so low, we could consider another approach. Requiring corporate and institutional funders to balance their research endeavors between applied and basic research projects is an achievable goal. Even a ratio of 1 basic project for every 4 or 5 applied projects (measured in dollars invested) would be a good start. No doubt there would be much bipartisan name-calling and aggressive lobbying at the first mention of such a proposal, but at least it would start a conversation.

A New Version of Salami Slicing

Without continued funding to study the fundamental questions of science, applied research projects will continue to focus on narrower niches with increasingly unrealistic expectations of delivery of marketable (and usually very profitable) products or treatments. Researchers seeking to publish will be faced with a new version of [salami-slicing](#). Rather than being penalized for parsing results from one research study out into multiple papers, the tables will be turned, and large research projects will be divided into ever smaller sub-projects to offer work for all the researchers scrambling for the opportunity.

A New “Brain Drain”

China's spending on [basic research](#) projects is estimated to have increased by 300% over the last decade. Part of that growth may be attributed to centralized control of foundational research, but the fact remains that the “brain drain” that brought so many of the world's researchers to the United States to take advantage of opportunities to participate in government-funded large-scale research projects may soon change direction.

The dominance of [corporate funding](#) doesn't seem to be ending anytime soon, so we must ask ourselves: which offers a better utilization of resources? Young researchers that worked extremely hard to build a career in developing our understanding of quantum mechanics, or those same researchers, seeing no future positions in that field, who put their math skills to a more lucrative use in developing algorithms for Wall Street, Netflix, or the next online dating site?

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