

Pielke's Perspective: Pure Science Ideal and Science Policy

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By Roger A. Pielke, Jr.



With apologies to [John Maynard Keynes](#), much of what occurs in discussions of science policy is in servitude to the ideas of some defunct scientist from quite a few years back. A fascinating workshop in Bonn, Germany, last month explored the deep historical currents that shape how we think today about the role of science in society.

The concepts that we use in science policy reflect historical debates about class, economics, and politics that exert continuing influence on how we think about the role of publicly supported research in society. Here I will describe some of what stood out for me among the impressive array of historical research presented at the conference workshop.

The notion of the “[pure science ideal](#)” has long been part of the history of science policy. It turns out that many of the stories still told today about “pure science” in history may actually be fables constructed to impart lessons. [Graeme Gooday of the University of Leeds](#) explained that, a century ago, scientists went to great lengths to construct narratives that reinterpreted applied science not as a unique endeavor but rather as built upon a necessary foundation of previously completed pure science discoveries. [Gooday writes that](#) such histories “colonize[d] ‘applied science’ and reconfigure[d] it as if it were not only a subordinate branch of ‘pure science’ but somehow – thanks to a considerable resort to amnesia – always had been.” This colonization was, of course, to create a future place for “pure science” in government budgets at a time when industry and government were developing a deeper appreciation for the value of research.

The effort to subsume applied science to pure science is more than a bit ironic. Robert Bud of the [Science Museum, London](#), has argued that the notion of “applied science” had been originally promoted in the mid-19th century as a way for academic scientists to argue for their relevance in an era of rapid industrialization. Scientists who wanted to secure public support for their work as well as freedom from oversight – a recurring theme – took to telling stories that privileged their contributions in a certain way, such as in “the certainly apocryphal story of the saintly Faraday telling the evil Prime Minister Gladstone that one day he would tax electricity.”

The decades-long debate between the planned science championed by John Desmond Bernal on the left and the anti-communist emphasis by Michael Polanyi on scientific freedom represented another front in the Cold War, one on which intellectual battles had already begun well before World War II. During much of the Cold War, the tension between planning and freedom was mitigated by the so-called linear model of science in society, in which basic research is the antecedent of applied research, which then leads to development and ultimately applications.

[The semantic importance of “basic research”](#) – a phrase that entered the English lexicon around 1920 but only became prominent following the 1945 publication of Vannevar Bush’s *Science: the Endless Frontier* – cannot be overstated. Its plasticity as a political symbol allowed scientists to believe that with public funding they were following the pure science ideal while politicians could simultaneously believe that they were making investments in direct response to societal needs. The underlying conceptualization tied the “colonized” history of pure science to demands for scientific utility, while integrating the larger political rhetorics of the left and the right.

It is no surprise, then, that the semantics of science policy, and the underlying conceptualizations, have traveled far in space and time. [Désirée Schauz of the Munich Center for the History of Science and Technology](#), and one of the workshop’s co-organizers, explained that under the Nazi regime an initial distinction was made between *Grundlagenforschung* (basic research) and *Zweckforschung* (goal-directed research). This distinction created a space for a degree of autonomy in Germany’s state-centered science. She explained that, “The metaphor of ‘basic’ did the trick: it conveyed that science would lay the foundation for all kinds of future benefits.”

After the war, according to [Gregor Lax of the University of Bielefeld](#), West Germany adopted a language highly consistent with that of the linear model: *Grundlagenforschung* (basic science) and *Anwendungsforschung* (applied science). According to [Manuel Schramm of the Technical University of Chemnitz](#), Communist East Germany went so far as to institutionalize its research programs explicitly under these concepts (and, I should add, in a framework surprisingly similar to that used by the US Department of Defense). The specific meanings of concepts that were shared far and wide differed according to their local context. However, it is a testament to the power of “basic research” as a political symbol that it could be adapted to science policies of the United States as well as those of East Germany.

[Alexei Kojevnikov, from the University of British Columbia](#), explained that “pure science” had no place in the early Soviet Union, where it was considered to be “a false consciousness of academics in contemporary bourgeois societies.” Later, after Sputnik, the Soviet Union also came to recognize a distinction between “basic” and “applied” research. Likewise, [Zuoyue Wang of California State Polytechnic University, Pomona](#), explained that: “For much of the history of the People’s Republic of China, debates over basic vs. applied research drove, animated, and sometimes masked the dynamics of its science policy – making and politics.” The concept of “fundamental research” did similar work in the UK, according to [Sabine Clarke of York University](#), where colonial development was offered as the justification for significant “fundamental research” investments from the British Treasury.

Incredibly, over the twentieth century, a period characterized by massive global conflicts, the conceptualization of science policy became universalized in important respects and perhaps even as a direct consequence of those conflicts. Over that period, we also saw the transnational community of scientists developing a shared political agenda in pursuit of public support quite apart from the big ideological battles of the times. To be sure, plenty of scientists were caught up in those battles as well. Today, the modern “science lobby” is a globalized community that crosses national borders and has created its own supranational institutions and practices.

Yet, in more recent times, the universalized language of science policy has begun to show weaknesses. Part of this no doubt has to do with the end of the Cold War and part with ever greater government demands for accountability from researchers, straining the old linear model whose claim to describing how the real world works has frequently been shown to be quite limited, although accepted for decades as a “[schizophrenia](#).”

Times may be changing. “Innovation,” according to [Benoît Godin of the University of Montreal](#), “is a counter-concept to science – and more particularly to basic research” and thus threatens to upset the old order. [Tim Flink, WZB Berlin Social Science Center](#), showed how the European Research Council has sought to redefine “basic research” with the new jargon of “frontier research.” Flink argues that such a semantic shift helps to overcome two deficits of legitimacy: one in

“basic research,” which no longer does the conceptual work it used to do at the boundary of science and the rest of society, and the other regarding a perceived democratic deficit of European governance institutions. He asks if the new notion of “frontier research” might represent a shift in science-policy practice.

Another of the workshop organizers, [David Kaldewey of the *Forum Internationale Wissenschaft*](#), asked a similar question. He is looking at the “grand challenges” discourse which in a short period has become ubiquitous in science-policy discussions. He asks “whether the grand challenges discourse has the potential to become a science policy master narrative for the 21st century?”

The historical science-policy stories that we tell and the concepts that we use are important to how scientists, politicians, and the public think about science policy today. As Gooday explained: “a particular narrative of past events [serves] to give primacy to certain agents and processes in explaining the historical ‘successes’ of science; moreover, they extrapolate from these to make political appeals to grant funding to those privileged in their accounts as the key agents of future scientific change.”

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