

“A New Economics of Science”
Dasgupta and David (1994)

The goal of this article is to describe the essential features of the social organization of Science (which is usually associated with academia) as compared to Technology (which is usually associated with private industry or military organizations). These domains are fundamentally distinct because of the goals they consider legitimate, their cultural norms of behavior (particularly around disclosure), and their rewards systems. An understanding of the particularities of Science is critical for any funder or government agency considering the appropriate policy to incentivize scientific research.

Science as an institution is characterized by three features: monitoring its critical inputs (research time or talent) is difficult or impossible; there are often large fixed costs and economies of scale involved; and discoveries can either be disclosed or concealed for private gain. The major cultural norm that has emerged as a result of these features is the importance of priority of discovery. Being first to make a discovery earns a researcher accolades and professional credibility. This improves efficiency in Science because it gives researchers an incentive both to work quickly and to quickly disclose their findings. Peer review of new discoveries to assign priority to the proper researcher also subjects new findings to effective scrutiny. However, the importance of priority may direct excessive attention to certain high-profile scientific research programmes, resulting in duplications of effort. Moreover, the ‘winner takes all’ system needs to be tempered by *some* rewards for follow-on discoveries, or else researchers will bear too much risk. University professors’ teaching compensation in a sense plays this role.

There are important complementarities between the institutions of Science and Technology. Because of Science’s norms of disclosure and peer evaluation, managers of private research and development labs have access not only to quality scientific work, but also to good information about the quality of academic researchers they may eventually hire.

However, the institutional features that make Science function as an organization can pose challenges when researchers attempt to transfer insights from open science to the world of industrial research and development. For example, the norm of speedy disclosure is at odds with the need to withhold information pending patent filings. Even trickier is the difficulty of exchanging the tacit knowledge of academic researchers, that is, the set of skills and techniques they have acquired experimentally and experientially, with their industry counterparts. There is little incentive for professionals in Science and Technology to exchange this type of tacit knowledge because they belong to different communities and are pursuing different goals (priority vs. profit). The different norms of Science and Technology have developed to ensure that each community functions well and meets its goals, but are not necessarily always conducive to collaboration across these two types of research communities.

Note from A. Jaffe: This article is valuable in laying out some fundamental conceptual issues. I believe that most observers would say that the distinctions drawn here between the Science and Technology realms have weakened since the article was written.