Tracing Value and Impact of Tacit Knowledge

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Can we better measure and understand the impact of tacit knowledge on encoding of new knowledge, some of which may be codified as patents? When breakthrough knowledge is initially discovered, it is often transmitted primarily through learning by doing, thus highly tacit and naturally excludable. While tacit knowledge close to discoveries is fundamental to development of highly important and valuable knowledge, patents and other forms of codified knowledge accelerate open application to commercial products in contrast to trade secrets that tend to remain unknown, at least prior to court cases to protect them.

Many paths to sharing or selling access to tacit knowledge have been documented. Though many different avenues to transmission exist, we focus on one type: the “corporate-academic” model. This model emphasizes attracting the best and brightest scientists, providing them with a commensurate increase in autonomy including initiation of bench-level collaborations with top university scientists in which valuable tacit knowledge is transferred in both directions. More generally, this basic model of knowledge flow holds whenever two organizations, or person, hold different protected knowledge content (tacit if natural excludible; codified if protected by law, patent or trade secret) which if put together yield significantly higher returns to both organizations/persons compared to alternative use. The following figure provides a sketch of our empirical results (figure taken from Zucker and Darby 2014):

![Figure 1: Basic Science Discoveries and Knowledge Impacts on High-Tech Firm Success](image)

We provide suggestive evidence that both firm and university scientists learn from these collaborations, e.g., both types of scientists experience sharply higher patenting rates once they have engaged in university-firm collaborations. We propose and test two indicators of adoption...
of the corporate-academic model, whether or not the firm has ever: (a) co-authored an article with a university scientist and (b) applied for (an eventually granted) patent with non-patent references, where these references are used importantly to cite scientific articles and other scientific materials. Both were robustly positive and statistically significant across four measures of U.S. high-tech firm success (publishing, patenting, obtaining venture capital, and going public) for six broad S&T areas (bio/chem/med, information technology, nanotechnology, semiconductors, other science, and other engineering). Star scientists publication as or with firm employees, SBIR grants received, and citation-weighted patents and articles all played comparatively supporting roles in the empirical estimates. We conclude that the most successful high-tech firms have adopted a strategy of operating near the edge of the scientific envelope where high levels of tacit knowledge provide substantial natural excludability reducing or preventing entry of imitators.