

EPISTEMOLOGY, HYPOTHESIS TESTING, AND PROGRESSIVE VALIDATION OF THE COMMERCIAL VIABILITY OF INNOVATIVE PRODUCTS

Abstract

This article draws on academia's unique knowledge and skills to further improve the technology commercialization (and new product development) process. Academics in the social sciences (e.g., management) are empiricists, which distinguishes us from venture capitalists, economic development professionals and corporate executives. Our training and experience allow us to provide a unique type of assistance to venture capitalists and economic development professionals when they are analyzing potential investments in different technologies. Accordingly, this article draws on our expertise as empiricists to offer insights to the practice of technology commercialization.

Technology commercialization is very resource intensive, so only the most attractive technology commercialization projects should receive funding. However, not all technology commercialization projects that look attractive on the surface actually have the potential to succeed in the market. There are countless roadblocks that doom commercialization projects—superior technologies emerge first, customer interest may never be developed, insoluble technology problems can be discovered, barriers to entry can keep superior technologies from getting a foothold in an industry, etc. Investors (private investors and public sector agencies) must therefore predict which technology commercialization projects have a good chance of succeeding and fund those projects instead of the projects that will reach insurmountable roadblocks. Unfortunately, those predictions have to be made based on partial information. It is not possible (nor would it be cost-effective) to collect complete information about a project's future viability prior to deciding whether to fund it. Only a sample of the relevant information about a project is collected and used in decision making.

Collecting a sample of information and generalizing to a larger class of phenomena is fundamental to empirical research, which positions academics to apply our capabilities to uniquely assist with technology commercialization investment decisions. That a commercialization project will be a market success is essentially a hypothesis. Data pertinent to that hypothesis is collected, and conclusions are reached as to the correctness of the hypothesis. Empiricists are experts at hypothesis testing. We strive to minimize Type I errors (concluding that the hypothesis is supported when it is actually false) and Type II errors (concluding that the hypothesis is not supported when it is actually true) in hypothesis testing. Similarly, the parties that decide whether or not to fund a commercialization project need to avoid concluding that a project is viable when it actually is not, and avoid concluding that a project is not viable when it actually is.

The principles, tools and techniques empiricists use in experimental design and hypothesis testing can be applied to technology commercialization funding decisions and can thereby inform the business community. Type I and Type II errors can be minimized through careful design of tests (experiments) to increase internal validity (the accuracy of conclusions about the sample data). Sampling and research design expertise can also be applied to improve external validity (the accuracy of predictions made about the population based on the findings from the sample).

Despite the clear linkages between (a) hypothesis testing and (b) the problem of predicting the viability of technology commercialization projects, little if any prior research has systematically compared the two.